AN ASSESSMENT OF HEALTH LITERACY IN

INDEPENDENT RURAL OLDER ADULTS

by

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DEDICATION

This scholarly project is dedicated to my husband, Scott, who has been a constant source of support and encouragement during the challenges of graduate school and life. When I felt it was impossible to continue and my struggles seemed overwhelming, his encouragement provided the strength to carry on. I am truly thankful for having him in my life and deeply appreciate his belief in me. I would also like to dedicate this project to my children who have made me stronger, better, and more fulfilled than I could have ever imagined. And finally, I would like to dedicate this project to my friends and family who helped with childcare, gave endless reassurance, and calmed my fears.

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ABSTRACT

Adequate health literacy can increase an older adult's ability to manage treatment options, promotes informed decisions concerning self-care, and can play an important part in improving public health while decreasing healthcare costs. The purpose of this project was to assess general health literacy and complementary and alternative medicine (CAM) health literacy in independent older rural adults, explore their use of CAM and over the counter (OTC) medications and their sources of information regarding these therapies, and determine if health literacy and CAM health literacy levels changed based on prior experience with the questionnaire used in this project. Two questionnaires were administered to 30 rural independent older adults approximately 4 weeks apart. Descriptive statistics, paired samples t tests, and correlations were utilized for analysis. To measure general health literacy, three measures were used: Newest Vital Sign (NVS), a single question, and PEPPI. It was found that participants in this project had confidence in their ability to communicate with their provider, had average to above average general health literacy, and on average, were moderately health literate about CAM. Participants were less likely to have used CAM in the last five years than previous research and they frequently referred to their provider for information regarding CAM therapies. The majority of the participants had used OTC medicines in the last year, and mainly received their information regarding OTC medicines from their healthcare provider. There was no change in the participants' scores on the instruments used in this project with repeated exposure to the questionnaires. The results of the Health Information-Seeking Instrument allowed for the exploration of participants' tendency to seek health information. The results suggested that those participants who had a higher average income were more likely to seek health information than those with a lower annual income. This study has implications that are important to patient care. Determining the health literacy of the patient is of utmost importance in order to provide quality care to older adults. As a provider, it is important to understand a patient's health literacy level and to monitor this level over time.

INTRODUCTION

People are living longer than ever, which may lead them to live with chronic illnesses necessitating constant management of the disease course and symptoms. Older adults in rural areas may have limited treatment choices due to inadequate access to health care, leading them to independently use alternative therapies, e.g. over-the-counter (OTC) medications, herbal therapies, vitamins and minerals, and complementary and alternative medicine (CAM) to treat their chronic illnesses (Nichols, Sullivan, Ide, Shreffler-Grant, & Weinert, 2005).

Complementary and alternative medicine (CAM) is readily available as it can be purchased OTC, does not require a prescription, and is not monitored by the Food and Drug Administration (FDA). Older adults may use CAM therapies without proper education putting them at risk for adverse reactions, interactions with current medications, and harmful effects. These issues can lead to increased healthcare costs, mortality and morbidity, and decreased health of the public (Baker, Wolf, Feinglass, Thompson, Gazmarian, & Huang, 2007; Nichols et al., 2005). Older adults also have been shown to have a lower health literacy than younger populations combined with a higher number of chronic illnesses putting them at an increased risk for adverse events related to CAM therapies (Kobayashi, Wardle, Wolf, & von Wanger, 2016; Centers for Disease Control and Prevention, 2009).

Background

Health Literacy

The Patient Protection and Affordable Care Act (PPACA) of 2010 defined health literacy as "the degree to which individuals have the capacity to obtain, communicate, process, and understand basic health information and services needed to make appropriate health decisions" (p. 518). Due to the PPACA's focus, improving health literacy has become a priority for those involved in healthcare policy, research, practice, and education. In the United States, 75 million adults have only basic or less than basic health literacy (Baker et al., 2007). Poor health literacy skills are frequently associated with poor self-care management, low use of preventive services, unhealthy behaviors, higher use of emergency room services, frequent hospitalizations, and poor health outcomes (Baker et al., 2007). Older age is strongly associated with limited health literacy (Kobayashi, Wardle, Wolf, & von Wanger, 2016). There are several different interventions available to help improve health literacy such as written, visual, and verbal information as well as educational programs and services. Specialized instruction on Internet usage and resources supplemented with written and visual aids has been shown to improve health literacy (Kim & Xie, 2017; Wali, Hudani, Wali, Mercer, & Grindrod, 2016). Rural residents have lower health literacy than urban residents, making it important to improve the health literacy of these populations. Lower health literacy may lead to poorer health behaviors and outcomes, such as difficulties with managing chronic diseases and higher healthcare costs (Zahnd, Scaife, & Francis, 2009).

Rural Residents

Rural residents have been shown to have health disparities in comparison to urban populations. A health disparity indicates that a population has significant differences in the overall rate of disease incidence, prevalence, morbidity, mortality, or survival rates in comparison to the health status of the general population (Hartley, 2004). These rural-urban disparities in health are linked to both preventable and chronic diseases and are also seen in the infrastructure and professional ability to address these needs. This disparity between rural and urban residents is associated with the tendency of rural residents to be older, more impoverished, less educated, and have more chronic illnesses. Other factors that contribute to the health disparity of rural residents are the need to travel large distances and lack of public transportation which leads to a decrease in access to preventive and primary care services (Gamm, Hutchison, Bellamy, & Dabney, 2002). This health disparity puts older rural adults at risk for adverse events when they use CAM therapies to treat their chronic illnesses without the proper knowledge or direction from their provider on how to use these therapies (Baker et al., 2007; Nichols et al., 2005).

Individuals living in rural areas are more likely to report their health as poor (Zahnd, Scaife, & Francis, 2009). In rural areas where there may be inadequate access to healthcare, treatment choices may be more limited, and decisions made more independently (Nichols et al., 2005). Despite limited evidence, the Quality Chasm report reveals that, for rural populations, quality of healthcare levels falls far short of what it should be (Institute of Medicine, 2005). Older rural adults are more independent, participate in more self-care, and have less access to allopathic care (Shreffler-Grant,

Hill, Weinert, Nichols, & Ide, 2007). Poorer health status, limited access to healthcare, reduced treatment choices, and a lower quality of healthcare may explain why rural adults choose CAM.

Complementary and Alternative Medicine

Complementary and alternative medicine (CAM) is a "group of diverse medical and healthcare systems, therapies, and products that are not presently considered to be part of conventional medicine" (Barnes, Bloom, & Nahin, 2008, p. 1). Therapies are termed complementary when they are utilized in addition to conventional medical care and alternative when they are used instead of conventional medical care (Mayo Clinic Staff, 2014). Complementary and alternative medicine (CAM) is becoming more common in today's health care. Evidence of when and how consumers decide to use CAM and whether they comply with instructions from CAM providers or product labels is limited. People who use CAM are more likely to have poorer health status and those with chronic illnesses are more likely to use CAM therapies (Astin, 1998; Barnes, Bloom, & Nahin, 2008; Eisenberg, Davis, Ettner, Appel, Wilkey, Rompay, & Kessler, 1998; Shreffler-Grant et al., 2007).

Although alternative therapies are commonly self-directed practices, many people do not understand the effects of these therapies (Nichols et al., 2005). Older adults have easy access to CAM, but do not necessarily have the proper education regarding CAM use. In a study by Shreffler-Grant, Weinert, Nichols, and Ide (2005), more than two-thirds of the participants reported chronic health conditions and more than one-third of

the respondents used self-directed complementary care practices, primarily based on information from friends and relatives, not healthcare professionals.

<u>Older Adults</u>

Use of CAM therapies in rural older adults may be due to frequent poor health, inconsistent use of care providers, difficulty affording healthcare, a tendency towards self-care, a belief that CAM is safe because its natural, and difficulty accessing healthcare providers. The 2014 Annual Report of the Department of Public Health and Human Services (2014) reported that, among individuals older than 65 years of age in the county where this project will be implemented, 4.3% could not afford to see a provider, 22.8% thought that their health was fair to poor, 17.3% felt that they had frequent poor health, 9.2% did not have a personal healthcare provider, and 17.7% had not had a routine check-up within the last year. Older adults are apt to use many prescriptions and OTC medications to treat their health problems. King and Pettigrew (2004) found that most older adults in their study added vitamins, herbs, or both to their daily medication plan.

Older adults who use CAM have a tendency towards self-care (Astin, 1998; Shreffler et al., 2007). There is a misconception that, because CAM therapies are natural, they are safer, even when these therapies are used with prescription drugs. Excessive and inappropriate medicine use occurs frequently among older adults and the concurrent use of CAM further complicates this problem (Agbabiaka, Wider, Watson, & Goodman, 2016; Shahrokh, Lukaszuk, & Prawitz, 2005).

Without routine checkups, there is no monitoring of medications, supplements, or other CAM therapies used by individuals. Even with individuals who have routine

checkups, the use of CAM may not be reported to the provider. Approximately 30% of the participants inform their physician that they use CAM (Arcury, Bell, Altizer, Grzywacz, Sandberg, & Quandt, 2013; Eisenberg et al., 1998). In addition, older adults have lower rates of Internet use compared to other adult age groups, higher rates of comorbidities and chronic diseases, less mobility and access to healthcare services, higher rates of use of healthcare services, limited literacy and declines in cognitive function, and decreases in financial resources (Centers for Disease Control and Prevention, 2009). These factors put older rural adults at an increased risk for poor health literacy, poor health outcomes, and adverse events.

Purpose Statement

The purpose of this project was to:

1) Assess the general health literacy and CAM health literacy among a group of independent older rural adults,

2) Explore older adults' use of CAM and OTC medications as well as their sources of information about these therapies, and

3) Determine if health literacy and CAM health literacy levels changed based on prior experience with the questionnaire used in this project.

This project focused on general health literacy and CAM health literacy among adults 55 years or older in one rural community in southeastern Montana and was a partial replication of a research study conducted by Shreffler-Grant, Nichols, Weinert, and Young. Although this was a partial replication of another study, an additional purpose of

this project was to determine which OTC medicines and CAM are used by older rural

adults in the chosen population, the reasons for using them, and their sources of

information regarding these therapies. The results of the current project revealed the

extent of CAM and OTC medicine use by older independent adults and provided

information that can be used for the education of this population.

<div align="center">Significance of the Clinical Practice Problem</div>

Barnes, Bloom, and Nahin (2008) reported that 38% of adults have used CAM in

the previous 12 months and, of those who have used CAM, 38% were over the age of 60.

With many older adults using CAM, there is a pressing need to cultivate health literacy

regarding these therapies. Complementary and alternative medicine (CAM) is readily

available, easy to purchase, and does not need a prescription in order to obtain it. Some of

these products have significant therapeutic value but can pose health risks if the

consumers do not understand the dose, expected effects, known side effects, and the

potential interactions with foods and other medications. In a study by Shreffler-Grant,

Weinert, and Nichols (2014), it was found that 58% of the participants over the age of 65

had used CAM in past and 52.4% of the participants had significant health problems. For

older adults, this is especially alarming since many of them are on multiple prescribed

medications for chronic illnesses that may interact with the CAM products or therapies

they choose. In a study regarding CAM use in rural adults over the age of 60, it was

found that 35.7% had used self-directed CAM for health promotion and had heard of the

CAM therapy through informal sources (Shreffler-Grant et al., 2005).

Although there is ample literature regarding older adults' incidence of inadequate health literacy and use of CAM, there is limited research regarding interventions for improving health literacy in older adults. When education using Internet resources was provided to adults older than 65, Crespo, Eberle, and Rossi (2011) reported increased confidence in ability to navigate these systems and an increased likelihood of using them. People with inadequate health literacy have fewer skills needed to navigate the healthcare system, which can result in decreased access to healthcare and increased healthcare costs for the individual. Healthcare is used more often by individuals with inadequate health literacy. These same individuals are also less likely to use preventive care and have an increased risk for hospitalization (Nielson-Bohlman, Panzer, & Kindig, 2004). Mortality rates for those with inadequate health literacy are over twice as high as those with adequate health literacy (Baker et al., 2007). Health literacy can increase an older adult's ability to manage treatment options, promote informed decisions concerning self-care, and can play an important part in improving public health while decreasing healthcare costs.

<u>Conceptual Model to Guide the Project</u>

The Conceptual Model of CAM Health Literacy (Shreffler-Grant, Nichols, Weinert, and Ide, 2013) was used to guide this scholarly project throughout its entirety (Figure 1). The MSU CAM Health Literacy Scale, which was used in this project, was developed based on the Conceptual Model of CAM Health Literacy.

The antecedents, the structural components, and the outcome are the three components of the MSU Conceptual Model of CAM Health Literacy. Antecedents are the characteristics that the individual brings to the activity. These include the environment, information-seeking propensity, health/illness trajectory, and general health literacy. The focus for the structural component of the model is CAM health literacy, or the information regarding CAM that is needed to make knowledgeable self-care decisions concerning health. The desired outcome of CAM health literacy is informed self-management of health, and those with increased CAM health literacy are more informed self-managers of their health (Shreffler-Grant, Nichols, Weinert, & Ide, 2013).

The main concept in the model is CAM health literacy. There are four major sub-concepts that individuals must know about in order to be CAM health literate. These sub-concepts are dose, effect, safety, and availability.

1. Dose is the amount of CAM used, which includes the frequency, strength/amount, duration, and route.

2. Effect is what the user expects the CAM to accomplish. There are three observed indicators of effect: effect evaluation, treatment replacement/addition, and tradeoffs.

3. Safety is the knowledge needed to reduce harm when using a CAM therapy. There are four indicators of safety. The first is empirical validation, which is an understanding of whether research has established therapeutic efficacy of a specific CAM. The second is the quality of the CAM used. This is the knowledge that reputable sources should be used to obtain CAM. The third

indicator of safety is the source of information. This is understanding that

information regarding CAM should be obtained from reputable and

professional sources. The last indicator of safety is risk. This indicator is

realization of any potential interactions of CAM therapies and the basic

symptoms of an adverse reaction.

4. Availability pertains to the concern of whether a certain CAM therapy would

be reasonably accessible. The indicators of availability are accessibility and

cost. Accessibility is determined by whether the CAM can be attained within a

practical distance from the individual. Cost refers to whether the CAM is

affordable to an individual (Shreffler-Grant, Nichols, Weinert, & Ide, 2013).

In this project, data were collected on the concepts of environment, information-seeking,

health/illness trajectory, general health literacy, and CAM health literacy. This model

influenced the project by providing a measure of CAM health literacy and assisted with

evaluating health literacy in decision-making regarding self-care of older rural adults.

The results from measures of environment, information-seeking, and health/illness

trajectory were used to identify implications for education of this population.
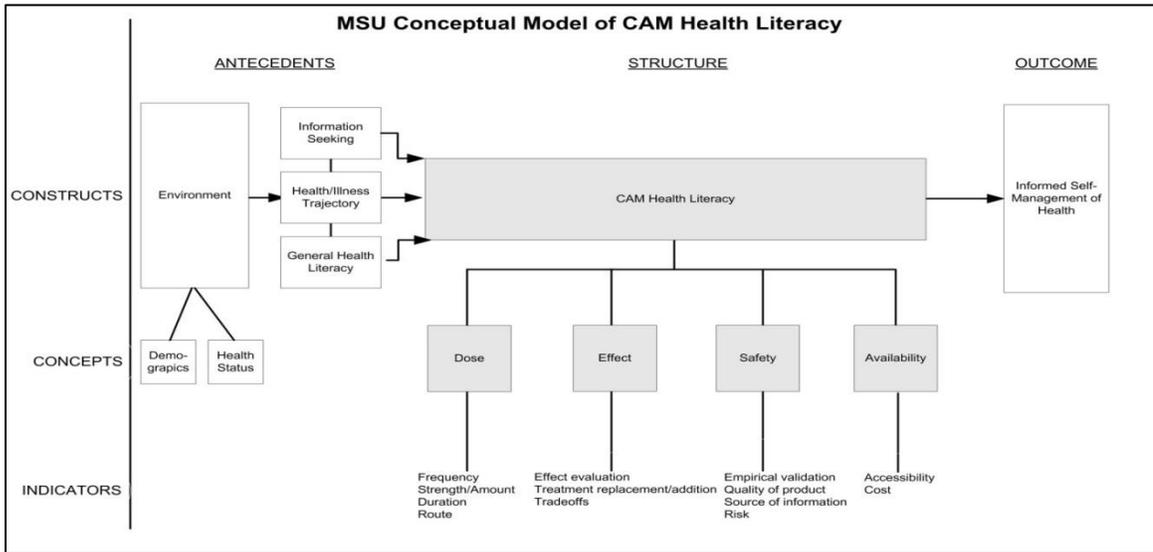
Figure 1. Montana State University (MSU) conceptual model of complementary and alternative medicine (CAM) health literacy (Shreffler-Grant, Nichols, Weinert, & Ide, 2013).

REVIEW OF THE LITERATURE

A review of literature was conducted to provide background for this project. The review includes a summary of publications on health literacy in older adults, efforts to improve health literacy, rural adults, information sources, and CAM. Multiple themes were noted in the literature: vulnerable populations at risk for low health literacy need to be identified; education is important in the improvement of health literacy; CAM has increased in use, but information obtained by consumers regarding CAM is often from nonprofessional sources; and limited studies have been conducted regarding strategies to improve health literacy in rural older adults. Although health literacy in older adults has been widely studied, literature is lacking in the strategies for improving health literacy in this population.

Health Literacy

"Health literacy is the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (Centers for Disease Control and Prevention, 2009, p. 1). Health literacy is a concern to everyone including those involved in health promotion, health protection, disease prevention and early screening, policy making, and healthcare maintenance (Nielson-Bohlman, Panzer, & Kindig, 2004).

Limited health literacy has been associated with increased health disparities, poor health outcomes, increased use of healthcare services, and safety issues such as medical and medication errors (Centers for Disease Control and Prevention, 2009). Due to the

importance of improving health literacy, the Department of Public Health and Human Services named improving health literacy as one of the 20 necessary actions to improve healthcare for all Americans (United States Department of Public Health and Human Services, 2013).

Researchers have shown that approximately a third of the population has marginal or inadequate health literacy (Wolf, Gazmararian, & Baker, 2005; Baker et al., 2007). Those with low health literacy are likely to experience multiple negative health consequences such as an increase in morbidity and mortality, less self-care health management skills, more medical and medication treatment errors, and an increase in hospitalizations and emergency room visits. (Baker et al., 2007; Nielson-Bohlman, Panzer, & Kindig, 2004; Safeer & Keenan, 2005; Wolf, Gazmararian, & Baker, 2005). In a study by Wolf, Gazmararian, and Baker (2005), inadequate health literacy was associated with worse health. The degree of associations between inadequate health literacy and poorer physical and mental health functioning and greater limitations in routine activities was comparable to having a diagnosis of cancer, more than twice that of having a diagnosis of heart failure, and equivalent to having a diagnosis of chronic obstructive pulmonary disease on physical function and mental health (Wolf, Gazmararian, & Baker, 2005).

There are several tools that have been used to detect levels of health literacy such as the Short Test of Functional Health Literacy in Adults (STOFHLA), Newest Vital Sign (NVS), Rapid Estimate of Adult Literacy in Medicine (REALM), and MSU CAM Health Literacy Scale (Chew, Bradley, & Boyko, 2004; Osborn, Weiss, Davis, Skripkauskas,

Rodrigue, Bass, & Wolf, 2007; Shreffler-Grant, Weinert, & Nichols, 2014). These tools can be used either singularly or in combination with other health literacy tools as a means of determining a person's health literacy level although STOFHLA is the most widely used.

<center>Health Literacy in Older Adults</center>

It has been documented that older adults have a high rate of inadequate health literacy (Chew, Bradley, & Boyko, 2004; Shreffler-Grant et al., 2007; Kim & Xie, 2017; Kobayashi et al., 2016; Delgado & Ruppar, 2017; Nielson-Bohlman, Panzer, & Kindig, 2004). In a study conducted by Chew, Bradley, and Boyko (2004), 332 people participated in completing surveys to determine health literacy. Two hundred seventy-two (81.9%) of the 332 participants were over the age of 46, with 41% of these being over the age of 65. Of the total participants, 12% were found to have less than adequate health literacy (Chew, Bradley, & Boyko, 2004). Kim and Xie (2017) conducted a systematic review involving 45 studies of various special populations and found that individuals with limited health literacy were predominant among those 65 years of age or older. In a metanalysis involving 29 studies, older age was strongly associated with limited health literacy when health literacy was measured by reading comprehension, reasoning, and numeracy skills (Kobayashi et al., 2016). In eight quantitative studies in a systematic review by Delgado and Ruppar (2017), inadequate health literacy was found in 87.2% of elderly Latinos. Nielson-Bohlman, Panzer, and Kindig (2004) reported that older age was strongly associated with lower health literacy, and this relationship

persisted despite adjusting for years of school completed and cognitive impairment. Wolf, Gazmararian, and Baker (2005) conducted a study regarding health literacy and functional health status of older adults. This study involved 2,923 participants with a mean age of 71. Of those who participated, 11.3% had marginal health literacy and 22.2% had inadequate health literacy and were more likely to be older, have a lower annual income, and fewer years of education (Wolf, Gazmararian, & Baker, 2005).

Baker, Wolf, Feinglass, Thompson, Gazmararian, and Huang (2007) found that the mean age for marginal health literacy was 74.1 years of age and for inadequate health literacy was 75.6 years of age. They reported that individuals with inadequate health literacy were older and had worse physical and mental health than individuals with adequate health literacy. They also determined that inadequate health literacy predicted all-cause mortality and cardiovascular death among community-dwelling elderly persons (Baker et al., 2007). According to Safeer and Keenan (2005), older patients have inadequate health literacy primarily because their reading and comprehension abilities are affected by their cognition as well as their vision and hearing status. Safeer and Keenan (2005) also indicated that older patients with low health literacy had difficulty accessing healthcare, following instructions from physician, and taking medications properly leading them to be hospitalized more than patients with adequate health literacy.

Older adults create high healthcare costs due to an increase in multiple chronic health issues. These healthcare costs increase even more when accompanied with limited health literacy. While older adults have the highest rates of limited health literacy, they also have the most challenging healthcare needs. Limited health literacy in older adults

may cause a situation in which those in the most need of healthcare may be the least able

to access and benefit from healthcare (Nielson-Bohlman, Panzer, & Kindig, 2004).

<u>Efforts to Improve Health Literacy</u>

Although there is abundant evidence that older adults are at risk for limited health

literacy, the types of interventions to improve health literacy among older adults and their

impact on health literacy are limited. Improved health literacy has been shown to improve

rates of adherence and improve knowledge of therapies and medicines in older adults

with low health literacy (Ward & Cohen, 2015; Wali et al., 2016; Kim & Xie, 2017;

Delgado & Ruppar, 2017; Young, Weinert, & Spring, 2012). In a pharmacist-delivered

intervention involving the provision of resources to participants to enhance adherence

and avoid medication-related preventable harm, a 14% improvement in adherence to

medications resulted (Ward & Cohen, 2015). The United States Department of Public

Health and Human Services (DPHHS) (2010) stated that it is the responsibility of health

professionals to communicate in plain language and provide accurate, easy-to-use

information about health issues to better able individuals to take action to protect and

promote their health and wellness. The DPPHS asserted that it is critical to improve

health literacy in order to achieve the objectives in *Healthy People 2020* and it is key to

success of the national health agenda (DPHHS, 2010).

Wali, Hudani, Wali, Mercer, and Grindrod (2016) conducted a systematic review

of 47 research publications in which interventions aimed at improving health literacy

were described. Of the 47 studies, significant improvement of knowledge following the

interventions was reported in 27 studies and improvement in adherence was reported in 19 studies following the interventions. The most common type of intervention was written information, followed by visual, verbal, educational programs/services, reminder systems, and medication label information (Wali et al., 2016).

In a systematic meta-review, Goebers, Brainard, Loke, Jansen, Salter, and Reijneveld, (2015) found the evidence on association between health literacy and adherence in older adults is relatively weak in the studies reviewed. They determined that adherence interventions are potentially effective in older adults with low levels of health literacy, but evidence regarding this is limited (Goebers, Brainard, Loke, Jansen, Salter, & Reineveld, 2015). In contrast, other investigators have found that health literacy and adherence is significantly associated. In a study involving 389 older adult participants, Mayo-Gamble and Mouton (2017) found that health literacy scores were significantly associated with medication adherence scores. Further, those with limited health literacy were more likely to forget to take medications and take less medication than prescribed than those who had adequate health literacy (Mayo-Gamble & Mouton, 2017).

Kim and Xie (2017) conducted a systematic review of the literature on online health service use. The content of the 74 publications they reviewed fell into five categories: evaluation of health-related content, development and evaluation of eHealth services, development and evaluation of health literacy measurement tools, interventions to improve health literacy, and online health-information-seeking behavior. In this review, researchers in nine intervention studies explored the effects of the use of websites or online apps on health literacy. Six education interventions, low-literacy adults, and

older adults were targeted, and positive effects were reported on knowledge about health conditions, use of computers and the Web, search skills, confidence in finding eHealth resources, and use of health information for their own healthcare. With three of the interventions, the use of websites and avatars were not effective in improving health literacy skills, even when websites were tailored to people with low health literacy (Kim & Xie, 2017).

Young, Weinert, and Spring (2012) implemented a program focused on improving health literacy, health outcomes, and wellbeing of rural elderly. The program involved four interventions consisting of introducing My Health Companion to track personal health information, self-care information for informal caregiving, a hands-on workshop guiding older adults on quality, web-based health information, and five monthly webinars on health-related information for older adults. The average age of participants was 67.2 years and all participants lived in a rural setting. After the program, the participants were found to have a significant increase in computer skills, confidence in searching for health information, and health knowledge (Young, Weinert, & Spring, 2012).

Shreffler-Grant, Weinert, Nichols, and Ide (2005) conducted a research study regarding CAM use in older rural adults. They found that 64.6% of participants indicated that they had at least one significant acute or chronic health problem and 32.3% of participants reported they had two or more significant health problems. Many participants (82.1%) used CAM and received their information regarding their CAM therapies from informal sources. Due to the findings of this study, the researchers recommend efforts

that are beneficial to older adults' health and finances, including an increase in efforts to educate rural adults regarding safe methods for meeting their health needs and ways to avoid deceitful sales practices (Shreffler-Grant et al., 2005). Nurses and providers in a rural environment are in a position to work with underserved rural populations by providing local health education programs, home visits, and screening/wellness services. The researchers also recommended that public- and/or community-health nurses educate clients regarding adverse interactions between drugs and herbs or vitamins as it is important in providing care to older adults, especially those with chronic health problems who may be taking multiple prescription medications (Shreffler-Grant et al., 2005).

Zwicker and Flumer (2012) developed a national guideline pertaining to reducing drug events in older adults. They advised that healthcare members assess abilities, limitations, and health literacy in self-administration of medications using appropriate tools and recognize that self-administration and nonadherence can induce adverse drug reactions (ADRs). According to recommendations in these guidelines, individuals should be given the necessary information and the opportunity to exercise a degree of control regarding healthcare decisions that affect them (Zwicker & Flumer, 2012). According the Zwicker & Flumer (2012):

- Individuals who are involved in decision-making, are less likely to make choices that may lead to ADRs,
- Education that is tailored to the age group and needs of the individual is important as well as educating the patient and caregiver about the benefits and risks and potential medication side effects, and

- Teaching safe medication management may be done using an interactive computer program (personal education program) designed for the learning styles and psychomotor skills of older adults to teach about potential drug interactions that can result from self-medication with alternative therapies.

<u>Rural Adults</u>

Health disparities among rural residents have been well documented (Gamm, Hutchison, Bellamy, & Dabney, 2002; Hartley, 2004; Institute of Medicine, 2005; Zahnd, Scaife, & Francis, 2009). Zahnd, Scaife, and Francis (2009) found that rural individuals (7.7%) are less likely to have higher than a high school diploma and more likely to live in poverty and have significantly lower proficient-health-literacy compared to urban residents (12.7%). There are rural-urban disparities with certain preventable or chronic diseases and in infrastructure or professional capacity to address health needs. Rural residents have a shortage of both specialists and primary care physicians. Aging, poverty, lack of insurance, travel distances, and lack of public transportation reduce access to preventive and primary care services resulting in more avoidable hospitalizations in rural areas (Gamm, Hutchison, Bellamy, & Dabney, 2002). Rural populations have low levels of health literacy which hinders efforts to involve rural residents in health-related activities. Rural areas also have barriers to accessing health-related information, such as lack of internet access and cost of these services (Institute of Medicine, 2005).

Rural areas are aging at a faster rate than urban areas (Jones, Kandel, & Parker, 2007; National Advisory Committee on Rural Health and Human Services, 2011; Zhand,

Scaife, & Francis, 2009). The fastest growing segment of the U.S. population is those 85 years of age and over and it is expected to increase from four million in 2000 to 21 million by 2050, with most of this growth in rural areas (National Advisory Committee on Rural Health and Human Services, 2011). In 2005, 50 million people lived in rural areas and 7.5 million of these rural residents were older than the age of 65 (Jones, Kandel, & Parker, 2007). Zahnd, Scaife, and Francis (2009) conducted a study in which 3,850 (21.3%) rural individuals and 14,260 urban individuals (78.7%) were sampled regarding health literacy. Almost 43% of the rural individuals were over 50 years of age compared to 34.3% of urban individuals.

According to Hartley (2004), rural areas rated poorly on 21 of 23 population health indicators that included health behaviors, morbidity, and mortality. Rural residents also smoke more, exercise less, have less nutritious diets, and are more likely to be obese (Hartley, 2004). Hartley (2004) reported that healthcare systems make a small contribution to health outcomes (approximately 3.5%) and that social status, income, education, occupation, and place of residence, such as living in a rural area, are significant determining factors of life expectancy and health.

<u>Information Sources Regarding Complementary and Alternative Medicine</u>

Multiple studies have evaluated how individuals receive their information regarding complementary and alternative therapies. Most participants receive their information from friends, relatives, word of mouth, informal sources, and the Internet (King & Pettigrew, 2004; Shreffler-Grant et al., 2005; Nichols et al., 2005; Young,

Weinert, & Spring, 2012). In a pilot study conducted by King and Pettigrew (2004), the most frequently cited sources of information were friends, family members, physicians, television, and radio. Information sources that were least used were nurses, drug stores, and health-food stores. Shreffler-Grant, Weinert, Nichols, and Ide (2005) found that 60% of participants in their study learned about self-directed CAM practices by word-of-mouth information, direct consumer marketing, and reading rather than information from healthcare professionals. Although older rural adults sometimes sought information from reliable sources like a physician or nurse practitioner, they did not always have an accurate understanding of the effects of the supplements they were taking. Almost all of the participants supplemented information from their primary care provider with material from additional services such as magazines, doctor books, television ads, health books, friends, people with similar issues, websites, friends and family, and the Internet (Nichols et al., 2005). The researchers also found that participants were skeptical about information they received from the television or in the mail, although some did obtain information from the internet, but this was most commonly provided by relatives (Nichols et al., 2005).

Zahnd, Scaiffe, and Francis (2009) found that there was little difference between rural and urban individuals regarding the sources they used to receive health information, which included newspapers, magazines, radio, TV, books, brochures, family, friends, and healthcare professionals. They did determine that rural residents received significantly less health information from the Internet (13%) than urban individuals (19%), and more

than half of rural residents reported that they did not receive any information from the

Internet (Zahnd, Scaiffe, and Francis, 2009).

Complementary and Alternative Medicine

Eisenberg, Davis, Ettner, Appel, Wilkey, Rompay, and Kessler (1998) defined

alternative medical therapies as interventions that are not taught widely in medical school

and are not generally available in United States hospitals. Complementary and alternative

medicine encompasses a wide range of therapies. Dietary supplements and vitamins are a

commonly used CAM therapy (Butler, Owen-Smith, DiIorio, Goodman, Liff, &

Steenland, 2011; Nichols et al., 2005; Shreffler-Grant, Weinert, Nichols, & Ide, 2005;

King & Pettigrew, 2017). Butler, Owen-Smith, DiIorio, Goodman, Liff, and Steenland

(2011) found that the most commonly used CAM was dietary supplements (75%)

followed by special food (36%), dietary changes (34%), physical therapy (29%), and

spiritual practices (23%). In a study conducted by Nichols, Sullivan, Ide, Shreffler-Grant,

and Weinert (2005), 36 participants were interviewed regarding their CAM use and it was

found that the participants primarily used vitamin and mineral supplements, some herbal

dietary supplements, aspirin, herbal creams, biofeedback, massage, chiropractic, and

podiatry with vitamins being cited most frequently. Shreffler-Grant, Weinert, Nichols,

and Ide (2005) studied 325 rural residents and, of those who used CAM, 82.1% saw

chiropractors. Other providers used by participants were physical therapists, massage

therapists, acupuncturists, and herbalists. The most frequently self-directed practices were

vitamins, minerals, herbs, and magnets (Shreffler-Grant, Weinert, Nichols, & Ide, 2005).

A pilot study by King and Pettigrew found the most commonly used CAM therapies (from order of most popular to least) were: prayer, vitamins, diet, massage, and medication. The least used therapies were acupuncture, hypnosis, yoga, homeopathy, touch therapies, and Tai Chi. The top four treatment categories for CAM use in the past year in a study conducted by Astin (1998) were chiropractic (15.7%), lifestyle diet (8.0%), exercise/movement (7.2%), and relaxation (6.9%). Eisenberg, Davis, Ettner, Appel, Wilkey, Rompay, and Kessler (1998) studied the prevalence of alternative medicine use between 1990 and 1997. The largest increase in CAM was in the use of herbal medicine, massage, megavitamins, self-help groups, folk remedies, energy healing, and homeopathy (Eisenberg et al., 1998).

Complementary and alternative therapies are increasingly being used as a substitute or in combination with conventional healthcare making them an important part of the American healthcare system. The use of at least one CAM therapy increased from 33.8% in 1990 to 42.1% in 1997. There was a 43.7% increase in total visits to an alternative medicine practitioner in 1997, which exceeded the total visits to all primary care physicians (Eisenberg et al., 1998). Forty-four percent of participants aged 50-64 years reported using CAM and 35% of adults over the age of 64 reported using CAM (Astin, 1998). In a study by Butler, Owen-Smith, DiIorio, Goodman, Liff, and Steenland (2011), 26.4% of rural individuals reported ever using CAM. Of 325 older adults in rural communities in Montana and North Dakota, 35.7% used self-directed CAM for health promotion and 45.2% had used some form of complementary care such as providers, self-directed practices, or both (Shreffler-Grant et al., 2005). In a pilot study by King and

Pettigrew (2004) of 60 participants, 80% used two or more CAM with the average of six CAMs used. In a study of CAM use among older rural women, Shreffler-Grant, Hill, Wienert, Nichols, and Ide found that 25.6% of women had used CAM in the recent past. Shreffler-Grant, Weinert, Nichols, and Ide (2005) reported that 17.5% of the participants in their study had used complementary providers and most pursued this care for chronic problems.

Evidence has shown that individuals are more likely to use CAM if they have poorer health status and have multiple chronic illnesses. Astin (1998) conducted a study on why patients use CAM and selected 1,035 individuals randomly to participate in mail surveys. Forty percent of the respondents reported using some form of alternative healthcare during the last 12 months. A significant predictor of alternative healthcare use was declining health status (Astin, 1998). In 2007, 40% of adults had used CAM in the last 12 months and CAM use was positively associated with the number of health conditions and number of doctor visits during the past year (Barnes, Bloom, & Nahin, 2008). An increasing pattern of alternative medicine use has been seen. The proportion of respondents with one or more medical conditions reporting using alternative therapy for at least one those conditions increased from 22.9% in 1990 to 33.7% in 1997 (Eisenberg et al., 1998). Shreffler-Grant, Hill, Weinert, Nichols, and Ide (2007), conducted a study on factors associated with CAM use in rural women. Of the 156 women participants, 40 reported they used CAM in the past year. For every additional year of education and each additional chronic illness, the probability of using CAM increased by 22% and 46% respectively.

Evidence is limited on whether people disclose their CAM use to their providers. In a study of men with prostate cancer in a rural setting by Butler, Owen-Smith, DiIorio, Goodman, Liff, and Steenland (2011), participants told their physicians about CAM use more often after treatment for prostate cancer (61%) than before (44%). They reported that they did not tell their providers about their CAM use because they were not asked about it and did not feel there was a reason to disclose their CAM use (Butler, Owen-Smith, DiIorio, Goodman, Liff, & Steenland, 2011). Arcury, Bell, Altizer, Grzywacz, Sandberg, and Quandt (2013) conducted a study involving interviews of 39 older adults and found that 23 (58.97%) used CAM and disclosed the use to their providers. Participants revealed their CAM use to their provider because they felt their healthcare providers were supportive of the use and they felt it was important to share all information with their providers. Some participants in this study withheld information about their use of CAM for several reasons: to seemingly test their providers knowledge of CAM therapies, perception that the provider had negative views of CAM, the physician did not ask about CAM use, CAM use would affect the providers income, CAM was not the providers business, and a need to protect cultural knowledge (Arcury et at., 2013).

There is very limited evidence about health literacy specific to CAM. O'Neill (2007) explored the CAM health literacy in Flathead, Montana. Ninety-two adults participated in the study, which contained a set of questions to measure CAM health literacy. CAM health literacy scores were considered high in 53.3% of the participants, although only one participant was able to identify any adverse effects associated with

CAM therapy (O'Neill, 2007). The Montana State University (MSU) CAM Health

Literacy Scale can be used to determine the health literacy in regard to CAM. Shreffler-

Grant, Weinert, and Nichols (2014) evaluated the MSU CAM Health Literacy Scale to

describe the initial psychometric evaluation of this scale. This 21-item instrument had a

Cronbach's alpha of 0.753 and 42.27% explained variance. Significant correlations were

found between the scale and measures of general health literacy (Shreffler-Grant,

Weinert, and Nichols, 2013).

METHODS

The purpose of this project was to assess general health literacy and CAM health literacy in independent older rural adults, explore their use of CAM and OTC medications and their sources of information regarding these therapies, and to determine if health literacy and CAM health literacy levels changed based on prior experience with the questionnaire used in this project. This was accomplished by administering two questionnaires at designated times to a group of independent rural adults.

Human Subjects Committee Approval

This project was a partial replication of a research study that had prior approval from the Montana State University Institutional Review Board (IRB). A Request for Modification of the prior approval for this project was submitted to IRB and was approved on September 15, 2017.

When recruiting potential participants for the project, the purpose of the project was explained and individuals were verbally informed of their right to refuse to participate, ability to skip any questions they did not wish to answer, assured of the confidentiality of all information, and that results were to be reported in group form. Their agreement to complete the questionnaires in this project constituted consent.

Population and Sample

Project Participants

Participants were recruited during January and February, 2018, from the Auxiliary of the local hospital association and from the Council of Aging in the project community. The eligibility criteria included: 55 years of age or older, living independently, able to read and write in English, and able to complete the questionnaire independently. The goal was to include at least 20 to 30 older rural adults who completed both questionnaires. This is the number of participants that was felt to be attainable given the time and resources available for this project. This target number was set due to estimates of the number of participants who were likely to be available at the Auxiliary meetings and the Council of Aging congregate lunches. Recruitment beyond these two groups was not feasible due to time and resource limitations.

Prior to administration of the questionnaires, the graduate student attended a hospital Auxiliary meeting. A local committee member and the graduate student met at the Council of Aging dining room in December, 2017, at the scheduled lunch time. While attending the lunch and the Auxiliary meeting, potential participants were given a presentation regarding the significance and purpose of this project, data collection procedures, and timeline for the project. Any questions by the attendees were answered at this time. Meeting with both the Auxiliary members and the attendees of the Council of Aging lunch, allowed the graduate student to both inform potential participants about the project and estimate the number of participants that would participate in this project.

Elements of the Setting

The purpose of the hospital Auxiliary is to promote good public relations, service the hospital and its patients, fundraise for the facility, and purchase needed equipment. The Council of Aging program functions to develop programs and activities that benefit senior citizens; provide opportunities for socialization for older adults; assist in referral services for health, housing, finances, and transportation; promote public relations and fiscal management; and seek out resources to provide services for older adults such as Meals on Wheels (Big Horn County, 2017). The purpose of this organization is to promote the development of thorough and coordinated services to meet the needs of older adults. To promote good nutrition and socialization for older adults, the Council on Aging supplies lunch at their facility daily and delivers lunches to those who are home-bound on Tuesdays and Thursdays.

Instrument and Data Collection Procedures

Data Collection

This project is a partial replication of a research study being conducted by Shreffler-Grant, Nichols, Weinert, and Young and was implemented in a county in southeastern Montana. In the related study, an initial survey was administered to independent rural seniors 55 years of age or older in selected communities. The researchers then implemented a skill building intervention over seven weeks with the same adults. The survey was administered prior to the skill building intervention for baseline health literacy and CAM health literacy levels directly after the last session and

four months after completion of the intervention to determine changes in health literacy and CAM health literacy and retention of information.

Modifications to the questionnaires for the project reported here were made to the background section of both the initial questionnaire and the second questionnaire. Questions were added that addressed use of over-the-counter medicines, reasons for use of CAM and OTC medicines, and sources of information regarding CAM and OTC medicines. In the background information, sections were removed that pertained to the skill building interventions since there was no intervention in this project.

Questionnaires were given to participants to complete at both the hospital Auxiliary and the Council of Aging at two different times approximately four weeks apart. The time of administration of the first questionnaire is referred to as Time 1 and the time of administration of the second questionnaire is referred to as Time 2.

After receiving verbal consent, the hospital association Auxiliary members and attendees of the congregate lunch at the Council of Aging were given the initial questionnaire. Participants were instructed that they could not take the questionnaire home and were asked to complete the questionnaire at that time. Participants were encouraged to complete the questionnaires individually and to refrain from assisting others in completing the questionnaire. Those members of the Auxiliary who participated were encouraged to return to the next scheduled meeting in approximately one month and complete the second questionnaire. Those who participated at the Council of Aging congregate lunch were encouraged to return in four weeks during lunch time to complete the second questionnaire. The graduate student received permission from each participant

to contact them to complete the second questionnaire if they did not attend the next scheduled meeting. Contact information for the participants was received on an attachment to the initial questionnaire that requested their name, phone number, and email address. The graduate student attempted to contact participants one week prior to administration of the second questionnaire to remind them of the date and time of the second questionnaire. A second questionnaire was given to participants who returned for the next scheduled Auxiliary meeting or congregate lunch at the Council of Aging four weeks later in the same format as the initial questionnaire. The graduate student noted which participants did not return and attempted to contact the missing participants in order to complete the second questionnaire via both email and phone. All members of the hospital Auxiliary completed both the initial and subsequent questionnaire. The graduate student also attended congregate lunches once a week for one additional month in an attempt to contact participants who had not completed the second questionnaire. Ultimately, four participants did not complete the second questionnaire.

Questionnaire Composition

Information-seeking, general health literacy, and CAM health literacy were assessed in each questionnaire. The measures of these concepts are consistent with the conceptual model, have adequate psychometric properties, and are short in length (see Table 1). The first questionnaire consisted of Perceived Efficacy in Patient-Physician Interactions (PEPPI), Health Information-Seeking, MSU CAM Health Literacy Scale, Newest Vital Sign, background information, and additional questions regarding the use of OTC and CAM therapies. The background information included an additional general

health literacy measure involving a single question regarding the participant's confidence

in filling out medical forms independently (Chew, Bradley, & Boyko, 2004). This section

included a question added for this project asking whether they have used CAM such as

herbs, dietary supplements, acupuncture, medication, or other therapies within the last

five years and, if so, which therapies. Additional questions regarding OTC and CAM

medications included where they received their information regarding these medications.

The second questionnaire followed the same format as the initial questionnaire but

without the demographic information and PEPPI (see Appendix A for the initial

questionnaire and Appendix B for the second questionnaire).

To promote rigor of the project, the tools have been evaluated for reliability and

validity. The PEPPI has a Cronbach's alphas ranging from 0.91 to 0.96 (Maly, Marshall,

DiMatteo, & Reuben, 2003). The Health Information-Seeking Screening has construct

and criterion validity (Maibach, Weber, Massett, Hancock, & Price, 2006). The Newest

Vital Sign has construct validity and Cronbach's alpha of 0.75–0.94 (Osborn et al., 2007).

The MSU CAM Health Literacy Scale has Cronbach's alphas that ranged from 0.75–

0.79. Convergent validity showed weak but significant correlations between the MSU

CAM Health Literacy Scale and measures of general health literacy (Shreffler-Grant,

Nichols, & Ide, 2014).

One instrument was used to evaluate the tendency for seeking health information.

The Health Information-Seeking instrument is a 10-item instrument to measure people's

orientation to their health, such as active versus passive and degree of independence in

making healthcare decisions. People are categorized into four segments based on results

from this instrument. These segments are independent actives, doctor-dependent actives, independent passives, and doctor-dependent passives (Maibach, Weber, Massett, Hancock, & Price, 2006).

To measure general health literacy, three instruments were used. They included the Newest Vital Sign, a single question, and PEPPI. The Newest Vital sign is an instrument with high sensitivity for identifying patients at risk for limited literacy (Osborn et al., 2007). The Newest Vital Sign instrument contains six questions that measure general health literacy. The participant is given a specifically designed, ice-cream nutrition label to review and questions are asked regarding the label. The participant's health-literacy level is based on the number of correct answers. A score of 0–1 suggests high likelihood (50% or greater) of limited literacy, score of 2–3 indicates the possibility of limited literacy, and score of 4–6 almost always indicates adequate literacy (Pfizer, 2016). The single question of "How confident are you in filling out medical forms by yourself?" has been demonstrated to detect inadequate health literacy (Chew, Bradley, & Boyko, 2004). Participants rated themselves as 1 "Not at all Confident," 2 "A Little Confident," 3 "Somewhat Confident," 4 "Quite Confident," and 5 "Extremely Confident." The minimum score that a participant can achieve is 1 and the highest score is 4. The PEPPI instrument is used to measure participants' confidence in their ability to effectively communicate information to their provider (Maly et al., 2003). The PEPPI includes 10 questions to measure participants' confidence in their ability to effectively communicate information to their provider. Participants are asked to rate their confidence from 1, meaning "Not at all Confident," to 5, meaning "Very Confident." The

possible range of scores on the PEPPI is 10 to 50 with higher scores indicating more confidence in effectively communicating information to providers.

With the MSU CAM Health Literacy Scale, higher scores indicate a greater level of CAM health literacy. This scale is a 21-item instrument which has four Likert-response choices that range from one signifying "Disagree Strongly" to four signifying "Agree Strongly." The MSU CAM Health Literacy scale has a weak, but significant, correlation to general health literacy (Shreffler-Grant, Weinert, & Nichols, 2014).

The second questionnaire administered at Time 2 was in the same measures as the initial questionnaire without the demographic questions, the PEPPI, and the additional questions added for this project. Both questionnaires used in this project are the same instruments used in the study by Shreffler-Grant, Nichols, Weinert, and Young with revisions mentioned above.

Table 1. Constructs, Measures, Number of Items, and Psychometric Properties

Model Constructs	Measures	Number of Items	Psychometric Properties of Each Measure
Demographics	Demographics—age, education, gender, etc.	8-10	N/A
Health Status	Self-rating of health	2	N/A
Information Seeking	Health Information Seeking Screening (Maibach, Weber, Massett, Hancock, & Price, 2006).	10	Construct & criterion validity
General Health Literacy	Newest Vital Sign (Osborn et al., 2007)	6	Construct validity Alpha 0.75–0.94

Table 1. Constructs, Measures, Number of Items, and Psychometric Properties Continued

General Health Literacy	Single item medical forms question (Chew, Bradley, & Boyko, 2004)	1	N/A
General Health Literacy	Perceived Efficacy in Patient-Physician Interactions Questionnaire (PEPPI) (Maly et al., 2003).	10	Alpha 0.91 to 0.96
CAM Health Literacy	MSU CAM Health Literacy Scale (Shreffler-Grant, Nichols, & Ide, 2014)	21	Convergent validity Alpha 0.75–0.79

Booklet

After completing the second questionnaire, each participant was given a booklet, "Talking with your Doctor: A Guide for Older People." It was anticipated that material resources such as this booklet will help older adults to continue to manage their health independently. This booklet assists older adults with:

- Selecting a provider

- Preparing for an appointment

- Important information to give providers such as symptoms, medications, personal habits, and voicing concerns

- Information like learning about medical tests, discussing diagnosis, finding out about medications, and understanding how to take medications

- How to make decisions with their provider

- Talking to a provider in special circumstances, such as when information is unclear, writing down as much information as possible, and informing a

primary care provider if the patient is seeing a specialist, needs surgery, or has

recently been seen in the emergency department

- Discussing sensitive subjects

- Involving family and friends (National Institute of Aging, 2016)

This booklet has multiple general resources as well as resources for advance directives,

alcohol consumption, assisted living, end-of-life care, driving and transportation,

exercise, grief, mourning and depression, HIV/AIDS, incontinence, medication, memory

problems, problems with family/caregiving, and sexuality. Worksheets are also provided

in the booklet for users to list ailments, changes in their health to discuss, and medication

information.

Data Analysis

The graduate student was responsible for data management and analysis that

included data entry into Statistical Program for the Social Sciences Version 22 (SPSS),

examining data for entry errors, and ensuring confidentiality. The data and results of the

project were kept confidential and secure. Descriptive statistics using frequencies were

used to identify potential data entry errors and errors were corrected as necessary.

Missing data in the instrument were handled in the following manner: If a participant

completed at least 80% of the questions in a tool, the mode for the group was computed

for the missing questions and the missing value on that question was replaced with the

mode. If a participant did not complete at least 80% of the questions in a tool, the missing

values were left blank and not replaced.

The MSU CAM Health Literacy Scale is scored using an assigned value of 1–4 for each response. For questions 2, 3, 5, 11, 15, 16, 18, 19, 20, and 21, the best response is "Agree Strongly" and the least correct response is "Disagree Strongly." The coding for these responses is 4 for "Agree Strongly," 3 for "Agree Somewhat Strongly," 2 for "Disagree Somewhat," and 1 for "Disagree Strongly." For questions 1, 4, 6, 7, 8, 9, 10, 12, 13, 14, and 17, the best response is "Disagree Strongly" and the least correct response is "Agree Strongly." The coding of these responses is 1 for "Agree Strongly," 2 for "Agree Somewhat," 3 for "Disagree Somewhat," and 4 for "Disagree Strongly" (Shreffler-Grant, Weinert, & Nichols, 2014). For the MSU CAM Health Literacy Scale, responses were recoded as appropriate.

The Health Information-Seeking instrument is scored using an assigned value of 1–5 for each response. For questions 3, 5, 6, 8, 9, and 10, the best response is "Strongly Agree" and the least correct response is "Strongly Disagree." The coding for these responses is 5 for "Strongly Agree" and 1 for "Strongly Disagree." For questions 1, 2, 4, and 7, the best response is "Strongly Disagree" and the least correct response is "Strongly Agree." The coding of these responses is 1 for "Strongly Agree" and 5 for "Strongly Disagree." The Health Information-Seeking instrument responses were recoded as appropriate.

Scores were then computed for all scales included in the Time 1 and Time 2 questionnaires. These scales included Health Information-Seeking screening, Newest Vital Sign, PEPPI, and the MSU CAM Health Literacy Scale. The Health Information-Seeking screening total scores were determined by totaling the values of the 10 items

after the appropriate questions were recoded. The Newest Vital Sign score was calculated

by totaling the number of correct answers to six questions. The scores for PEPPI were

determined by totaling values of the 10 items. The MSU CAM Health Literacy Scale

score was computed by totaling the values of the 21 items after questions were recoded.

Descriptive statistics were used to summarize the background, demographics, and

descriptive data. Descriptive statistics including mean, frequency, range, and mode were

computed as appropriate to the level of data. Paired samples t tests and correlations were

used to compare scores obtained for each general health literacy measure and CAM

health literacy measure at Time 1 and Time 2.

RESULTS

The purpose of this project was to assess the general health literacy and CAM health literacy among a group of independent older rural adults; explore older adults' use of CAM and OTC medications as well as their sources of information about these therapies; and determine if health literacy and CAM health literacy levels changed based on prior experience with the questionnaire used in this project. In this section, a description of the participants is provided by the results of this project which are organized according to the purpose statements.

Sample and Demographics

A total of 30 older rural independent adults from either the Auxiliary or the Council of Aging in Big Horn County completed the initial questionnaire (Time 1). The second questionnaire (Time 2) was completed by 26 participants in the target population. Of the 30 participants, 24 (82.8%) were women and five (17.2%) were men. The ages of the participants ranged from 58 to 94 years with the average age being 72 years. As can be seen in Table 2, the majority of the participants had a high school education (44.8% or n=13) with only one participant having had less than a high school education. The remaining participants (n=15) held various college degrees. Of the 28 participants who reported their race and ethnicity, 27 (96.4%) were white and one (3.6%) was Hispanic. Most of the participants (n=16, 55.2%) were married, one (3.4%) was divorced, one (3.4%) was separated, eight (27.6%) were widowed, two (6.9%) were single, and one (3.4%) was living with a partner. Four participants (13.8%) chose not to answer the

questions regarding income, two (6.9%) had an income of less than $15,000, nine (31%)

had an income between $15,000 and $35,000, eight (27.6%) had an income between

$35,000 and $55,000, two (6.9%) had an income between $55,000 and $75,000, and four

(13.8%) participants had an income greater than $75,000. The demographic information

about the 30 participants is summarized in Table 2.

Table 2. Participant Demographic Information

Demographic Category	Total Sample (N = 30)	Percentage %	Demographic Category	Total Sample (N = 30)	Percentage %
Gender			**Income**		
Female	24	82.8%	Less than $15,000	2	6.9%
Male	5	17.2%	$15,000 to $35,000	9	31.0%
Age			$35,000 to $55,000	8	27.6%
55–65	5	18.5%	$55,000 to $75,000	2	6.9%
66–75	13	48.1%	Over $75,000	4	13.8%
76–85	8	29.6%	Chose not to answer	4	13.8%
86–95	1	3.7%	**Marital Status**		
Education			Divorced	1	3.4%
Less than High School	1	3.4%	Separated	1	3.4%
High School	13	44.8%	Widowed	8	27.6%
Associate Degree	6	20.7%	Married	16	55.2%
Bachelor's Degree	7	24.1%	Single	2	6.9%
Master's Degree	2	6.9%	Living with Partner	1	3.4%
Race					
White	27	96.4%			
Hispanic	1	3.6%			

Note: Not all questions were answered by participants.

Participants were asked to rate their health status, compare their health to others

their age, and whether they had any significant health problems. None of the participants

felt that their health status was poor or excellent. Many of the participants (n=16, 53.3%)

felt that their health was good, 10 (33.3%) participants felt that their health was very

good, and only four (13.3%) felt that their health was fair. A little less than half (46.7%)

of the participants reported that they had significant health problems. When comparing

their health to others, three (10.7%) participants felt that their health was worse than their

peers, nine (32.1%) felt it was about the same, and 16 (57.1%) felt their health was better.

Of the participants who reported significant health problems, heart issues (n=6) was the

most common cause with diabetes being the second most common cause (See Table 4).

Table 3. Participants' Health Status

Background Information	Total Sample (N = 30)	Percentage %
Health Rating		
Poor	0	0.0%
Fair	4	13.3%
Good	16	53.3%
Very Good	10	33.3%
Excellent	0	0.0%
Significant Health Problems		
No	16	53.3%
Yes	14	46.7%
Health Compared to Others		
Worse	3	10.7%
About the Same	9	32.1%
Better	16	57.1%

Note: Not all questions were answered by participants.

Table 4. Participants' Health Problems

Health Problem	# of Participants
Heart	6
Arthritis	2
Skin	1
Respiratory	1
Autoimmune	2
Eye Issues	2
Diabetes	3
Weight	1

Table 4. Participants' Health Problems Continued

Health Problem	# of Participants
Musculoskeletal	1
Nerve	2
Thyroid	1
Migraines	1

Purpose Statements

Purpose Statement #1

"Assess general health literacy and CAM health literacy among a group of independent rural adults" was addressed using the following procedures: Individual scores on the general health literacy and CAM health literacy scales used at Time 1 and Time 2 were calculated and summarized.

To measure general health literacy, three measures were used. They included the Newest Vital Sign, a single question, and PEPPI. At Time 1, the average score for the Newest Vital Sign was 4.77 and scores ranged from 1 to 6. For Time 2, scores ranged from 0 to 6 with the average score being 4.55. The possible range of scores on the Newest Vital Sign is 0 to 6 with 0–1 indicating a high likelihood of limited health literacy, 2 to 3 indicating a possibility of limited health literacy, and 4 to 6 indicating adequate health literacy (Pfizer, 2016). The average scores (4.77 and 4.55) obtained in this project indicated adequate health literacy on average. Despite the average level of adequate health literacy, a few participants had scores that indicated a high likelihood of limited health literacy.

With the single health literacy question, "How confident are you in filling out medical forms by yourself?" participants rated themselves as 1 "Not at all Confident," 2

"A Little Confident," 3 "Somewhat Confident," 4 "Quite Confident," and 5 "Extremely

Confident." The minimum score that a participant could achieve was 1 and the highest

score was 4. The average score for this question at Time 1 was 3.83 and 3.75 at Time 2.

These results indicated that participants on average felt "Somewhat Confident" to "Quite

Confident" in filling out medical forms by themselves.

The PEPPI instrument consists of 10 questions to measure participants'

confidence in their ability to effectively communicate information to their provider.

Participants were asked to rate their confidence from 1, meaning "Not at all Confident,"

to 5, meaning "Very Confident." The possible range of scores on the PEPPI is 10 to 50

with higher scores indicating more confidence in effectively communicating information

to providers. The PEPPI scores of the participants ranged from 15 to 50 with the mean

being 39.2, indicating that most of the participants had a moderate level of confidence in

their ability to communicate with their providers.

To assess the participants' CAM health literacy, the MSU CAM Health Literacy

Scale was used. Answers to the 21 questions were rated as 1 "Agree Strongly," 2 "Agree

Somewhat," 3 "Disagree Somewhat," and 4 "Disagree Strongly." The possible range of

scores on the MSU CAM Health Literacy Scale is 21 to 84 and the scores in this project

ranged from 51 to 83 at Time 1, with the average score of 68.35. At Time 2, the scores

ranged from 51 to 81 with the average score of 69.56. These results indicated that

participants, on average, were moderately health literate about CAM.

This purpose was achieved using the three instruments described above. These

instruments were used to determine the participant's general health literacy. Most

participants had adequate health literacy, were confident in filling out medical forms, and had confidence in their ability to communicate with their providers. Based on the results of the MSU CAM Health Literacy Scale, the participants were moderately health literate about CAM. Most of this sample did not have inadequate general health literacy or CAM health literacy.

Purpose Statement #2

"Explore older adults' use of CAM and OTC medications as well as their sources of information about these therapies," was addressed using the following procedures: Individual responses to open-ended questions about use of OTC and CAM, reason for use, and source of information at Time 1 and Time 2 were categorized for entry into SPSS and summarized using descriptive statistics.

Of the 30 participants, 21 (70%) had not used CAM therapies in the last five years and only nine participants (30%) had. Of those who had recently used CAM therapies, nine participants used dietary supplements and two people specified that the supplements used were herbs. Participants used CAM for various reasons such as pain, arthritis, inflammation, fatigue, and to reduce triglycerides. The participants obtained information regarding CAM therapy from various sources. The most frequent source of information was from the participants' healthcare providers (n=8, 53.3%). The other two common sources of CAM therapy information were friends and family (n=3, 20%) and the Internet (n=2, 13.3%). This information is summarized in Table 5.

Table 5. CAM Use by Participants

CAM Use	Total Sample (N = 30)	Percentage %	CAM Use	Total Sample (N = 30)	Percentage %
Used			**Reason ***		
No	21	70%	Pain	1	
Yes	9	30%	Arthritis	1	
Types *			Inflammation	1	
Dietary Supplements	9		Fatigue	1	
Massage	1		Reduce Triglycerides	1	
Acupuncture	1		**Source of Information ***		
Oils	1		Health Care Provider	8	53.3%
Yoga	1		Friends/Family	3	20.0%
			Television	1	6.7%
			Other	1	6.7%

Note: Not all questions were answered by participants. *Participants could provide more than one answer

Eighty percent (n=24) of the participants had used OTC medicines in the last year and six (20%) of the participants had not. The participants' healthcare provider (n=19, 79.2%) was the most common source of information regarding OTC medicines, with friends and family (n=12, 50%) being the second most common. The healthcare provider and friends and family were also the two most common sources of information for CAM therapy. Unlike with CAM therapy, the television (n=5, 20.8%) was a more common source of information for OTC medicines than the Internet.

Table 6. OTC Use by Participants

OTC Use	Total Sample (N = 30)	Percentage %
OTC		
No	6	20.0%
Yes	24	80.0%
Source of Information *		
Health Care Provider	19	79.2%

Table 6. OTC Use by Participants Continued

OTC Use	Total Sample (N = 30)	Percentage %
Friends/Family	12	50.0%
Television	5	20.8%
Internet	2	8.3%
Other	4	16.7%

Note: Not all questions were answered by participants. *Participants could provide more than one answer

This purpose of exploring older adults' use of CAM and OTC medications and their sources of information was achieved using open-ended questions. Only a small number of participants in this project had recently used CAM therapies while most of the participants had used some form of OTC medicines. Participants commonly used their healthcare provider for sources of information regarding OTC medicines and CAM therapies; however, friends and family were also a frequent resource for information.

Purpose Statement #3

"Determine if health literacy and CAM health literacy levels changed based on prior experience with the questionnaires used in the project" was addressed using the following procedures: Paired samples t tests and correlations were used to compare summary scores obtained for two general health literacy measures (Newest Vital Sign and single question) and the CAM health literacy measure at Time 1 and Time 2.

When comparing the Newest Vital Sign scores between Time 1 and Time 2, the correlations procedure indicated that the scores were significantly correlated, r=.833, p=.000 (see Table 7). A paired samples t test was computed to compare the Newest Vital Sign scores at Time 1 and Time 2. There was no significant difference in scores for Time

1 (M=4.77, SD=1.54) and Time 2 (M=4.55, SD 1.84); t (21)=1.045, p=.308. As seen on

Figure 2, the differences in scores for participants between Time 1 and Time 2 (sd = 1.02)

show that most participants' scores did not change. Of the 22 participants who completed

the Newest Vital Sign at Time 1 and Time 2, 11 of the participants had no change in their

score (see Figure 2).

Table 7. Paired T Test and Correlations for Instruments

Instrument	n	Correlation (r)	p value for correlations (p)	t value	p value for t test
Newest Vital Sign	22	.833	.000	1.045	.308
Single Question	24	.785	.000	.000	1.000
MSU CAM Health Literacy	23	.704	.000	-1.511	.145
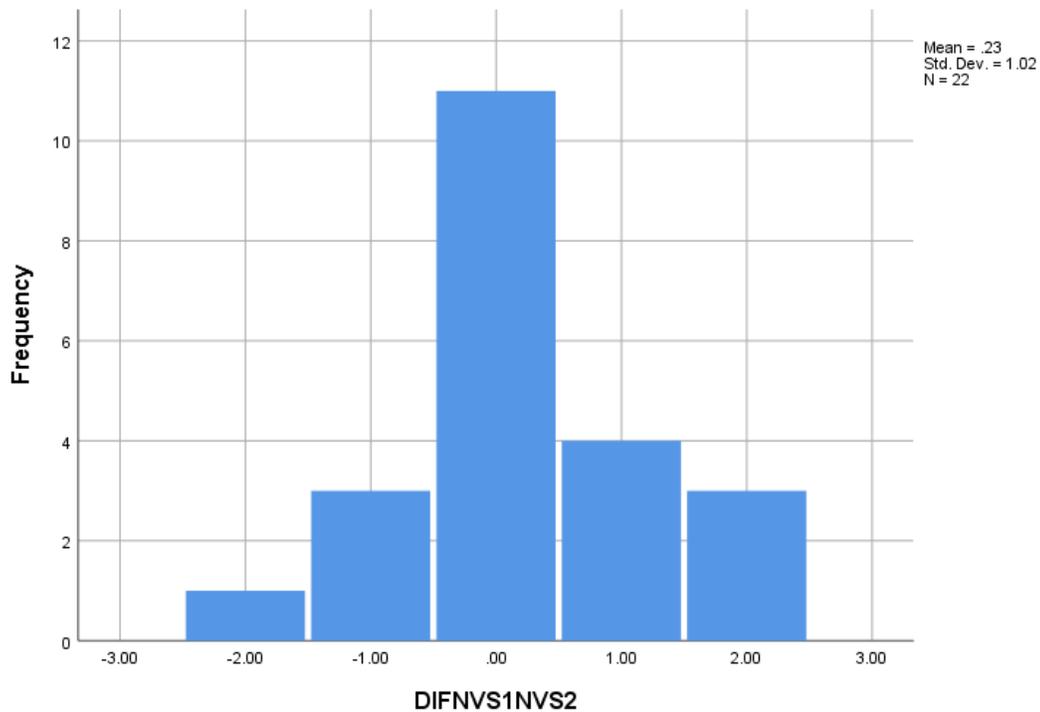
Figure 2. Distribution frequency of the Newest Vital Sign
Note: DIFNVS1NVS2 = Difference of scores of the Newest Vital Sign between Time 1 and Time 2

With the single question to measure general health literacy, scores between Time 1 and Time 2 were compared, and the correlations indicated that the scores were significantly correlated, r=.785, p=.000 (see Table 7). The paired t test was computed to compare scores at Time 1 and Time 2. There were no significant differences in scores between Time 1 (M=3.75, SD=1.03) and Time 2 (M=3.75, SD 1.42); t(23)=.000, p.1.000. When doing a distribution curve for the single question to measure general health literacy (see Figure 3), of the 24 participants who completed the question at both Time 1 and Time 2, 12 of the participants had no change in their confidence in filling out medical forms by themselves. Six of the participants had less confidence, while six participants had increased confidence.
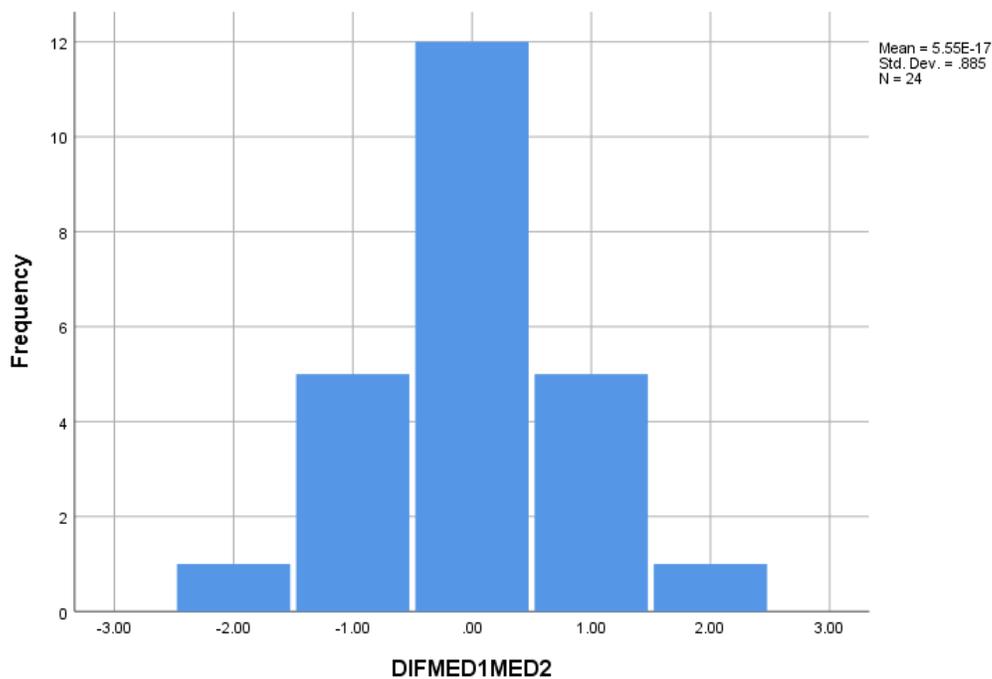
Figure 3. Distribution frequency for the single question
Note: DIFMED1MED2 = Difference of scores of the single question between Time 1 and Time 2.

When comparing the MSU CAM Health Literacy Scale between Time 1 and Time 2, the results of the correlations procedure indicated that the scores were significantly correlated, r=.704, p=.000 (see Table 7). A paired samples t test was computed to compare the MSU CAM Health Literacy Scale between Time 1 and Time 2. There was no significant difference in scores between Time 1 (M=68.39, SD 7.31) and Time 2 (M=70.26, SD 8.01); t(22)=-1.511, p=.145. When performing a distribution curve for the MSU CAM Health Literacy Scale, of the 23 participants who completed this scale at Time 1 and Time 2, there was one outlier (-20.0), in which a participant showed significant improvement of CAM health literacy between Time 1 and Time 2. Twelve (52%) total participants had improved scores between Time 1 and Time 2 while seven (30%) had worse scores. Four (17%) had scores that did not change between Time 1 and Time 2.
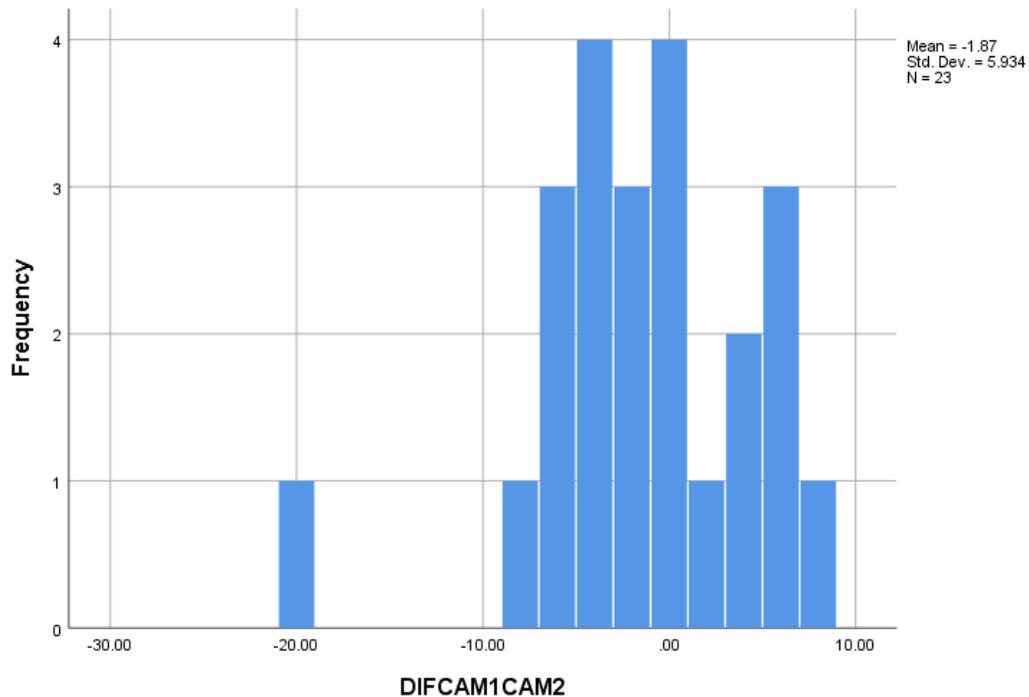
Figure 4. Distribution frequency for MSU CAM Health Literacy Scale
Note: DIFCAM1CAM2 = Difference of scores of the MSU CAM Health Literacy Scale
between Time 1 and Time 2.

The paired samples t tests and correlations were used to determine if health

literacy and CAM health literacy levels changed based on prior experience with the

questionnaires. There were no significant changes in the scores for the Newest Vital Sign,

single question, or the CAM Health Literacy Scale between Time 1 and Time 2,

indicating that participants' health literacy and CAM health literacy scores did not change

due to prior exposure to the instruments.

Health Information-Seeking Instrument

The results of the Health Information-Seeking Instrument allowed for the

exploration of participants' tendency to seek health information. On average, participants

with a higher total Health Information-Seeking score at Time 1 had a higher level of education and income. Participants who had a college education had an average Health Information-Seeking score of 37 while those with less than a college education had a slightly lower average score of 36.14. For participants who had an annual income of greater than $55,000, the average Health Information-Seeking score was 40 while those with an income of less than $55,000 had an average Health Information-Seeking score of 36. It appears that those participants who had a higher average income were more likely to seek health information than those who had a lower annual income.

When comparing the Health Information-Seeking scores between Time 1 and Time 2, the scores were significantly correlated, r=.764, p=.000. There was no significant difference in scores for Time 1 (M=36.62, SD 5.74) and Time 2 (M=37.19, p=5.46); t(25)=-.762, p=.453. As shown in Figure 5, there were no significant changes in scores on the Information-Seeking instrument between Time 1 and Time 2, indicating that participants were no more likely to seek health information one month after the initial questionnaire.
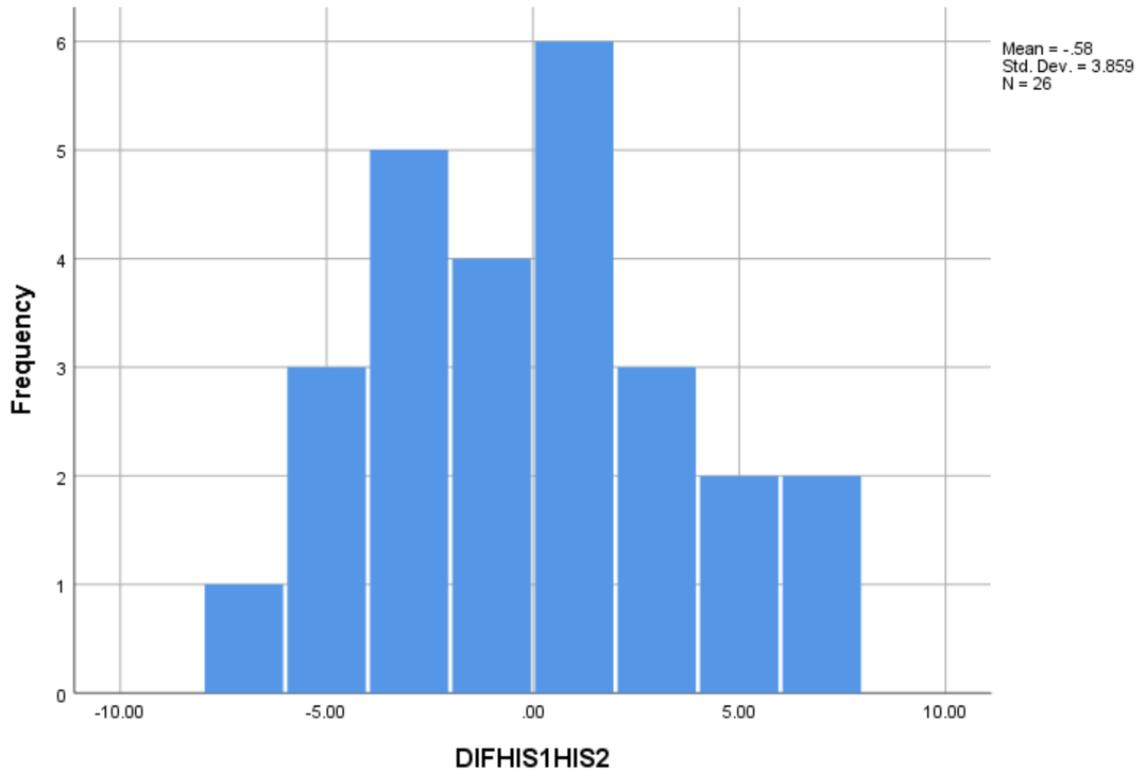
Figure 5. Distribution frequency for the Health Information-Seeking Instrument
Note: DIFHIS1HIS2 = Difference of scores of the Health Information-Seeking instrument between Time 1 and Time 2.

DISCUSSION

The purpose of this project was to assess the general health literacy and CAM health literacy among a group of independent older rural adults; explore older adults' use of CAM and OTC medications as well as their sources of information regarding therapies; and determine if health literacy and CAM health literacy levels changed based on prior experience with the questionnaire used in this project. This was accomplished by recruiting a group of independent older rural adults in southeastern Montana who completed questionnaires at two designated times.

Summary of Results

Older adults were recruited from the hospital Auxiliary and the Council of Aging to complete the project questionnaires at two different times approximately four weeks apart. Thirty older adults participated at Time 1 and 26 participated at Time 2. Demographics, health status, information-seeking, general health literacy, and CAM health literacy were assessed in one or both of the questionnaires.

Demographics

Many of the participants were women (n=24, 82.8%), with the mean age of 72 years, and most were white (n=27, 96.4%). Almost half of the participants had a high school education (n=13, 44.8%), were married (n=16, 55.2%), and had an income between $15,000 and $55,000 (n=17, 55.6%). Many of the participants (n=16, 53.5%) felt that their health status was good and a little less than half (46.7%) felt that they had

significant health problems, with heart issues being the most common health problem.

This finding is different from previous research, which showed that individuals living in

rural areas are more likely to report their health as poor (Zahnd, Scaife, & Francis, 2009).

It is unknown if this is due to this population having a higher health literacy score than

those in other studies of rural dwellers. In comparison to their peers, 57.1% reported that

their health was better than those of others their age. In a study by Wolf, Gazmararian,

and Baker (2005), inadequate health literacy was associated with worse health. In this

project the participants viewed their health as good and having adequate health literacy

may have contributed to a positive assessment of their health.

Purpose Statements

Purpose Statement #1, "Assess general health literacy and CAM health literacy

among a group of independent rural adults," was addressed using the following

procedures: Individual scores on the general health literacy and CAM health literacy

scales used at Time 1 and Time 2 were calculated and summarized.

To measure general health literacy, three measures were used: the Newest Vital

Sign, a single question, and PEPPI. The average score for the Newest Vital Sign at Time

1 (4.77) and Time 2 (4.55) indicates that, on average, the participants had adequate health

literacy. At Time 2, one participant had a score of 0 which indicated a high likelihood for

limited literacy. The average score on the single question, "How confident are you in

filling out medical forms by yourself?" showed that this group of participants were

"Somewhat Confident" to "Quite Confident" in filling out medical forms, indicating an

average general health literacy. The final instrument used to determine general health

literacy was PEPPI. The possible range of scores on the PEPPI is 10 to 50, with higher scores indicating more confidence in effectively communicating information to providers. The mean score for this population was 39.2 indicating that, on average, the participants had confidence in their ability to communicate with their providers. In this project the participants had an average to above average health literacy which is unlike other study findings that have documented that older adults have a high rate of inadequate health literacy (Chew, Bradley, & Boyko, 2004; Shreffler-Grant et al., 2007; Kim & Xie, 2017; Kobayashi et al., 2016; Delgado & Ruppar, 2017; Nielson-Bohlman, Panzer, & Kindig, 2004).

To assess CAM health literacy of the participants, the MSU CAM Health Literacy Scale was used. The possible range of scores is between 21 and 84, with the participants' average score at Time 1 of 68.35 and 69.56 at Time 2, indicating that participants, on average, were moderately health literate about CAM.

Purpose Statement #2, *"Explore older adults' use of CAM and OTC medications as well as their sources of information about these therapies,"* was addressed using the following procedures: Individual responses to open-ended questions about use of OTC and CAM, reason for use, and source of information at Time 1 and Time 2 were categorized into categories for entry into SPSS and summarized using descriptive statistics.

Only a few of the participants (n=9, 30%) had used CAM therapies in the last five years. Dietary supplements were the most common type of CAM therapy used and CAM therapy was used for a variety of reasons such as to treat pain, arthritis, inflammation,

fatigue, and to reduce triglycerides. This finding is similar to multiple studies which have shown that dietary supplements and vitamins are a commonly used CAM therapy (Butler, Owen-Smith, DiIorio, Goodman, Liff, & Steenland, 2011; Nichols et al., 2005; Shreffler-Grant, Weinert, Nichols, & Ide, 2005; King & Pettigrew, 2017). The study population used their provider most frequently for information regarding CAM therapy (n-8, 53.3%). This contradicts findings of previous research, such as in a study by Shreffler-Grant, Weinert, Nichols, and Ide (2005), in which more than two thirds of the participants who used self-directed complementary care practices primarily based their use on information from friends and relatives, not healthcare professionals. One-third (n=3) of the participants in this project who had used CAM therapies relied on friends and family as a source of information. Although this is less than reported in the literature it is not an insignificant number.

Most of the participants (n=24, 80%) in this project had used OTC medicines in the last year. This finding correlates with other research regarding OTC medicine use by older adults. Cybulski, Cybulski, Krajewska-Kulak, Orzechowska, and Cwalina (2018) found that over 40% of adults in their study took at least one OTC drug on a regular basis. As with CAM therapies, the majority of the participants received their information regarding OTC medicines from their healthcare provider (n=19, 79.2%). As discussed earlier, this does not correlate with previous research, which has shown that older adults primarily receive their information from friends and family. In other research, most participants receive their information from friends, relatives, word of mouth, informal

sources, and the Internet (King & Pettigrew, 2004; Shreffler-Grant et al., 2005; Nichols et al., 2005; Young, Weinert, & Spring, 2012).

Purpose Statement #3, "Determine if health literacy and CAM health literacy levels changed based on prior experience with the questionnaires used in the project," was addressed using the following procedures: Paired samples t tests and correlations were used to compare summary scores obtained for each general health literacy measure and CAM health literacy measure at Time 1 and Time 2.

Since there was no intervention in this study, it was expected that there would be no change in scores between administration of the first questionnaire and the second. The Newest Vital Sign, single question, MSU CAM Health Literacy Scale, and Information-Seeking Instrument had scores that were significantly correlated between Time 1 and Time 2 showing that there was no significant change with each administration of the questionnaire.

Limitations

This project had potential limitations such as a small sample size, reliance on self-reporting by participants, and participant bias. Due to the small sample size, there may be limited ability to generalize the results. The sample was from one rural county, limiting generalizability. Due the participants self-reporting, they may have guessed at answers or under- or over-reported their use of CAM therapies and OTC medicines. They may also have over- or under-reported their health status. Another limitation is that this project did not have an intervention to address health literacy issues other than the booklet, "Talking

with your Doctor: A Guide for Older People." If a participant had limited health literacy skills, they may not have benefited from the booklet that was given to them. A final limitation was that the graduate student was unable to locate four of the participants to ask that they complete the second questionnaire.

<div align="center">Implications</div>

Practice Implications for Advanced Practice

The results of this project have implications for both nurses and other healthcare providers. As an advanced practice registered nurse (APRN), it is important to assess health literacy when evaluating older adults. This assessment should not be done as a one-time assessment, but as part of an ongoing evaluation. An older adult's health literacy may change when health or cognitive status change, thus it cannot be assessed once and not reevaluated when caring for older adults. Despite the average levels of adequate health literacy among participants in this project, there were a few who had scores indicating inadequate health literacy. As mentioned in the limitations section, a booklet was distributed to help participants communicate with providers, but no other follow up was done in this project for those with health literacy limitations. An important implication of this study is the importance of identifying individuals with inadequate health literacy who would benefit from additional resources and an evaluation from their provider, which can assist them in navigating the healthcare system more effectively and efficiently.

Evidence is limited on whether people disclose their CAM use to their providers.

Due to the increasing use of CAM therapies and OTC medicines, it is important for

providers to determine a patient's source of health information as well as provide safe

and understandable resources for patients. In a study by Butler, Owen-Smith, DiIorio,

Goodman, Liff, and Steenland (2011), participants reported that they did not tell their

providers about their CAM use because they were not asked about it and they did not feel

there was a reason to disclose their CAM use. Arcury, Bell, Altizer, Grzywacz, Sandberg,

and Quandt (2013) conducted a study in which they found that 58.97% used CAM and

disclosed the use to their providers. Participants revealed their CAM use to their provider

because they felt their healthcare providers were supportive of the use and they felt it was

important to share all information with their providers. Reasons for withholding

information about their use of CAM included:

- to test their provider's knowledge of CAM therapies,

- perception that the provider had negative views of CAM,

- the physician did not ask about CAM use, perception that CAM use would

  affect the provider's income, and

- CAM was not the provider's business, and a need to protect cultural

  knowledge (Arcury et at., 2013).

At each visit, older adults should be asked about not only OTC medicines, but any CAM

therapies they may be using, why they are using them, if they feel the medicines or

therapies are helping them, and how they received their information regarding these

therapies. Individuals need to know the importance of discussing these therapies with their providers to avoid potentially adverse events.

The United States Department of Public Health and Human Services (DPHHS) (2010) stated that it is the responsibility of health professionals to communicate in plain language, and provide accurate, easy-to-use information about health issues to help individuals to take action to protect and promote their health and wellness. For older adults with low health literacy, interventions can be provided, such as skill building sessions that focus on health literacy and CAM, communication with healthcare professionals, essential CAM knowledge, and health-information-seeking skills to improve their health literacy. Tools such as My Health Companion©, which is a skill building aid to help participants better manage their health, may be used (Weinert, Cudney, & Kinion, 2010). A busy practice schedule may make it difficult for a provider to conduct a health literacy intervention. It is essential that APRNs or other providers, at a minimum, assess their clients' health literacy level and adapt all health communications to the client's health literacy level.

Many older adults take OTC medicines. Although most of the participants in this project received information regarding their OTC medications from their provider, it is important that providers discuss the use of OTC medicines with all their patients. Providers should stress the importance of consulting their provider or pharmacist before using any OTC medications. Also, it is paramount that nurses and providers compile a thorough prescription, OTC, and CAM therapy history with their older adult clients to identify risk factors for serious interactions. Another implication of this study is the

importance of education with older adults of the potential adverse interactions of CAM therapy and OTC medicines. This is especially important for those with chronic health problems who tend to take multiple medications.

Implications for Research and Scholarly Projects

Limited research is available that focuses on CAM health literacy and the use of OTC medicine by older adults. Research studies are needed to better understand health literacy related to CAM therapy use as well as interventions to increase health literacy and CAM health literacy in older adults. A wider reaching study regarding CAM and OTC medicine use should be conducted to include a larger group of elderly people in order to determine if the results of this project are generalizable. Replicating this project in another rural community or urban area can assist in determining if the results of this project are similar in other communities. The project could also be replicated with an intervention to establish which interventions are effective in increasing health literacy among older adults. Additional research addressing CAM therapy use and OTC medicine use, reasons for use, source of information, and types of therapies and medicines used could help expand the knowledge base, allowing providers to give informed quality care to their patients.

Conclusion

This project addressed three purposes: determined the general health literacy and CAM health literacy in independent older rural adults, explored their use of CAM and OTC medications and their sources of information regarding these therapies, and

determined whether health literacy and CAM health literacy levels changed based on prior experience with the questionnaire used. It was found that participants in this project had confidence in their ability to communicate with their provider, had an average to above average general health literacy, and participants, on average, were moderately health literate about CAM. These findings are inconsistent with previous findings where rural older adults were found to have both inadequate health literacy and CAM health literacy.

Participants were less likely to have used CAM in the last five years than previous research, possibly due to having less access to CAM therapies. Participants most frequently referred to their provider for information regarding CAM therapy, contradicting findings of previous research that found that friends and family were the most common source of information. The majority of the participants in this project had used OTC medicines in the last year, which correlates with other research regarding OTC medicine use by older adults. As with CAM therapies, the majority of the participants received their information regarding OTC medicines from their healthcare provider, which conflicts with previous research findings. This sample of the population had relatively high health literacy, possibly explaining their increased use of their provider for information. As expected, there was no change in the participants scores on the instruments used in this project with repeated exposure to the questionnaires.

Despite the limitations of this study, it has implications important for providing care. Determining the health literacy of the patient is of utmost importance in order to provide quality care to older adults. Patients with low health literacy will need additional

assistance navigating the complex healthcare system to avoid adverse events. Moreover,

increased incidence of CAM therapy use and easy access to OTC medicines coupled with

chronic illness and multiple medications make older adults at increased risk for adverse

events. As a provider, it is important to understand a patient's health literacy level and to

monitor this level over time as health literacy levels can change as the patient's condition

changes.

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APPENDICES

APPENDIX A

QUESTIONNAIRE #1

Perceived Efficacy in Patient-Physician Interactions (PEPPI)

The following questions are about how you interact with health care providers, eg., nurse practitioner, doctor, physician assistant Please indicate how <u>confident</u> you feel in your ability to do each of the following by placing a check in the box that best fits your ability to do these things <u>in general (</u>not about any particular health care provider). Rate your confidence on a scale of 1 **"Not at all Confident"** to 5 **"Very Confident".**

	Statement	**Not at all Confident 1**	**2**	**3**	**4**	**Very Confident 5**
Q1	To get health care providers to pay attention to what you have to say.					
Q2	To know what questions to ask health care providers.					
Q3	To get health care providers to answer all of your questions.					
Q4	To ask your health care providers about your chief health concern.					
Q5	To make the most of your visit with your health care provider.					
Q6	To get health care providers to take your chief health concern seriously.					
Q7	To understand what your health care providers tell you.					
Q8	To get health care providers to do something about your chief health concern.					

Q9	To explain your chief health concern to health care providers.					
Q10	To ask your health care providers for more information if you don't understand what she/he said.					

Health Information-Seeking

Below is a list of statements. For each statement please place an **X** in the box that
best represents you from "**Strongly Disagree**" to "**Strongly Agree**".

	Statement	**Strongly Disagree**				**Strongly Agree**
		1	**2**	**3**	**4**	**5**
Q1	I rely on my doctor to tell me everything I need to know to manage my health.					
Q2	Most health issues are too complex for me to understand.					
Q3	I actively try to prevent diseases and illnesses.					
Q4	I leave it to my doctor to make the right decisions about my health.					
Q5	It is important to me to be informed about health issues.					
Q6	I need to know about health issues so I can keep myself and my family healthy.					
Q7	I have difficulty understanding a lot of the health information that I read.					
Q8	My doctor(s) and I work together to manage my health.					
Q9	When I read or hear something that's relevant to my health care, I bring it up with my doctor.					

Q10	I try to understand my personal health risks.					

MSU CAM Health Literacy Scale

Below is a list of statements about herbal products. For each statement, please place an **X** under "**Agree Strongly", "Agree Somewhat", "Disagree Somewhat"**, or **"Disagree Strongly"**.
==

	Statement	Agree Strongly	Agree Somewhat	Disagree Somewhat	Disagree Strongly
Q1	The federal government sets standards for the quality of herbal products.				
Q2	Herbal products come in a variety of forms, for example, liquid, lotion, pills.				
Q3	Herbal products are readily available in a variety of stores.				
Q4	There is enough information on the herbal product label to make a well-informed choice about using it.				
Q5	Herbal products sold in the USA may be made in foreign countries.				
Q6	It does not matter how often an herbal product is taken.				
Q7	There is no need to inform a health care provider about taking herbal products.				

Q8	Herbal products do not have side effects.				
Q9	The law requires that the label on the herbal product contain information about what the product is supposed to do.				

MSU CAM Health Literacy Scale (Cont.)

	Statement	Agree Strongly	Agree Somewhat	Disagree Somewhat	Disagree Strongly
Q10	If a famous person recommends an herbal product, it must work.				
Q11	The USP Verified mark means that there has been quality control in the manufacture of the herbal product.				
Q12	The words "organic" and "natural" mean the same thing.				
Q13	If an herbal product is helpful for a friend or family member it will help me.				
Q14	Herbal products can prevent most health problems.				
Q15	The way herbal products work in the body is often not known.				
Q16	It is important to know the correct amount of an herbal product to be used.				
Q17	There is plenty of good information about the quality of herbal products.				

Q18	Many herbal products can be purchased over the Internet.				
Q19	There are few research studies showing that herbal products work.				
Q20	There is little research about the safety of herbal products.				
Q21	It is important to keep track of what happens after starting to take an herbal product.				

Newest Vital Sign

Please answer the following questions. The information to answer the questions is on the back of a container of a pint of ice cream. The ice cream label is on the next page.

==

Q1 - If you eat the entire container, how many calories will you eat?

_____

Q2 - If you are allowed to eat 60 g of carbohydrates as a snack, how much ice cream could you have?

_____

Q3 - Your doctor advises you to reduce the amount of saturated fat in your diet. You usually have 42 g of saturated fat each day, which includes 1 serving of ice cream. If you stop eating ice cream, how many grams of saturated fat would you be consuming each day?

_____

Q4 - If you usually eat 2500 calories in a day, what percentage of your daily value of calories will you be eating if you eat one serving?

_____

Q5 - Pretend that you are allergic to the following substances: Penicillin, peanuts, latex gloves, and bee stings. Is it safe for you to eat this ice cream?

_____

Q6 - Reason?

_____

ice cream label

Nutrition Facts

Serving Size			½ cup
Servings per container			4

Amount per serving

Calories	250	Fat Cal	120

	%DV
Total Fat 13g	20%
Sat Fat 9g	40%
Cholesterol 28mg	12%
Sodium 55mg	2%
Total Carbohydrate 30g	12%
Dietary Fiber 2g	
Sugars 23g	
Protein 4g	8%

*Percentage Daily Values (DV) are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Ingredients: Cream, Skim Milk, Liquid Sugar, Water, Egg Yolks, Brown Sugar, Milkfat, Peanut Oil, Sugar, Butter, Salt, Carrageenan, Vanilla Extract.

Background Information

Now for just a few questions about you.

==

	Not at all confident	A little confident	Somewhat confident	Quite confident	Extremely confident
Q1 - How confident are you in filling out medical forms by yourself?					

How would you rate your:	Poor	Fair	Good	Very Good	Excellent
Q2 - ability to evaluate health information obtained from the Internet?					
Q3 - ability to use the computer to seek health information?					
Q4 - understanding of the safety aspects of using natural products?					
Q5 - ability to know what questions to ask your health care providers?					

	Poor	Fair	Good	Very Good	Excellent
Q6 - In general, would you say your health is:					

Q7 - Compared to other people your age, would you say your health is:
    a   Better
    b   About the Same
    c   Worse

Q8 - Do you have any significant health problems?
    a   Yes
    b   No

If YES, would you please describe

_____

_____

____

Q9 - Have you used complementary or alternative therapies such as herbs, dietary
supplements, acupuncture, meditation or similar therapy within the past 5 years?
a   Yes
b   No

If YES, please describe what you
use_____

_____

_____

If YES, please describe the reason you use it, for example, what symptom are you
treating or are you using it for general health promotion?
_____

_____

_____

Q10 – Where do you obtain your information about complementary or alternative
therapies?
(**Circle** all that apply)
a. Health care provider
b. Friends or Family
c. Television
d. Internet
e. Other
If OTHER, please describe

_____

Q11 - Have you used over-the-counter medicines (non-prescription medicines) within the
past 5 years?
a   Yes
b   No

Q12 – Where do you obtain your information about over-the-counter medicines?
(**Circle** all that apply)
a. Health care provider
b. Friends or Family
c. Television
d. Internet

    e. Other
       If OTHER, please describe

       _____

Q13 – Are you a
    a   Woman
    b   Man

Q14 - In what year were you born? _____

Q15 - What is the <u>highest</u> level of education that you completed?
    a   Less than high school
    b   High school diploma or equivalency
    c   Associate, two-year, trade school
    d   Bachelor's degree
    e   Master's degree
    f   Doctorate
    g   Professional (MD, JD, DDS, etc.)

Q16 - What is your marital status?
    a   Divorced
    b   Separated
    c   Widowed
    d   Married
    e   Single and never married
    f   Living with a partner

Q17 - Which categories describe you? (**Circle** all that apply)
    a   White or Caucasian
    b   American Indian or Alaska Native
    c   Hispanic, Latino, or Spanish origin
    d   Black or African American
    e   Asian
    f   Native Hawaiian or Other Pacific Islander
    g   Middle Eastern or North African
    h   Other _____

Q18 - Counting all sources what was your <u>total family income</u> in 2017?

a   Less than $15,000
b $15,000 to $35,000
c   more than $35,000 to $55,000
d   more than $55,000 to $75,000
e   Over $75,000
f   Chose not to answer

<u>APPENDIX B</u>

QUESTIONNAIRE #2

Health Information-Seeking

Below is a list of statements. For each statement please place an **X** in the box that best represents you from "**strongly disagree**" to "**strongly agree**".

	Statement	Strongly Disagree				Strongly Agree
		1	**2**	**3**	**4**	**5**
Q1	I rely on my doctor to tell me everything I need to know to manage my health.					
Q2	Most health issues are too complex for me to understand.					
Q3	I actively try to prevent diseases and illnesses					
Q4	I leave it to my doctor to make the right decisions about my health.					
Q5	It is important to me to be informed about health issues.					
Q6	I need to know about health issues so I can keep myself and my family healthy.					
Q7	I have difficulty understanding a lot of the health information that I read.					
Q8	My doctor(s) and I work together to manage my health.					
Q9	When I read or hear something that's relevant to my health care, I bring it up with my doctor.					
Q10	I try to understand my personal health risks.					

MSU CAM Health Literacy Scale

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Q4	There is enough information on the herbal product label to make a well-informed choice about using it.				
Q5	Herbal products sold in the USA may be made in foreign countries.				
Q6	It does not matter how often an herbal product is taken.				
Q7	There is no need to inform a health care provider about taking herbal products.				

Q8	Herbal products do not have side effects.				
Q9	The law requires that the label on the herbal product contain information about what the product is supposed to do.				

MSU CAM Health Literacy Scale (Cont.)

	Statement	Agree Strongly	Agree Somewhat	Disagree Somewhat	Disagree Strongly
Q10	If a famous person recommends an herbal product, it must work.				
Q11	The USP Verified mark means that there has been quality control in the manufacture of the herbal product.				
Q12	The words "organic" and "natural" mean the same thing.				
Q13	If an herbal product is helpful for a friend or family member it will help me.				
Q14	Herbal products can prevent most health problems.				
Q15	The way herbal products work in the body is often not known.				
Q16	It is important to know the correct amount of an herbal product to be used.				
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Q4 - If you usually eat 2500 calories in a day, what percentage of your daily value of calories will you be eating if you eat one serving?

    _____

Q5 - Pretend that you are allergic to the following substances: Penicillin, peanuts, latex gloves, and bee stings. Is it safe for you to eat this ice cream?

    _____

Q6 - Reason?

    _____

ice cream label

Nutrition Facts

Serving Size	½ cup
Servings per container	4

Amount per serving

Calories	250	Fat Cal	120

	%DV
Total Fat 13g	20%
Sat Fat 9g	40%
Cholesterol 28mg	12%
Sodium 55mg	2%
Total Carbohydrate 30g	12%
Dietary Fiber 2g	
Sugars 23g	
Protein 4g	8%

*Percentage Daily Values (DV) are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Ingredients: Cream, Skim Milk, Liquid Sugar, Water, Egg Yolks, Brown Sugar, Milkfat, Peanut Oil, Sugar, Butter, Salt, Carrageenan, Vanilla Extract.

Background Information

Now for just a few questions about you.
==

Q1 - Are you a
     a   Woman
     b   Man

Q2 - In what year were you born? _____

	Not at all confident 1	A little confident 2	Somewhat confident 3	Quite confident 4	Extremely confident 5
Q3 - How confident are you in filling out medical forms by yourself?					

How would you <u>rate</u> your:	Poor	Fair	Good	Very Good	Excellent
Q4 - ability to evaluate health information obtained from the Internet?					
Q5 - ability to use the computer to seek health information?					
Q6 - understanding of the safety aspects of using natural products?					
Q7 - ability to know what questions to ask your health care providers?					

Thank You!