ABSTRACT

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Poor appetite is common among older adults, and is influenced by factors including chronic disease and depression. The aim of this research is to examine the associations of hardiness (defined as the ability to manage stress), depression, and emotional well-being with appetite in older adults. A survey evaluating hardiness, depression and appetite was administered to 292 adults ($\geq$ 60 years), at assisted-living facilities or senior centers in the Washington D.C. area. In univariate models, depression, hardiness, and emotional well-being are associated with appetite. In multivariate models, fair/poor emotional well-being increases risk for poor appetite (OR=5.60, 95% CI= 2.60-12.07) and commitment (a dimension of hardiness - which indicates an individual's involvement in life) is associated with appetite (OR=1.35, 95% CI= 1.13-1.61). These variables maintained the strongest associations with appetite in multivariate models. These associations further elucidate the components of mental health which contribute to poor appetite in this population.

DEPRESSION AND HARDINESS AND THEIR ASSOCIATION WITH
APPETITE IN OLDER ADULTS

By

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<u>Introduction</u>

The older adult population in the United States is rapidly increasing.[1, 2] As a result, promotion of health maintenance in older adults is becoming increasingly important. Examination of health-related factors affecting older adults will help characterize the population and innovate health-promotion. One factor important to the health of older adults is appetite. Appetite decreases with age due to a variety of factors, and a decrease in appetite can cause involuntary weight loss and a variety of other chronic disease complications.[3] It has been established that appetite is negatively affected by depression in older adults.[4] Many older adults struggle with depression, especially those with diminished physical capacity. While depression is one factor affecting appetite, this research project investigated whether hardiness may be another. This literature review describes and summarizes research related to our examination of the relationship between hardiness, depression, and appetite, as well as quality of life.

The major aims of this study were to investigate the relationships between hardiness, depression and appetite in a sample of older adults. Hardiness is characterized by an ability to manage stress, and in our sample hardy older adults had better appetites than those with low hardiness. Confirming what is established in the literature, depression was found to be negatively associated with appetite. No interaction between hardiness and depression was found in their relationship to appetite. Emotional well-being, as assessed by a single question, had the strongest

association with appetite. Additionally, quality of life among the older adult population is of particular interest as the population ages. This research found that hardiness was significantly associated with quality of life, while oral health (another factor of interest) was not significantly associated with quality of life.

As nutrition is vital to maintaining health in older adults and appetite declines with age, determining modifiable risk factors that affect appetite provides support for the development of interventions to improve health in older adults. As emotional well-being was the factor most strongly associated with appetite, a single item asking about emotional well-being may be more valuable than depression screening for the presence of poor appetite. Interventions designed to foster hardiness have been demonstrated in other settings.[5] This research provides evidence that hardiness is associated with appetite, providing support for the development of potential hardiness interventions to foster hardiness in older adults with poor appetite. Hardiness interventions have the potential to improve the overall quality of life of older adults, in addition to improving appetite and decreasing chronic disease complications and morbidity.

Literature Review

In 2006 there were approximately 40 million Americans aged 65 and greater. [2] It is expected that this number will almost double to 75 million by 2030, meaning that older Americans will comprise approximately 22% of the population. As thirty years have been added to the average life expectancy of Americans over the last century, this great increase in the older adult segment of the population is not surprising. [1] Poor appetite is a problem among many older adults, and leads to an increase in chronic disease complications and morbidity. [3] Appetite is influenced by many factors, including chronic disease and depression. [4] Hardiness is believed to be another risk factor that may influence appetite in older adults. As hardiness is a characteristic that can be fostered in individuals, this research may begin to justify the development of interventions to improve hardiness in older adults. [5] By improving hardiness and potentially appetite and quality of life, these interventions could potentially reduce morbidity and mortality due to inadequate dietary intake and weight loss.

Proper nutrition is vital to the maintenance of health in older adult populations. Involuntary weight loss is common among older adults, and is associated with increased mortality.[6] Data from the first National Health and Nutrition Examination Survey showed that mortality risk increased with increasing weight loss, when controlling for age, race, smoking, parity, pre-existing illness and BMI. [7] Only among obese men, did weight loss between 5-15% seem to lessen mortality risk.[6] Many other studies have shown weight loss to be associated with increased mortality in older adult populations. In a review of pathologic and

psychological causes of anorexia and weight loss in older adults, Morley concluded that weight loss and protein-energy malnutrition are not rare in the older adult population. [8] It has also been concluded that "Protein-energy malnutrition is a major cause of functional decline in older persons." [7] Weight loss, as well as decreased intake of vitamins and minerals are associated with adverse health outcomes in older adults. Depression and loss of appetite are two of the factors associated with weight loss in older adults.

Hardiness

Hardiness is defined as an individual's ability to resist illness or manage their life when under stress. [5, 9] The original concept of hardiness was used in the agricultural field, referring to crops able to withstand adverse conditions.[10] In the initial study which characterized hardiness, it was seen that some people experiencing high degrees of stress have illness as a result of the stress, and others experiencing the same stress do not fall ill. The concept of hardiness was discovered through a longitudinal research project at Illinois Bell Telephone (IBT) from 1975 through 1986.[11] Managers at IBT were tested psychologically and medically each year. The company experienced a large upheaval when the telephone industry was federally deregulated in 1981. Most of the lives of participants in the research sample were severely disrupted, and the health of many of them was deteriorating. However, some managers thrived during this difficult time. This group with fewer illness symptoms scored significantly higher on measures of hardiness. Scrutiny of the

psychological data accumulated prior to 1981 identified hardiness as a basis for resilience under stress.

In 1979, Kobasa was the researcher who described hardiness as the characteristic which allowed individuals to resist stress-induced illness. Three characteristics of hardy persons were described by Kobasa.[9] One characteristic assumes that individuals can control or influence the events that make up their experience, which is known as the element of control. Another characteristic is a feeling of deep involvement in and commitment to the activities in their life, which is known as the element of commitment. Lastly, individuals who are hardy experience life changes or challenges as exciting possibilities for self-development. This is known as the challenge element of hardiness.[12] Hardy persons are also described as having curiosity and tending to find their experiences meaningful and interesting. [13] They believe they can be influential through what they do and say. They expect change to be part of a normal life, and find it an opportunity for development. All of these characteristics are useful in coping with stressful life events. The characteristics of hardiness help individuals maintain healthy perspectives in stressful situations. Hardy individuals are more likely to take decisive action than those who are less hardy. In contrast, persons with lower hardiness tend to find themselves meaningless and their environment threatening. They feel powerless and have little or no conviction that change is possible or important in their lives. In the face of stressful events, they have little ability appraise the situation optimistically or take decisive action. As a result, stress often has a debilitating effect on the health of individuals with lower levels of hardiness.[9]

In relation to health factors and outcomes, it is believed that individuals with increased hardiness can better utilize coping strategies to deal with stress and to view stress or health problems as a challenge that is worth attempting.[5, 14] It is believed that individuals with high hardiness are less affected by depression and poor health as a result of stressful events. [5] It has been proposed that "hardiness is a moderator in the stress-illness relationship."[14] As a result of this theory, hardiness has been studied in relationship to many social and mental health factors. In a study of institutionalized older adults, it was found that hardiness and depression were inversely related.[15] In a study of college psychology students, hardiness and depression were moderately negatively correlated ($r= -0.430$, $p < 0.001$).[12] Although hardiness and depression are negatively associated, it is important to note that hardiness only explains part of the variation in depression, and it is possible for depression to occur in hardy people.[14]

Social support is a variable that has been highly correlated with improved health in older adults. It has been found that hardiness is correlated with the amount of social support received by older adults. In a sample of older Anglo- and African-Americans, hardiness was found to be significantly correlated with social support, as well as with better perceived health status, age and lower income. [16] It has been shown that positive psychological characteristics such as optimism and health-related hardiness are correlated with self-rated health, but these are all affected by socioeconomic status, social support and illness. Not surprisingly, it has been shown that hardiness positively correlates with perceived health status in older adults.[16, 17] Another concept of hardiness in relationship to health has been developed, and it

is known as health-related hardiness. Pollock defined health-related hardiness as a set of personality characteristics that allow individuals to handle the stress caused by chronic disease. [18] In a study of patients with an inherited hemophilia disorder, it was found that health-related hardiness was positively associated with self-perceived health status (r=0.36, p<0.01).[10] Hardiness can be generally characterized as a personality trait which has a protective effect in stressful conditions.

Only one study to date has examined the relationship between hardiness and quality of life. In a study of older Australian women, it was found that optimism and health-related hardiness explained a significant portion of the variance in quality of life, as measured by the SF-36 instrument (which measures physical health and limitations), even when controlling for other positive confounding factors.[19]   This study suggests that health-related hardiness may contribute to personal well-being and quality of life.

In a study examining the relationships of work, protective factors and health outcomes, participants from two corporate samples completed measures of work support, hardiness, coping, stress, and illness symptoms. It was found that higher scores on hardiness and coping, as well as male gender were associated with lower scores on stress and illness symptoms. The researchers concluded that interventions that enhance protective factors such as hardiness and coping strategies may be most effective in reducing stress and illness among employees.[20] Another study examined the effects of hardiness and social support on the relationship between stress and depression in college students   Hardiness, stress, social support and depression were measured in the sample.[21] In this student sample, it was found that

stress and hardiness each predicted a significant amount of the variance in depression. The interaction between hardiness and stress was significant, indicating that individuals with high levels of hardiness are less likely to have depressive symptoms when stressed than those with lower levels of hardiness. These results suggest that hardiness may be considered a moderator in the stress-depression relationship among business employees and students.

Hardiness interventions have been shown to be effective at increasing hardiness and decreasing stress and illness in adults. One study evaluated the effectiveness of a hardiness training program in a group of managers. [22] The group receiving hardiness training was compared to a group participating in relaxation/meditations sessions and a group receiving only minimal social support. The hardiness training process used included participants describing their current stressful circumstances, presentation of a coping model, practicing techniques for transformational coping, and encouragement to continue the approach in future stressful situations. The techniques aim to enhance understanding of the stressor, find personal insight, and improve the acceptance of situations. The hardiness training was more effective than the other treatments in increasing self-reported hardiness and job satisfaction, while decreasing self-reported strain and illness severity. In a community setting, a small hardiness intervention study with 10 participants experiencing stress affecting their health was conducted.[5] Semi-structured group sessions promoting hardiness were held (9 sessions over 5 months) with the goal of assisting participants in responding to challenges, assuming control of life stress, and developing a sense of purpose and commitment to beliefs. Though no significant

increase in hardiness was found, the program had positive effects. Following the intervention participants paid more attention to the nature of thoughts, had better understanding of their feelings, exerted more assertive behavior and reported better communication with others. Although hardiness interventions have not been performed in older adults, the associations demonstrated between hardiness and positive health factors such as self-reported health and quality of life indicate potential for improvement of overall wellness as a result of a hardiness intervention.

Depression

Depression is very common among older adults (10-15% in the population, and up to 40% in institutional settings), and is considered to be a public health problem.[23-25] It is projected that by 2020, depression will be second only to cardiovascular disease in the contribution to the global burden of disease as measured by disability-adjusted life years.[26] As specified in the *Diagnostic and Statistical Manual* (DSM-IV), symptoms of major depressive disorder include: depressed mood, loss of interest or pleasure in activities, weight or appetite changes, sleeping disturbances, psychomotor agitation or retardation, low energy level, feelings of worthlessness, difficulty concentrating, and suicidal ideation. Depressed mood and lack of interest are the two core symptoms for older adults. One or both of these symptoms and four or more other symptoms must be present for a minimum of two weeks to meet the diagnostic criteria for major depressive disorder.[27] There is evidence that many cases of depression are undiagnosed in this population.[28]

Individuals with depression are more at risk of developing physical illness, and have higher risk for mortality.

Aging- and disease-related processes such as inflammatory and immune changes increase susceptibility to depression, and indeed older adults affected by disease and disability are the most susceptible to depression.[29] Changes in brain structure and heredity predispose to late life depression. Both the prevalence and the incidence of major depression double after age 70-85 years. Antidepressant drug therapy has been shown to be as effective in older adults as in younger adults.[29] Psychotherapy alone or in combination with antidepressants is recommended for management of depression in older adults.

Depression is most prevalent among hospitalized and institutionalized older adults with chronic disease [30], and is also the most common cause of weight loss in older adults both in community and institutional settings. [7, 23] This is due to the relationship of depression with incidence of anorexia and poor appetite in older adults. [31] In one study it was found that many under-nourished older adults actively practiced self-control with food or dieted.[8] This is indicative of a vicious cycle, in which depression increases anorexia. In a study by Callen and Wells (2005), determinants of nutritional health among adults aged 80 years and over were examined.[32] The study aimed to identify important risk factors associated with measures of poor nutritional status, to inform future development of nutritional screening tools for this population. Of the identified risk factors measured, only depression as measured by the Geriatric Depression Scale predicted weight loss in the sample. None of the following were significantly associated with weight loss: social

support, functional ability (IADLs), money spent on food and food guide pyramid category intake.

A review of the literature by Chapman and Perry (2008) surrounding public health and depression among older adults, led to the conclusion that depressive symptoms may lead to the development of chronic disease. Depression is associated with lower functional status and suicide among older adults.[33] Depression has also been shown to be correlated with disability. [14] Control over life and engagement in community life are included in a list of factors suggested to be protective against depression in older adults.[31] If the effects of depression can be lessened, then it may be possible to break this cycle for some older adults. It is clear that depression is a major problem in the older adult population, and when present contributes to health deterioration.

In the older adult population, a clear negative association between depression and appetite exists.[4] It has been shown that depression is a common problem and a significant cause of decreased appetite and motivation to eat in older adults.[34] The mechanism by which depression decreases appetite is not well understood. Physiologically, the decrease may partially be explained by an increase in corticotropin-releasing factor caused by depression, which results in decreased appetite. Altered regulation of leptin as a result of depression may also play a role in this process.[23, 35] The decrease in appetite due to depression often occurs in conjunction with decreased social networks, widowhood, a decrease in the variety of food, or institutionalization, which are common life experiences for older adults.

Appetite

       Appetite is defined as the desire to eat, and is regulated in a complex way by the brain.[36] It is modified by decreased hunger, changes in taste sensation, difficulty swallowing, and depression among other factors.[37] Appetite is regulated by the combination of the central feeding drive and peripheral satiety.[38] The central feeding drive is driven by nitric oxide, neuropeptide Y and corticotropin-releasing factor. Many signals in the gastrointestinal and nervous system are involved in satiety, including cholecystokinin and gastric-releasing peptide, among others.[8] Although the mechanisms are not well understood, many of these signals are altered with the aging process, and these alterations most often result in decreased appetite in older adults.

       Appetite decreases with increasing age due to a variety of physiological and psychological factors.[8, 23] These main physiological factors include: decreased rate of gastric emptying, onset of chronic disease, poor oral health, decreased physical activity, loss of taste and smell, and medication use. Few studies have examined the physiological mechanisms of decreased appetite in this population. One study compared gastric emptying and postprandial levels of cholecystokinin (CCK) and peptide YY (PYY) in healthy older (mean age= 77) and younger adults (mean age= 32).[39] Gastric emptying is mediated by CCK and PYY in the gut. These were examined in relationship to satiety and hunger sensations. The older participants had a significant delay in gastric emptying compared with the younger participants (p<

12

0.01). Fasting satiety and hunger scores were similar in the two groups. After 2 hours, the hunger score was higher than the satiety score in the younger participants, but in the older group even 4 hours after the meal, participants had a higher satiety score than hunger score. Pre-meal levels of CCK were higher in the older adult group ($p < 0.05$), and post-meal the rise in CCK was higher and more sustained than that of the younger group. PYY levels were similar pre-meal but were significantly higher in the older group 3 and 4 hours after the meal. The results showed that in a group of older adults, delayed gastric emptying was associated with reduced cholecystic contractility, as well as sustained increased CCK and PYY serum levels. These differences likely cause longer-lasting satiety and suppressed hunger after a meal as compared with younger adults. These changes with aging may lead to decreased consumption and eventually malnutrition.

Another factor possibly associated with decreased appetite is lack of or limited exercise or physical activity. In a cross-sectional study it was found that older adults with good appetite have higher levels of physical activity than those with decreased appetite.[40] Increased physical activity is a potential method for increasing energy needs and therefore appetite in this population. A 17-week nutrition and exercise intervention with frail older adults (BMI$\leq$ 25, inactive, age >70 years(mean age= 79 years)) aimed at promoting health was performed.[41] The nutrition intervention involved the incorporation of nutrient dense products (fruit and dairy), and the exercise intervention involved activities which improved mobility and ability to perform activities of daily living. At baseline, appetite and feelings of hunger were positively correlated ($p<0.001$) with reported energy intake. No effect of

the nutrition or exercise interventions on appetite was observed. These results suggest that reduced appetite may not be increased with exercise in an older, less active adult.

Medication use, and particularly polypharmacy is associated with decreased appetite in this population. Many medications commonly prescribed to older adults have anorexia as a major side effect.[38] Diet restrictions are often prescribed for older adults with nutrition related health problems such as heart disease and diabetes. These may restrict salt, sugar and fat intake, all of which may make food significantly less palatable to older adults. This is another cause of decreased intake, and can be potentially more harmful than helpful if undesired weight loss results. Diminished smell and taste perception, which is part of the aging process also contributes to decreased appetite and enjoyment of eating which can contribute to poor nutritional status.[42]

Although energy needs decrease as a result of aging, decreased intake as a result of decreased appetite can cause malnutrition. Impaired nutritional status is associated with impaired immunity, increased healthcare needs, and longer hospital length-of-stay in older adults.[42] Protein-energy malnutrition is relatively common (15%) among community-dwelling older adults.[43] The prevalence of malnourished older adults dramatically increases in institution and hospital settings, to 30-60%. Malnutrition increases the risk for infection and pressure ulcers, and can complicate other health problems, increasing mortality.[42]

Psychological factors affecting appetite include depression, dementia and social isolation.[44] The relationship between appetite and depression was described

previously in this literature review. The presence of others at mealtimes is shown to

increase consumption in adults of all ages, and may be a particularly important

modifiable factor to help maintain good appetites in older adults.[38] Weight loss

and malnutrition are major risk factors for decreased health status in older adults.[38]

Maintenance of a good appetite in older adults can help prevent health problems from

occurring or progressing. Modifiable risk factors which could improve appetite in

older adults are potentially beneficial. The correlation between hardiness and appetite

has not been previously studied.

Quality of Life

Though often loosely defined, quality of life is most commonly considered a

subjective measurement of the overall goodness of the life of a group or individual.

Quality of life (QOL) is defined by the WHOQOL group as:

> An individual's perception of their position in life in the context of the
> culture and value systems in which they live and in relation to their goals,
> expectations, values and concerns … incorporating in a complex way the
> person's physical health, psychological state, level of independence, social
> relationships, personal beliefs and their relationship to salient features of
> the environment … Quality of life refers to a subjective evaluation which
> is embedded in a cultural, social and environmental context. [45]

Though quality of life is defined in different ways, many sources agree that

measurements of QOL should contain both subjective and objective measurements,

such as happiness and income, respectively. [46]

The philosophical origins of well-being concepts have been traced to ancient

Greece. The ''hedonic view'' has been seen as following from the philosophy of

Aristippus who advocated maximizing pleasure to be the goal of life and the main

source of happiness.[47] The modern conceptualization of subjective well-being is most closely identified with this view. Throughout most of its first century of existence, the field of psychology was pursuing the goal of alleviating emotional suffering rather than seeking understanding of well-being. From 1960 to 1990 researchers have studied topics such as happiness, positive and negative affect or emotion, satisfaction with life, and subjective well-being. These various concepts studied were all influential in the development of QOL instruments, particularly those measuring the concept of satisfaction with life as a whole and components of one's life, which introduced the cognitive assessment portion of the modern concept of QOL. Since 1990 the research areas of QOL and subjective well-being have been very active, with hundreds of publications in many research areas.

Many types of approaches and instruments exist for the measurement of "quality of life." Even the term can have many different meanings, which may include health or functional status rather than a subjective quality measurement. Clinical researchers Gill and Feinstein found many discrepancies in the literature, and state that the concept of QOL should reflect: "the way that patients perceive and react to their health status and other aspects of their lives." They believe that the instruments should ask subjects to rate the overall quality of their life and the importance of individual factors affecting their QOL, such as physical functioning, mental well-being and relationships with friends.[48] In a qualitative study, it was determined that many factors influence QOL for older adults. The main factors emphasized by the older adults interviewed were social contacts, activities, emotional well-being, adequacy of material possessions and the living environment, and health

and functional ability.[49] One commonly used measure of QOL is the SF-36, which asks about health as compared to a year ago, physical limitations, limitations as a result of physical and emotional health problems, social activities, pain causing limitations, energy and emotions, and general health. This measure is very focused on the limitations caused by health problems, not on components of life that may provide positive or negative experiences.

As maintaining QOL for older adults as they age is a major goal of health interventions, research examining QOL in various samples of older adults has been performed. Quality of life has been studied many different ways, and for particular groups sharing a common experience of disease or life situation.

The relationship between QOL and physical activity has been examined in older adult populations. In a sample of community dwelling older adults, with varying levels of activity limitations, QOL was measured using the Quality of Life Index which includes the four domains of: health and functioning, socio-economic, psychological/spiritual and family. [50]   QOL was greater with a higher activity level ($p < 0.001$). This was significant only among participants without activity limitations compared to those with moderate to severe activity limitations. Another study examined the relationship between QOL and physical activity in healthy older adults.[51] Participants were classified into high and low activity groups, with the high activity group participating in at least 1 hour of moderate intensity physical activity per week. After adjustment for gender and presence of hypertension which were different between the groups, the physical function, physical limitation, bodily pain, vitality and social functioning domain scores of QOL were all higher in the high

activity group. Older adults residing in the community and those in long-term care were surveyed in a study attempting to describe the correlates of QOL in these two populations.[52] The researchers believed that there may be important differences in the correlates of QOL in the community as compared to those in the institutional setting. They found depression to be the most powerful predictor of QOL in both the community dwellers as well as those residing in long-term care. Regular participation in physical activity contributed to the variation in QOL in the community dwelling group, but not in the long-term care group. The directionality of the relationship between physical activity and QOL is unknown, but may reflect that older adults who are more physically active have a greater functional ability and thus better QOL, or alternatively that physical activity itself improves QOL through a potential biochemical mechanism.

Social support may be another factor associated with QOL for older adults. A cross sectional study examined the association between social network and health-related QOL in older adults. Rare or no contact with family members was associated with lower scores in the following scales of SF-36 questionnaire: physical limitation, body pain, general health and mental health ($p < 0.05$). This effect of the lack of family contact on QOL was compared to data examining the effect of osteoarthritis on QOL, and these were shown to have similar negative effects on QOL in this population.[53] The presence of social support may improve QOL for older adults both by providing personal contact, but also by potentially improving access to activities and possibly enhancing the perceived meaning in life.

The WHOQOL-BREF instrument has been used in older adult samples. In a sample of elderly Taiwanese residing in veteran homes, the ability of the WHOQOL-BREF to predict 2-year mortality was measured.[54] They measured the ability of each item and domain of the instrument to predict mortality 2 years after measurement of QOL. Four items of the instrument predicted mortality, and these included: pain and discomfort, mobility, activities of daily living, and work capacity. However, after adjusting for confounding variables including age, medical status and health behaviors, only the work capacity item of the WHOQOL-BREF significantly predicted mortality (RR = 1.96, p = 0.046). The results of this study suggest that this QOL instrument may not be a good tool to predict mortality, in light of stronger predictor variables. The WHOQOL-BREF was also used to assess QOL in a sample of Japanese schizophrenic patients and their nurses.[55] The researchers measured the presence of psychopathological symptoms, level of functioning and QOL. They found no significant differences in any QOL domain between individuals of different functional independence. Depression showed a small but significant, relationship with the physical and psychological domains of QOL. Comparison between the schizophrenic patients and the nursing staff control group revealed that schizophrenic inpatients showed a lower QOL in the domains of physical health and social relationships.

Quality of life has been correlated with some health factors in the older adult population. In older male cancer patients, it was found that QOL and oral health are correlated. [56] In a study of visual impairment in older adults, it was determined that the physical composite score of QOL as measured by the SF-12 was reduced in

all participants with visual impairment.[57] Physical health is an important

component of QOL for older adults. In a study of health-related QOL in arthritis

sufferers (as identified by Medicare data) subjects with arthritis had lower scores than

non-arthritic older adults in all areas of health-related QOL.[58] Additionally, those

with rheumatoid arthritis had lower scores than those with osteoarthritis. Older age,

nursing home residence, and greater comorbidity were the most consistently

associated with poorer health-related QOL. In a large cross-sectional study of aging,

poor health-related QOL was defined as 14 or more physically or mentally unhealthy

days over the last month.[59] It was found that blacks were more likely to have poor

health-related QOL than whites (11% vs. 9.7%). Lifetime socioeconomic status,

summary measures of medical conditions, and cognitive function explain most of the

difference. The presence of medical problems may affect the QOL of many older

adults. Not surprisingly, it has been shown that depression and QOL are negatively

correlated in older adults. [60, 61] If modifiable risk factors for low QOL can be

identified, QOL can be improved by making changes to these potential factors.

<u>Purpose of Research:</u>

It is well documented that depression and poor appetite are related to weight-loss in the older adult population.[7, 8] However, there has been no research into the relationship between hardiness and poor appetite. This research is of particular interest with regard to the older adult population. It has been shown that hardiness can be fostered in both an organizational and a health-related setting. [5, 62] Hardiness can be fostered through training and interventions to improve responses of managers to stressful situations, thus improving overall work morale and productivity. [62] It has also been shown that hardiness can be fostered in individuals with high stress in their lives, and result in positive changes in thoughts, feelings and behaviors.[5] Hardiness interventions can potentially be of great benefit to the older adult population who manages many sources of stress. If low hardiness is indeed correlated with decreased appetite and weight loss in older adults, then interventions designed to foster hardiness could be utilized to improve well-being and hence overall health and appetite. In Healthy People 2010, it is stated that: "The first goal of Healthy People 2010 is to help individuals of all ages increase life expectancy *and* improve their quality of life." [63] As improving QOL is a primary goal for the health of the American people, studies which measure QOL in particular segments of the population will be very productive both for assessment of the current QOL, and in discovering modifiable risk factors which influence QOL. Determination of modifiable risk factors such as hardiness which promote health will help increase QOL for older adults.

Chapter 2: Methods

<u>Research Methodology</u>

A cross-sectional survey of older adults attending senior centers or residing in assisted living facilities was conducted in the greater Washington-Baltimore area from June 2006 through March 2008. Subjects 59 years and over were self-selected and recruited through presentation of the study at the senior centers, and by announcements made by staff at the assisted living facilities. Senior centers and assisted living facilities were selected by generating a complete list of facilities in the greater Washington-Baltimore area. Mailings explaining the study were sent in rounds of ten, and follow up phone calls were made to answer questions and schedule visits. 2-15 participants were surveyed at each site (dependent on participant willingness), and this process was repeated until the desired sample size of at least 145 was collected in each setting.

Subjects

In total, 292 subjects participated in the study. Nine had incomplete hardiness portions of the survey, four had incomplete appetite portions of the survey, and four had incomplete depression portions of the survey. One subject had a missing score for both appetite and hardiness. Two subjects refused to report their age. Therefore, complete survey data is available for 274 subjects. As the models include different variables, participants were excluded from each analysis based on their completed portions of the survey.

A questionnaire which examines quality of life was added to the survey for the second phase of the project, and administered to the participants residing in

assisted living facilities only. Therefore, for analyses examining associations with quality of life, data is only available for 145 subjects.

Survey data collection

The following information was obtained on all volunteers:

Demographic information and health practices

Subjects were administered a questionnaire on demographic characteristics, health practices, and eating habits. Information collected included sex, race, marital status, years of education, income, recent weight loss or gain, self-reported oral health, number of people in the household, activity level, and self-reported health. Race or ethnicity was obtained by asking which category (American Indian/Alaskan native, Asian-American, Black or African-American, Hispanic or Latino, White, or Other) best described the participant. Education (less than high school (≤12 years); high school or more (> 12 years)) was used as an indicator of socioeconomic status (SES). Education was selected as the main SES indicator because of its very common use in health outcomes research and because many of the older adults had trouble choosing an income level, due to the fact that they did not manage their own finances, or did not want to disclose the information. [64] Income was obtained by asking if the participant's total household income during the previous year was more or less than $20,000, and then asking about $5,000 increments up to $40,000. Since the goal of the question is only to assess the prevalence of low SES and food insecurity, it was not necessary for the purpose of the study to specify income brackets that were well over 200% of the federal poverty line.

Marital status was assessed by asking which category (Married or life partner, Widowed/life partner deceased, Divorced, Separated or Never married/Single) best described the participant. The participants were asked if they had either lost or gained more than ten pounds within the last six months, in two separate questions. Information about oral health was obtained by asking how the participant would describe the condition of their mouth and teeth. The possible answers were: excellent, very good, good, fair or poor. Respondents were considered to have poor oral health if the condition of their mouth was self-reported as fair or poor, or if they reported having problems with loose teeth or mouth sores that made it hard for them to eat. Activity level was assessed in relationship to the participant's peers, and they were asked if they were very active, active, somewhat active or inactive, as compared to other people their age. Activity was dichotomized into inactive if they reported that they were somewhat active or inactive, or into the active if they reported being active or very active. Self-reported health was obtained by asking participants if their health was excellent, very good, good, fair, or poor. The responses were dichotomized to include those who responded fair or poor in one group, and good, very good or excellent in the other group. Additionally, participants were asked if they had been diagnosed with a list of chronic conditions, which included: heart disease, respiratory diseases, kidney disease, diabetes, nausea or bowel problems, stroke, and bone related diseases were combined to include arthritis, osteoporosis, hip or joint replacement and recent bone fracture. Participants were categorized as having one or fewer conditions, or two or more. For all questions that had response

options, visual aid cards were used to show participants the possible options, in

addition to hearing them aloud.

Emotional health components

Depression, hardiness and emotional well-being were measured.

Depression

Depression was measured using the Geriatric Depression Scale-5 (GDS-

5.)[30] This tool was tested in a small group of predominantly male veterans and was

shown to be as effective as its longer predecessor, the 15-item GDS. The

effectiveness of the GDS-5 for the screening of depression in elderly male and female

subjects has been shown in hospital, outpatient clinic, and nursing home settings. As

it is shorter and has shown good sensitivity (0.94), specificity (0.81), positive

predictive value (0.81) and negative predictive value (0.94), it is quicker to use and

clinically more efficient. As is recommended, participants in our study were

characterized as having depressive symptoms if they had a score of 2 or greater.[30]

Hardiness

Hardiness was measured using a modified version of the 18-item

Dispositional Resilience Scale II (DRS-II).[65] The DRS-II was tested in a

population of 1,465 National Guard members, and had good reliability for the

components control (α=0.79), commitment (α=0.79), and challenge (α=0.77). The

DRS-II was modified for this study based upon cognitive interviews conducted in an

older adult population (described below). A five-point Likert scale was used, with

the responses being: definitely false, false most of the time, true about half the

time/false about half the time, true most of the time and definitely true. Participants

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were asked to rate how true statements were for them, and the statements included: "I enjoy most things in life", "I often feel helpless", and "I don't like to make changes in my everyday routine" (See Appendix A). There are no recommendations for scoring. Therefore, the cutting point between the low and high groups was chosen in a way that maximized the difference in appetites between the low and high groups based on a least-squares criterion. Hardiness scores were categorized into low and high groups based on a least-squares criterion. The cutting point was chosen in a way that maximized the difference in appetites between the low and high groups and the cutting points were compared by their corresponding p-values with the lowest p-value determining the best choice.

Emotional well-being

Emotional well-being was assessed by inquiring how the subject would describe their emotional well-being, in general, with the four possible options of: excellent, good, fair or poor. This variable was dichotomized to include those who responded fair or poor into one group, and those who responded excellent or good into the other group.

Quality of Life

In the assisted living sample surveyed, quality of life was also measured. The WHOQOL-BREF was used to measure quality of life. It is a shorter measure, derived from the longer WHOQOL-100. In validation studies it was found to be highly correlated ($r>0.89$) with the WHOQOL-100, and has been shown to have good discriminant validity, content validity, internal consistency and test-retest reliability. [66] The scores for each WHOQOL-BREF item range from 1–5, and the WHOQOL-

BREF domain scores range from 4–20, with lower scores implying a lower quality of life. The domains include: physical health, psychological, social and environmental. Independent items assessing general quality of life and satisfaction with health are separate from the domains. In the case of missing responses, if more than one item was missing the domain score was not calculated (two items missing was acceptable in the environmental domain.)

Outcome variable: Appetite

Appetite was measured using the Simplified Nutritional Appetite Questionnaire (SNAQ.)[3] The SNAQ has been tested and validated in long-term care and community dwelling older adults. It was validated in comparison to a previously validated tool: the appetite, hunger and sensory perception questionnaire (AHSP).[67] The AHSP is much longer and complex, and is therefore not effective in clinical settings, or in the context of a longer survey tool. The SNAQ had good sensitivities and specificities for predicting 5% weight loss (sensitivity=81.3, specificity= 76.4) and 10% weight loss (sensitivity=88.2, specificity= 83.5). There are four questions in the tool, which query appetite, amount eaten at each meal, number of meals eaten per day, and the taste of food. There are 5 possible answers for each question, with the answer indicating the highest appetite receiving a score of 5, and the answer indicating the lowest appetite receiving a score of 1. These questions are then summed to create a score with a range of 4-20. Participants were classified as having poor appetite if their score on the SNAQ was less than 14. This follows the recommendation made by Wilson and her colleagues who developed the tool.[3]

Cognitive Interviewing

To ensure that the survey prepared would be suitable for the older adult population, cognitive interviewing was performed during the pretesting of the instrument. Cognitive testing was used in the early stages of questionnaire development of the instrument to discover problems of wording, language and context. In an intensive, one-on-one interview called a cognitive interview, the questionnaire was administered to representative members of the target population. Respondents were asked to paraphrase specific questions, verbalize their thoughts about the meaning and intention of the questions, and make suggestions to improve the wording. By focusing on language and wording comprehensible to respondents, interviewers gain insight into the cognitive processes and needs of the target audience and have the opportunity to revise and improve the questionnaire in order to elicit more accurate data. Survey methodologists from the cognitive research laboratory at the National Center for Health Statistics pioneered the use of cognitive interviewing to evaluate problems unique to surveying older adults. [68]

Seven older adults were interviewed for the cognitive testing process. The participants were over the age of 80, racially diverse, and from assisted living and senior center settings. A major goal for the cognitive testing was to investigate respondent perception of questions regarding depression and hardiness. Because the hardiness questions had not been designed for older adults, it was believed that the cognitive interviews might indicate whether the questions were effective for older adults as written.

Throughout the course of the cognitive interviews, different types of problems were found with the hardiness questions: some questions had confusing syntax or poorly understood terminology and some questions were interpreted based on physical rather than psychological limitations. Major changes in wording were made for two questions. Question 5 was originally: "I take a head-on approach to facing problems in my life," and was reworded to say "When I have a problem in my life, I face up to it." Question 11 was originally: "I see really stressful events as opportunities to grow personally," and was reworded to say: "When bad things happen, I see them as a chance to become a stronger person." Minor wording changes were made to several other questions. It is believed that these changes improved the effective understanding of the questions by this population.

The questions were tested and rewritten, and the rewritten hardiness questions were cognitively tested in seven additional older adults. The outcome measure of improvement to the questions was the ability of respondents to answer questions without hesitation or have other symptoms of poor comprehension. Although this is not a quantitative measure, it is considered a standard outcome measure of cognitive interviewing.[68] Through the cognitive interviewing process, problem questions and unfamiliar terms (including medical language) were clarified, and thus participant burden was minimized.

During the cognitive interviewing process, the GDS-5 depression tool was also assessed for participant understanding. Participants who answered affirmatively to questions that indicate presence of depressive symptoms cited physical limitations rather than depression as reasons for their answers.[69] The questions asked about

feeling worthless, preferring to stay at home, and boredom. This may indicate that the GDS-5 measures impairment in physical status rather than emotional status.

Statistical analyses

Data were transcribed from the paper surveys into Microsoft Excel, and spot checked for accuracy. Data were analyzed with SAS (version 9.1; SAS Institute Inc, Cary, NC). Logistic regression models were used to examine the association between independent variables and appetite, while controlling for demographic variables. The following variables were examined in univariate models: site (senior center or assisted living), age, educational attainment (high school education or less, and some college/graduate school), emotional well-being (excellent or good, versus fair or poor), commitment score(as measured by the hardiness instrument), hardiness (≤ 67 vs. >67), presence of depressive symptoms (<2 vs. $\geq$2), self-reported health (excellent, very good or good, versus fair or poor), activity compared with peers (somewhat active or inactive versus active or very active), and chronic disease ($\geq$2 vs. $\leq$1). The final model includes: site, age, educational attainment, activity, self-reported health, ethnicity, chronic disease, emotional well-being, and commitment (a continuous variable measured by the hardiness instrument). In the regression models, data from both genders were combined because there were many fewer men than women in the sample (men: n=60, women: n=232) and there were no significant differences when stratified. Associations between oral health, hardiness and quality of life were examined using Spearman rank correlation coefficients, as the oral health and hardiness variables were used as categorical variables. The relationship between hardiness and quality of life was also examined using multiple regression, controlling

for education level, age and ethnicity. Results were reported using odds ratios (OR) and their corresponding 95% confidence intervals (CI). Odds ratios indicate the % change in likelihood of being classified into a category of the outcome variable, and confidence intervals demonstrate significance when they do not include 1.

Chapter 3: Results

The demographic characteristics differed significantly by site (Table 1). The subjects included both sexes and ranged in age from 59 to 101 years. Those in the senior center population were younger (44.1% >75 years vs. 85.0%, p<0.0001), less educated (p=0.007) and more ethnically diverse. They were also less likely to live alone (p<0.0001), and less likely to exhibit depressive symptoms (p<0.0001). They had better self-reported health, and emotional well-being. However, there was no significant difference in recent involuntary weight loss, or poor appetite between the two groups.

Table 1- Characteristics of sample by site

Characteristic	Senior center (n=145)	Assisted living residents (n=147)	p-value for ttest
Mean age (years) ±(Standard error)	74.0 ± 0.67	83.1 ± 0.65	<0.0001
Age (>75 years) (%)	44.1	85.0	<0.0001
Education (≤ high school) (%)	53.1	36.7	0.007
Ethnicity (%)			
White	45.5	84.4	0.0002
African-American	43.4	13.6	<0.0001
Hispanic	2.8	0.7	<0.0001
Live alone (%)	45.5	88.4	<0.0001
Have depressive symptoms (%)	9.7	27.9	<0.0001
Self-reported health, fair/poor (%)	20.0	30.6	<0.05
Emotional well-being, fair/poor (%)	11.0	24.5	0.004
Involuntary weight loss (≥ 10 lbs. in last 6 months) (%)	13.8	9.5	0.34
Poor appetite (%)	18.2	22.8	0.34

The mean, median, standard deviation and range for the measures of hardiness, depression and appetite used are given below (Table 2).

Table 2- Results of measuring depression, appetite and hardiness: Descriptive Statistics

Measure	Mean	Median	Standard Deviation	Observed Range	Possible Range
Geriatric Depression Scale-5	0.77	0	1.10	0-5	0-5
SNAQ	15.3	16	2.17	8-20	4-20
Modified DRS-II	68.6	69	7.85	50-87	18-90

Separate regression models were conducted examining the association between depression, hardiness and emotional well-being, each with appetite. These models controlled for site, educational level, age, activity, self-reported health and ethnicity. Several variables which measure aspects of mental and emotional health were significantly associated with appetite (Tables 3-6). Having fair or poor emotional well-being was the most strongly associated with poor appetite, even after controlling for confounding variables (OR=5.60, 95% CI= 2.60-12.07).

Table 3- Association between emotional well-being and poor appetite (n=274)

Characteristic	n (with characteristic)	Univariate association		Multivariate associations (n=274)	
		OR	95% CI	OR	95% CI
Emotional well-being (Fair or poor vs. Excellent or good)	49	6.59	3.34-12.99	5.60	2.60- 12.07
Site (Assisted living)	136			0.64	0.28-1.49
Education level (high school or less vs. more than high school)	123			1.45	0.76 - 2.79
Age				1.04	1.00-1.09
Activity (inactive vs. active)	100			1.58	0.77-3.23
Self-reported health (fair or poor vs. good, very good or excellent)	71			1.25	0.58-2.67
Ethnicity (non-white vs. white)	99			0.94	0.44-1.98
Chronic disease (≥2 vs. ≤1)	154			1.16	0.59-2.26

As previously demonstrated in many studies, the presence of depressive symptoms was associated with increased risk for poor appetite (OR=2.30, 95% CI= 1.09-4.87).

Table 4- Association between depression and poor appetite

Characteristic	n (with characteristic)	Univariate association		Multivariate associations (n=274)	
		OR	95% CI	OR	95% CI
Depression (Depressive symptoms present)	53	3.13	1.61-6.05	2.30	1.08- 4.87
Site (Assisted living)	136			0.64	0.28- 1.46
Education level (high school or less vs. more than high school)	123			1.44	0.77- 2.69
Age				1.04	0.99- 1.08
Activity (inactive vs. active)	100			1.94	0.98-3.87
Self-reported health (fair or poor vs. good, very good or excellent)	71			1.57	0.76-3.23
Ethnicity (non-white vs. white)	99			0.94	0.46-1.93
Chronic disease (≥2 vs. ≤1)	154			1.03	0.54-1.97

Low hardiness was found to be associated with poor appetite (OR=2.02, 95% CI= 1.07-3.81), as shown in Table 5.

Table 5- Association between hardiness and appetite

Characteristic	n	Univariate association		Multivariate associations (n=281)	
		OR	95% CI	OR	95% CI
Low Hardiness	113	2.40	1.33-4.35	2.02	1.07-3.81
Site (Assisted living)	136			0.70	0.31-1.56
Education level (high school or less vs. more than high school)	123			1.43	0.77-2.68
Age	136			1.04	1.00-1.08
Activity (inactive vs. active)	100			2.00	1.02-3.92
Self-reported health (fair or poor vs. good, very good or excellent)	71			1.78	0.89-3.59
Ethnicity (non-white vs. white)	99			0.95	0.46-1.95
Chronic disease (≥2 vs. ≤1)	154			0.97	0.51-1.87

The commitment dimension of hardiness also had a significant association

with appetite, even after controlling for confounding variables (OR=1.35, 95% CI=

1.13-1.61).

Table 6- Association between commitment and poor appetite

Characteristic	n	Univariate association		Multivariate associations (n=285)	
		OR	95% CI	OR	95% CI
Commitment (for every one unit decrease)		1.40	1.20-1.63	1.35	1.13-1.61
Site (Assisted living)	136			0.76	0.34-1.72
Education level (high school or less vs. more than high school)	123			1.60	0.84-3.05
Age	136			1.03	0.99-1.08
Activity (inactive vs. active)	100			1.46	0.71-3.02
Self-reported health (fair or poor vs. good, very good or excellent)	71			1.80	0.87-3.72
Ethnicity (non-white vs. white)	99			0.77	0.37-1.62
Chronic disease (≥2 vs. ≤1)	154			0.98	0.51-1.89

In addition to these mental health factors, other variables of interest with

relationship to appetite were self-reported health and activity. The univariate

association between self-reported health (fair or poor vs. good, very good or

excellent) was strong. Fair or poor self-reported health is associated with increased

risk for poor appetite (OR=2.18, 95% CI: 1.17-4.06). The univariate association

between activity level compared with peers (somewhat active or sedentary vs. active

or very active) and appetite was also interesting. In our sample, reporting a level of

activity as somewhat active or sedentary is associated with increased risk for poor

appetite (OR=2.59, 95% CI: 1.43-4.70).

In multivariate models, controlling for the same covariates, emotional well-

being and the commitment dimension of hardiness were the most strongly associated

with appetite. The other independent variables, total hardiness and depression,

became non-significant when emotional well-being and commitment were included in

the model. These results are shown in Table 7. Although all four models shown

explain significant amounts of the variance in appetite, model 4 which includes

emotional well-being and commitment explains the largest amount of variance ($R^2=$

0.23, p<0.0001). There were no interactions between hardiness, depression or

emotional well-being.

Table 7- Odds ratio and 95% confidence interval (CI) for four models examining appetite among older adults in our sample (n=274) *

Variables	n (with characteristic)	Model One (n=274)		Model Two (n=274)		Model Three (n=274)		Model Four (n=274)	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Low Hardiness	113	1.77	0.92-3.43			1.42	0.71-2.84		
Depression (Depressive symptoms present)	53	1.92	0.88-4.18	1.74	0.80-3.81				
Commitment (lower=decreased commitment score of hardiness)				1.31	1.09-1.57			1.25	1.04-1.51
Emotional well-being (Fair or poor vs Excellent or good)	49					4.96	2.23-11.02	4.45	2.02-9.80

*Controlling for site, education level, age, activity, self-reported health, ethnicity and chronic disease (Model 1: $R^2=$ 0.14, p<0.01, Model 2: $R^2=$ 0.17, p<0.001, Model 3: $R^2=$ 0.20, p<0.0001, Model 4: $R^2=$ 0.23, p<0.0001)

In addition to examining factors affecting appetite in this sample, we also

measured quality of life among individuals in the assisted living sample. We

hypothesized that quality of life would be associated with both hardiness, and oral

health. While no correlations between oral health and any quality of life domains

were significant, moderate correlations exist between hardiness, general quality of life

and health satisfaction, as well as hardiness and each domain of quality of life,

particularly the social and environmental domains of quality of life as measured by

the WHOQOL-BREF (Table 8).

Table 8- Spearman correlation coefficients of Quality of life (QOL) with
dichotomous variables of hardiness and oral health

Quality of life domain	Hardiness class	Oral health class
General QOL	0.41 (p< 0.0001)	0.06 (p> 0.05)
Health satisfaction QOL	0.29 (p< 0.0001)	0.08 (p> 0.05)
QOL domain 1 (Physical health)	0.24 (p< 0.01)	0.16 (p> 0.05)
QOL domain 2 (Psychological)	0.23 (p< 0.01)	0.10 (p> 0.05)
QOL domain 3 (Social)	0.47 (p< 0.0001)	0.05 (p> 0.05)
QOL domain 4 (Environmental)	0.42 (p< 0.0001)	0.12(p> 0.05)

To further examine the relationship between hardiness and quality of life,

regression was performed with general quality of life, health satisfaction and the four

domains (physical health, psychological, social and environmental) as the dependent

variables, and hardiness and its dimensions as the independent variables. Total

hardiness explained the most variation in the general QOL score (R^2= 0.33,

p<0.0001), with commitment also explaining a large amount of variance (R^2= 0.26,

p<0.0001). Indeed, hardiness was significantly associated with all domains of quality

of life, and commitment was the dimension of hardiness most strongly associated

with quality of life.

Table 9-Regression with quality of life as the dependent variable, examining the relationship with hardiness and its components, while controlling for age, education level and ethnicity:

Quality of life domain	Hardiness (R^2, p value)
General QOL	0.33, <0.0001
Health satisfaction QOL	0.16, <0.0001
QOL domain 1 (Physical health)	0.16, 0.0001
QOL domain 2 (Psychological)	0.16, <0.0001
QOL domain 3 (Social)	0.22, <0.0001
QOL domain 4 (Environmental)	0.35, <0.0001

Chapter 4: Discussion

<u>Major findings</u>

The results of this study indicate that self-reported emotional well-being, hardiness, and depression are the variables most strongly associated with appetite. This research is consistent with the results of many previous research studies in finding an association between the presence of depressive symptoms and poor appetite among older adults when controlling for site, education level, age, activity, self-reported health, ethnicity and chronic disease. Similarly, when controlling for the same variables, there was also an association between emotional well-being and appetite.

Another variable, hardiness, which has not been explored extensively in relationship to health in older adults was also associated with appetite. Lower hardiness was associated with poor appetite in our study sample. One component of hardiness in particular; commitment, was strongly associated with poor appetite in our population. Individuals with low commitment scores had an increased risk of poor appetite, when controlling for other variables. The commitment dimension of hardiness measures the level of involvement that an individual has in his or her life activities.[12] While there was no significant interaction between depression and hardiness, depression, emotional well-being and hardiness were individually significantly associated with appetite while controlling for site, education level, age, activity, self-reported health, ethnicity and chronic disease. In multivariate models, fair or poor emotional well-being was the variable most strongly associated with poor appetite. This suggests that a simple, single item question regarding emotional well-

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being may be a good indicator of risk of poor appetite and simpler to use than the short form of the Geriatric Depression Scale which has been used in other studies. [70, 71]

Depression and appetite

The relationship between depression and appetite in the older adult population has been well studied. It has been established that in this population, appetite is negatively affected by depression.[4] Among younger populations, depression has been shown to be associated with increased and decreased appetite in different individuals.[72] Decreased appetite is more likely as people age for a variety of reasons, and is of more concern due to its potential to increase mortality.[6] It has been shown that depression is a common psychological problem and a significant cause of decreased appetite and motivation to eat in older adults.[34] The decrease in appetite due to depression often occurs in conjunction with decreased social networks, widowhood, a decrease in the variety of food, or institutionalization, which are common life experiences for older adults.

Many older adults that we interviewed were taking multiple medications, and it is likely that many were taking medication for the treatment of depression. In a 3 month depression treatment trial, the reduced appetite symptom of the Montgomery-Asberg Depression Rating Scale (MADRS) had the highest severity among the symptoms in those patients in remission.[73] This gives evidence for the lingering presence of decreased appetite caused by depression, even in those being treated successfully.

In our sample, emotional well-being was more strongly associated with appetite than depression. A qualitative study which interviewed older adults about factors affecting their appetite found that there were six categories of factors which affected the appetites of the older adults interviewed.[74]   The main factor affecting appetite was the willingness to eat, and subcategories included: mood, personal values, wholesomeness (health), food, eating environment (cleanliness and sounds) and meal fellowship. This study suggests that in this population, appetite and willingness to eat may be strongly influenced by each person's psychological well-being, among other factors. In our study, when asked to rate their emotional well-being as excellent, good, fair or poor, we were asking them to report how their positive or negative emotions affect their life. Our results suggest that individuals' perception of their emotional well-being may be more indicative of the effect of negative emotions on appetite than depression as measured by the GDS-5. This may be due to participants answering questions of the GDS-5 based on physical limitations rather than emotional status, as previously mentioned.

In a study including young, middle aged, and older adults, it was found that as compared with their healthy weight counterparts, underweight individuals had significantly higher levels of depression and negative affect.[75] This suggests a possible vicious cycle, whereby depression causes reduced appetite and weight loss, and the cycle continues. It is well established that negative emotions and depression in the older adult population are strongly associated with reduced appetite and weight loss, which increases mortality.[29, 34]

Previous research has shown that older adults with chronic conditions are less likely to engage in leisure-time physical activity, and that association partially accounts for some negative consequences of chronic conditions, including mobility limitations, pain, and emotional problems.[76] We found that those individuals reporting that they were somewhat active or sedentary as compared to their peers had an increased risk for having poor appetite. Reduced levels of activity may be a result of depression, and may also cause a decrease in appetite due to the reduced energy needs. This study supports the previous findings that depression and emotional problems are strongly associated with risk of poor appetite in this population.

Hardiness and appetite

Our study has shown an association between hardiness and appetite, and particularly between commitment and appetite. This is the first study to examine the relationship between hardiness and appetite. However, as loss of appetite is often associated with chronic illness and multiple medication use, previous research examining associations of hardiness with response to chronic illness are relevant. The relationship between hardiness and adaptation to physiological stress has been studied previously. A study examining the relationships between hardiness and both psychosocial and physiological adaptations to chronic disease was performed in a group of older adults recently diagnosed with rheumatoid arthritis, insulin-dependent diabetes mellitus or hypertension (total n=60, n=20 with each condition).[77] It was found that hardiness was correlated with psychosocial adaptation to disease in all groups (r=0.42, p=0.01). Hardiness was significantly correlated with physiological adaptation in the group diagnosed with diabetes mellitus (r=0.43, p<0.05). The

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correlation between hardiness and physiological adaptation in those with diabetes indicates a potential for improved health maintenance in those individuals with increased hardiness. One component of physiological adaptation to many diseases is maintenance of a good appetite. This research lends support to our result that hardiness and appetite are correlated. Additionally, the correlation between psychosocial adaptation and hardiness in all disease condition groups indicates that older adults who are hardy may adapt better mentally and socially (calling on their social support) when faced with a disease diagnosis.

Consistent with previous research, we found hardiness to be associated with self-reported health. In a sample of 110 older adults, hardiness was found to be significantly correlated with perceived health status.[16] Hardy older adults may perceive health problems as less stressful, and therefore report higher self-reported health than individuals with low levels of hardiness. It is also possible that appetite is less affected by chronic disease when the perception of the individual is that the disease is manageable.

Associations with Quality of life

Our results showed that hardiness is associated with all domains of quality of life as measured by the WHOQOL-BREF. This is the first study known to examine hardiness and quality of life in older adults. Previous quality of life research has shown measures of quality of life to be associated with some health factors in the older adult population. In older male cancer patients, it was found that quality of life and oral health are correlated. [56] This may be very specific to the cancer patient population, as cancer treatment often has effects on oral health. We did not find a

significant correlation between self-reported oral health, and quality of life. Correlations were small and non-significant. However, there were moderate correlations between hardiness and the single item rating of quality of life, as well as between hardiness and the social and environmental domains of quality of life. As the WHOQOL-BREF tool is largely a self-reported assessment of satisfaction with various aspects of one's life, it follows that individuals who are more capable of managing stress, and have a sense of control in their life will be more satisfied and therefore have higher quality of life as measured by this tool. This association is yet another reason why hardiness interventions have the potential to increase not only health but quality of life in this population.

Clinical relevance

It is well documented that depression and poor appetite are related to weight-loss and malnutrition in the older adult population.[4, 7, 78] This research suggests that emotional well-being and hardiness are other factors which are associated with appetite in older adults. This may indicate that a single question asking how the patient would describe their emotional well-being, in general, with the four possible options of: excellent, good, fair or poor, may be as good of a tool or better for use in screening for risk of malnutrition as the GDS-5 and potentially other depression screening tools. Additionally, hardiness, and in particular the commitment dimension is also associated with appetite and may measure a different aspect than depression of the mental/emotional component influencing appetite in this population.

It has been shown that hardiness can be fostered in both an organizational and a health-related setting.[62] Hardiness interventions can potentially be of great benefit to the older adult population who manages many sources of stress. In our sample, the commitment dimension of hardiness remains associated with poor appetite when controlled for emotional well-being. Interventions designed to foster hardiness, and commitment in particular could be utilized to improve well-being and hence overall health and appetite. In Healthy People 2010, it is stated that: "The first goal of Healthy People 2010 is to help individuals of all ages increase life expectancy *and* improve their quality of life."[63] Improvement in appetite by interventions designed to change modifiable risk factors such as hardiness and commitment has the potential to promote health and increase quality of life for older adults.

There are limitations to the conclusions that can be drawn from our research for several reasons. This study is cross-sectional and therefore causal relationships cannot be determined. Questions about income may have been difficult for the respondents to interpret, as many older adults do not have control over their finances. This limited our ability to associate any variables with socio-economic status, although we did include education level as a variable in our models, which is often used as a proxy for socio-economic status. As with any orally administered survey, there is always a risk of "leading" the respondent. Some participants may have tried to answer emotionally difficult questions in a more socially acceptable manner than if they had been answering on paper. [79] Editing for social desirability has been specifically noted in older respondents. [80] However, oral administration of the survey was considered the best option to minimize burden for the participants and maximize participation.

As the nature of our study population was self-selected, eligible subjects did not volunteer to participate for various reasons. It is likely that depressed individuals were less inclined to participate. The contacts at each assisted living site helped recruit the participants, and it is likely that the methods were inconsistent between the different locations, though we requested that each coordinator announce the study to all of the residents. It is also likely that there is a higher incidence of depression among older adults in assisted living, when compared with the general population. This may limit the study's applicability to other settings, but will give the best possibility of examining the interaction between appetite, depression and hardiness.

This study has several strengths. The survey includes many questions that have been previously validated, cognitively tested and used among older adults. This contributes to the validity, reliability and ease of comparison of the survey. The survey instrument also assessed a broad range of factors that may influence appetite, including medication use, presence of chronic disease, social isolation, physical activity and depression. This study contributes to the literature surrounding factors affecting appetite in the older adult population. The study is new and innovative, as the association between hardiness and appetite has not been previously studied.

<u>Suggestions for further research</u>

There have only been a few documented cases of interventions to increase hardiness, but none of these have been among the older adult population. However, it is likely that positive changes in appetite and health may occur with interventions designed to increase hardiness among older adults. Hardiness has been fostered through training and interventions to improve responses of managers to stressful situations, thus improving overall work morale and productivity. It has also been shown that hardiness can be fostered in individuals with high stress in their lives, and result in positive changes in thoughts, feelings and behaviors. [5] In addition to the likely positive influence of improved hardiness on appetite, increasing hardiness in a sample of older adults with low hardiness may have other benefits as older adults manage many sources of stress. A program which would foster hardiness would hopefully increase the ability of the participants to manage stress in their lives. Future research involving a hardiness intervention in older adults with poor appetite and hardiness would provide valuable information. Older adults face many life and health-related stressors, and hardiness interventions in this population may be a way to help them manage these and maintain their health and quality of life.

Appendices

Hardiness Questionnaire: Fall 2007

PART 1: DEMOGRAPHIC INFORMATION

For the first part of this survey, I would like to find out some information about you.

DEMOG1. Which race/ethnic groups best describes yours? (READ OUT ALL OPTIONS)
American Indian/Alaskan Native…………….1 (NEXT QUESTION IS DEMOG2)
Asian-American……………….…………….2 (NEXT QUESTION IS DEMOG2)
Black or African-American……………….…3 (NEXT QUESTION IS DEMOG2)
Hispanic or Latino………….…..…………4 (NEXT QUESTION IS DEMOG2)
Native Hawaiian or Other Pacific Islander….5 (NEXT QUESTION IS DEMOG2)
White……………………………………….6 (NEXT QUESTION IS DEMOG2)
Other ……………………………………..… 7 (NEXT QUESTION IS DEMOG2)
(Please specify)_____
Don't know…………………………………..77 (NEXT QUESTION IS DEMOG2)
Refused……………………………………….88 (NEXT QUESTION IS DEMOG2)

DEMOG2. Which of the following describes your current status? (READ OUT ALL OPTIONS)
Married or life partner ….. …. …. ..1 (NEXT QUESTION IS DEMOG3)
Widowed/life partner deceased ….2 (NEXT QUESTION IS DEMOG3)
Divorced……………….. … ……….3 (NEXT QUESTION IS DEMOG3)
Separated………….… …. …..…...4 (NEXT QUESTION IS DEMOG3)
Never married/Single.. ….. …..……5 (NEXT QUESTION IS DEMOG3)
Don't know………….. … ………..77 (NEXT QUESTION IS DEMOG3)
Refused……………….. ……. …..88 (NEXT QUESTION IS DEMOG3)

DEMOG3. Including yourself, how many people live in your household right now?

Number _____

DEMOG4A. What is your date of birth? (If unable to answer, go to DEMOG4B)
__ __ / __ __ / __ __ __ __ (MONTH/DAY/YEAR)
Gave date of birth ….1 (NEXT QUESTION IS DEMOG4B)
Don't know…………77 (NEXT QUESTION IS DEMOG4B)
Refused……………..88 (NEXT QUESTION IS DEMOG4B)

DEMOG4B. What age range does your age fall into?
60-69…..……..1 (NEXT QUESTION IS DEMOG5)
70-79………..…2 (NEXT QUESTION IS DEMOG5)
80+ … ….. …..3 (NEXT QUESTION IS DEMOG5)
Don't know..…77 (NEXT QUESTION IS DEMOG5)
Refused……....88 (NEXT QUESTION IS DEMOG5)

DEMOG5. How many years of education have you completed?
Number _____   (NEXT QUESTION IS
DEMOG6)
Don't know………………………………………...77 (NEXT QUESTION IS
DEMOG6)
Refused………………………………………………88 (NEXT QUESTION IS
DEMOG6)

DEMOG6. Thinking about the total combined income from all sources for all persons in this household, was your total household annual income during the year 2006 above or below $20,000?
Above $20,000………………...…1 (NEXT QUESTION IS DEMOG8)
Below $20,000………….…..….2 (NEXT QUESTION IS DEMOG7)
Don't Know………………......77 (GO TO NEXT SECTION)
Refused……………………….…88 (GO TO NEXT SECTION)

DEMOG7. Which category best describes your total household annual income during the year 2006?
$10,000 or less ....1 (GO TO NEXT SECTION)
$10,001 to $15,000 ....2 (GO TO NEXT SECTION)
$15,001 to $20,000 ....3 (GO TO NEXT SECTION)
Don't Know………………......77 (GO TO NEXT SECTION)
Refused……………………….88 (GO TO NEXT SECTION)

DEMOG8. Which category best describes your total household annual income during the year 2006?
$20,001 to $25,000 ....…..........................1 (GO TO NEXT SECTION)
$25,001 to $30,000 ....2 (GO TO NEXT SECTION)
$30,001 to $35,000 ....3 (GO TO NEXT SECTION)
$35,001 to $40,000 ....4 (GO TO NEXT SECTION)
Over $40,000 ....5 (GO TO NEXT SECTION)

Part 2: GENERAL HEALTH ASSESSMENT

Next, I'm going to ask you some general questions about your health.

GENHLTH1. How would you describe your overall health right now (READ OUT RESPONSE OPTIONS; SHOW CARD)?
Would you say it is:
Excellent ……………….………1 (NEXT QUESTION IS GENHLTH2)
Very good………………………2 (NEXT QUESTION IS GENHLTH2)
Good ……..……………….…….3 (NEXT QUESTION IS GENHLTH2)
Fair ……….….……………..……4 (NEXT QUESTION IS GENHLTH2)

Poor ………………….…………5 (NEXT QUESTION IS GENHLTH2)
Don't know …………….….……77 (NEXT QUESTION IS GENHLTH2)
Refused ……………….………..88 (NEXT QUESTION IS GENHLTH2)

GENHLTH2. Was your last visit to a health professional (such as a doctor or nurse):
Within the last 12 months …. …..1 (NEXT QUESTION IS GENHLTH3A)
More than 1 year ago … …. ….. .2 (NEXT QUESTION IS GENHLTH3A)
Don't know ………………..…….77 (NEXT QUESTION IS GENHLTH3A)
Refused …………………….…..88 (NEXT QUESTION IS GENHLTH3A)

GENHLTH3A. Has a health professional (such as a doctor or nurse) ever told you that you have any of the following health conditions?

_____ Heart disease, including coronary heart disease, angina, heart attack, congestive heart failure or myocardial infarction
_____ Respiratory diseases such as emphysema, pneumonia, or asthma
_____ Kidney disease
_____ Hypertension or high blood pressure
_____ Diabetes or high sugar in the blood
_____ Mental health conditions such as dementia or depression
_____ Nausea, diarrhea or other bowel problems
_____ Stroke
_____ Bone related disease such as arthritis or osteoporosis
_____ Anemia or iron-poor blood
_____ Hip or joint replacement
_____ Bone fracture within the last year
_____ Cancer
_____ Other (If yes, go to **GENHLTH3B;** otherwise go to **GENHLTH4**)

GENHLTH3B. Please specify the condition you have:

_____

GENHLTH4A. Have you been hospitalized within the last year?

No …. … … … ….……….……1 (NEXT QUESTION IS GENHLTH5)
Yes … … .……….………..….2 (NEXT QUESTION IS GENHLTH4B)
Don't know ………….…...…77 (NEXT QUESTION IS GENHLTH5)
Refused ……….….…….….88 (NEXT QUESTION IS GENHLTH5)

GENHLTH4B. What was the reason for your hospitalization?

_____

GENHLTH5. Within the last year, have you changed the TYPE of food you eat?

No….…….…………1 (NEXT QUESTION IS GENHLTH6)
Yes….….…………..2 (NEXT QUESTION IS GENHLTH6)
Don't know ….….…77 (NEXT QUESTION IS GENHLTH6)
Refused …….….….88 (NEXT QUESTION IS GENHLTH6)

GENHLTH6. Within the last year, have you changed the AMOUNT of food you eat?

No….……….………1 (NEXT QUESTION IS GENHLTH7)
Yes….….…………..2 (NEXT QUESTION IS GENHLTH7)
Don't know ….….…77 (NEXT QUESTION IS GENHLTH7)
Refused …….….….88 (NEXT QUESTION IS GENHLTH7)

GENHLTH7. Have you, without wanting to, <u>LOST</u> more than 10 pounds over the last 6 months?

No….….…….…1 (NEXT QUESTION IS GENHLTH8)

Yes….….…...2 (NEXT QUESTION IS GENHLTH9)
Don't know….77 (NEXT QUESTION IS GENHLTH9)
Refused …….88 (NEXT QUESTION IS GENHLTH9)

GENHLTH8. Have you, without wanting to, <u>GAINED</u> more than 10 pounds over the last 6 months?

No….….…….…1 (NEXT QUESTION IS GENHLTH9)

Yes….….…...2 (NEXT QUESTION IS GENHLTH9)
Don't know….77 (NEXT QUESTION IS GENHLTH9)
Refused …….88 (NEXT QUESTION IS GENHLTH9)

GENHLTH9. How many alcoholic beverages do you drink each day?
Number _____ (NEXT QUESTION IS GENHLTH10)
Don't know…… …. . .77 (NEXT QUESTION IS GENHLTH10)
Refused ….. ……. ….88 (NEXT QUESTION IS GENHLTH10)

GENHLTH10. Do you currently smoke?
No … …. ….…1 (NEXT QUESTION IS GENHLTH11)
Yes … … ……2 (NEXT QUESTION IS GENHLTH12)
Don't know ...77 (NEXT QUESTION IS GENHLTH11)
Refused ....88 (NEXT QUESTION IS GENHLTH11)

GENHLTH11. Have you smoked more that 100 cigarettes over your lifetime?
No … …. …1 (NEXT QUESTION IS GENHLTH12)
Yes … …. ...2 (NEXT QUESTION IS GENHLTH12)
Don't know ...77 (NEXT QUESTION IS GENHLTH12)
Refused ....88 (NEXT QUESTION IS GENHLTH12)

GENHLTH12. Would you say you eat your meals alone (READ OUT ALL OPTIONS):

All of the time……..…1 (NEXT QUESTION IS GENHLTH13)
Most of the time….….2 (NEXT QUESTION IS GENHLTH13)
Some of the time……3 (NEXT QUESTION IS GENHLTH13)
Never………………...4 (NEXT QUESTION IS GENHLTH13)
Don't know……….…77 (NEXT QUESTION IS GENHLTH13)
Refused ………….....88 (NEXT QUESTION IS GENHLTH13)

GENTHLTH13. How would you describe the condition of your mouth and teeth? Would you say (READ OUT ALL OPTIONS; SHOW CARD):
Excellent………1 (NEXT QUESTION IS GENHLTH14)
Very good……..2 (NEXT QUESTION IS GENHLTH14)
Good…………..3 (NEXT QUESTION IS GENHLTH14)
Fair …………....4 (NEXT QUESTION IS GENHLTH14)
Poor …………...5 (NEXT QUESTION IS GENHLTH14)
Don't know ….77 (NEXT QUESTION IS GENHLTH14)
Refused ……..88 (NEXT QUESTION IS GENHLTH14)

GENHTLTH14. Do you have problems such as loose teeth or mouth sores that make it hard for you to eat?
No……………1 (NEXT QUESTION IS GENHLTH15)
Yes…………..2 (NEXT QUESTION IS GENHLTH15)
Don't know….77 (NEXT QUESTION IS GENHLTH15)
Refused …….88 (NEXT QUESTION IS GENHLTH15)

GENHLTH15. Do you have dentures? (If yes, skip to GENHLTH17)
No……………1 (NEXT QUESTION IS GENHLTH16)
Yes…………..2 (NEXT QUESTION IS GENHLTH17)
Don't know….77 (NEXT QUESTION IS GENHLTH16)
Refused …….88 (NEXT QUESTION IS GENHLTH16)

GENHLTH16. Do you feel that you need dentures?
No……………1 (NEXT QUESTION IS GENHLTH19)
Yes…………..2 (NEXT QUESTION IS GENHLTH19)
Don't know….77 (NEXT QUESTION IS GENHLTH19)
Refused …….88 (NEXT QUESTION IS GENHLTH19)

GENHLTH17. Do you wear your dentures?
No……………1 (NEXT QUESTION IS GENHLTH18)
Yes…………..2 (NEXT QUESTION IS GENHLTH18)
Don't know….77(NEXT QUESTION IS GENHLTH18)
Refused …….88 (NEXT QUESTION IS GENHLTH18)

GENHLTH18. How well do your dentures fit (READ OUT ALL OPTIONS)?
Very well………1 (NEXT QUESTION IS GENHLTH19)
Well…………..2 (NEXT QUESTION IS GENHLTH19)
Fairly well……..3 (NEXT QUESTION IS GENHLTH19)
Poorly………… 4 (NEXT QUESTION IS GENHLTH19)
Very poorly……5 (NEXT QUESTION IS GENHLTH19)
Don't know……77 (NEXT QUESTION IS GENHLTH19)
Refused………88 (NEXT QUESTION IS GENHLTH19)

GENHLTH19. How often do you limit the kind or amount of food you eat because of problems with your teeth or dentures? Would you say (READ OUT ALL OPTIONS):
Always……….1 (NEXT QUESTION IS GENHLTH20)
Very often……2 (NEXT QUESTION IS GENHLTH20)
Sometimes…..3 (NEXT QUESTION IS GENHLTH20)
Seldom……… 4 (NEXT QUESTION IS GENHLTH20)
Never………...5 (NEXT QUESTION IS GENHLTH20)
Don't know….77 (NEXT QUESTION IS GENHLTH20)
Refused……..88 (NEXT QUESTION IS GENHLTH20)

GENHLTH20. Compared to other people your age, would you describe yourself as
Very active … …….. …1 (CONTINUE TO NEXT SECTION)
Active … …. …. … ……2 (CONTINUE TO NEXT SECTION)
Somewhat active …. … 3 (CONTINUE TO NEXT SECTION)
Inactive or sedentary ….4 (CONTINUE TO NEXT SECTION)
Don't know ….. … … ..77 (CONTINUE TO NEXT SECTION)
Refused ..…… … … ...88 (CONTINUE TO NEXT SECTION)

GENHLTH21. How many prescription medications do you presently take each day?
Number _____

GENHLTH22. Are any of your medications for the treatment of depression?

No …. … … … .………………1 (NEXT QUESTION IS DEPASSMT1)
Yes … … ………………..…..2 (NEXT QUESTION IS GENHLTH22B)
Don't know …………….....77 (NEXT QUESTION IS DEPASSMT1)
Refused ……………….…….88 (NEXT QUESTION IS DEPASSMT1)

GENHLTH22B. Which medications are for the treatment of depression?

_____

PART 3: DEPRESSION STATUS ASSESSMENT

The next questions are to find out about your outlook on life in general. I am going to ask you these questions because I am interested in how things are going for you. Please answer these questions with "Yes" or "No". Remember, all your answers will remain confidential. Are you ready to begin?

DEPASSMT1. Are you basically satisfied with your life?

No……………1 (NEXT QUESTION IS DEPASSMT2)
Yes…………..2 (NEXT QUESTION IS DEPASSMT2)
Don't know….77 (NEXT QUESTION IS DEPASSMT2)
Refused …….88 (NEXT QUESTION IS DEPASSMT2)

DEPASSMT2. Do you often get bored?

No……………1 (NEXT QUESTION IS DEPASSMT3)
Yes…………..2 (NEXT QUESTION IS DEPASSMT3)
Don't know….77 (NEXT QUESTION IS DEPASSMT3)
Refused …….88 (NEXT QUESTION IS DEPASSMT3)

DEPASSMT3. Do you often feel helpless?

No……………1 (NEXT QUESTION IS DEPASSMT4)
Yes…………..2 (NEXT QUESTION IS DEPASSMT4)
Don't know….77 (NEXT QUESTION IS DEPASSMT4)
Refused …….88 (NEXT QUESTION IS DEPASSMT4)

DEPASSMT4. Do you prefer to stay at home rather than going out and doing new things?

No……………1 (NEXT QUESTION IS DEPASSMT5)
Yes…………..2 (NEXT QUESTION IS DEPASSMT5)
Don't know….77 (NEXT QUESTION IS DEPASSMT5)
Refused …….88 (NEXT QUESTION IS DEPASSMT5)

DEPASSMT5. Do you feel pretty worthless the way you are now?

No……………1 (NEXT QUESTION IS DEPASSMT6)
Yes…………..2 (NEXT QUESTION IS DEPASSMT6)
Don't know….77 (NEXT QUESTION IS DEPASSMT6)
Refused……..88 (NEXT QUESTION IS DEPASSMT6)

DEPASSMT6. In general, how would you describe your emotional well-being?
Excellent….…..1 (NEXT QUESTION IS SOCSUPP1)
Good …….…..2 (NEXT QUESTION IS SOCSUPP1)
Fair…………...3 (NEXT QUESTION IS SOCSUPP1)
Poor………….4 (NEXT QUESTION IS SOCSUPP1)
Don't know…..77 (NEXT QUESTION IS SOCSUPP1)
Refused ……..88 (NEXT QUESTION IS SOCSUPP1)

SOCSUPP1. Do you have someone you can talk to about pretty much anything?
No . . . . . . 1 (GO TO NEXT SECTION)
Yes . . . . . .2 (NEXT QUESTION IS SOCSUPP2)
Don't know . . 77 (GO TO NEXT SECTION)
Refused . . . . 88 (GO TO NEXT SECTION)

SOCSUPP2. If so, please tell me how often this is true for you.
Always………1 (GO TO NEXT SECTION)
Very often…..2 (GO TO NEXT SECTION)
Often………..3 (GO TO NEXT SECTION)
Sometimes…4(GO TO NEXT SECTION)
Not often……5 (GO TO NEXT SECTION)
Never……….6 (GO TO NEXT SECTION)
Don't know…77 (GO TO NEXT SECTION)
Refused ……88 (GO TO NEXT SECTION)

Now, I'd like to ask you some questions about how you feel about your life in general. There are 5 possible answers for these questions (show card). You may answer "definitely true," "true most of the time," "true about half the time and false about half the time," "false most of the time," or "definitely false." Please pick the answer that best describes the way your whole life has been.

Part 4: Hardiness Assessment

1 = definitely false	2 = false most of the time	3 = true about half the time, false about half the time	4 = true most of the time	5 = definitely true

1. (CO +) ____		The successes I've had in life are due to my effort and ability.
2. (CO -) ____		Things don't turn out right no matter how hard I try.
3. (CM +) ____		I enjoy most things in life.
4. (CM -) ____		Most days, life seems meaningless to me.
5. (CH +) ____		When I have a problem in my life, I face up to it.
6. (CH -) ____		It bothers me when my daily routine gets interrupted.
7. (CO+) ____		I feel confident I can handle just about any problem.
8. (CO-) ____		I often feel helpless.
9. (CM+) ____		I spend most of my time doing things that are worthwhile.
10. (CM-) ____		I often feel alienated, or emotionally disconnected, from the people around me.
11. (CH+) ____		When bad things happen, I see them as a chance to become a stronger person.
12. (CH-) ____		I don't like to make changes in my everyday routine.
13. (CO+) ____		When I succeed, it's because I made good choices.
14. (CO-) ____		The tried and true ways are always best.
15. (CM+) ____		Most days, my life is really interesting.
16. (CM-) ____		I usually feel all alone in the world.
17. (CH+) ____		I often wake up eager to get on with my life.
18. (CH-) ____		I carefully plan just about everything I do.

Part 5: Appetite Assessment

The next few questions are designed to help me learn more about your appetite.

APP1. Is your appetite:
Very poor…………1 (NEXT QUESTION IS APP2)
Poor……………..2 (NEXT QUESTION IS APP2)
Fair………………3 (NEXT QUESTION IS APP2)
Good………………4 (NEXT QUESTION IS APP2)
Excellent…………5 (NEXT QUESTION IS APP2)
Don't know…..77 (NEXT QUESTION IS APP2)
Refused ……..88 (NEXT QUESTION IS APP2)

APP2. When you eat, do you feel full after:
Eating only a few mouthfuls………………1 (NEXT QUESTION IS APP3)
Eating about 1/3 of a dinner plate full . . . .2 (NEXT QUESTION IS APP3)
Eating over ½ of a dinner plate full ………3 (NEXT QUESTION IS APP3)
Eating most of the food…………………... 4 (NEXT QUESTION IS APP3)
Hardly ever…………………………………5 (NEXT QUESTION IS APP3)
Don't know…..77 (NEXT QUESTION IS APP3)
Refused ……..88 (NEXT QUESTION IS APP3)

APP3. In general, food tastes:
Very poor……………1 (NEXT QUESTION IS APP4)
Poor …………………2 (NEXT QUESTION IS APP4)
Average…..…………3 (NEXT QUESTION IS APP4)
Good………………..4 (NEXT QUESTION IS APP4)
Very good …………5 (NEXT QUESTION IS APP4)
Don't know…..77 (NEXT QUESTION IS APP4)
Refused ……..88 (NEXT QUESTION IS APP4)

APP4. Normally, do you eat:
Less than one full meal a day………………..1 (NEXT QUESTION IS APP5A)
One meal a day………………………………2 (NEXT QUESTION IS APP5A)
Two meals a day……………………….…...3 (NEXT QUESTION IS APP5A)
Three meals a day……………………………4 (NEXT QUESTION IS APP5A)
More than three meals a day, including snacks…..5 (NEXT QUESTION IS APP5A)
Don't know…… …. …. … …. … … … …. … ....77 (NEXT QUESTION IS APP5A)
Refused ….. …. … …. . …. … .. … … .. ……..88 (NEXT QUESTION IS APP5A)

APP5A. Do you think anything in your life currently affects your appetite?
No …. …. … 1 (NEXT QUESTION IS APP6)
Yes …. … … 2 (NEXT QUESTION IS APP5B)
Don't know ...77 (NEXT QUESTION IS APP6)
Refused ..…..88 (NEXT QUESTION IS APP6)

APP5B. If yes, please describe.

APP6. How many meals per week do you normally eat in the dining room of this facility?
Number _____
Don't know ...77
Refused .…...88

Part 6: QUALITY OF LIFE ASSESSMENT
The following questions ask how you feel about your quality of life, health, or other areas of your life. I will read out each question to you, along with the response options. **Please choose the answer that appears most appropriate.** If you are unsure about which response to give to a question, the first response you think of it often the best one.

Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **in the last four weeks.**

		Very poor	Poor	Neither poor nor good	Good	Very good
1.	How would you rate your quality of life?	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
2.	How satisfied are you with your health?	1	2	3	4	5

The following questions ask about **how much** you have experienced certain things in the last four weeks.

		Not at all	A little	A moderate amount	Very much	An extreme amount
3.	To what extent do you feel that physical pain prevents you from doing what you need to do?	5	4	3	2	1
4.	How much do you need any medical treatment to function in your daily life?	5	4	3	2	1
5.	How much do you enjoy life?	1	2	3	4	5
6.	To what extent do	1	2	3	4	5

		Not at all	A little	A moderate amount	Very much	Extremely
	you feel your life to be meaningful?					

		Not at all	A little	A moderate amount	Very much	Extremely
7.	How well are you able to concentrate?	1	2	3	4	5
8.	How safe do you feel in your daily life?	1	2	3	4	5
9.	How healthy is your physical environment?	1	2	3	4	5

The following questions ask about how completely you experience or were able to do certain things in the last four weeks.

		Not at all	A little	Moderately	Mostly	Completely
10.	Do you have enough energy for everyday life?	1	2	3	4	5
11.	Are you able to accept your bodily appearance?	1	2	3	4	5
12.	Have you enough money to meet your needs?	1	2	3	4	5
13.	How available to you is the information that you need in your day-to-day life?	1	2	3	4	5
14.	To what extent do you have the opportunity for leisure activities?	1	2	3	4	5

		Very poor	Poor	Neither poor nor good	Good	Very good
15.	How well are you able to get around?	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
16.	How satisfied are you with your sleep?	1	2	3	4	5
17.	How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
18.	How satisfied are you with your capacity for work?	1	2	3	4	5
19.	How satisfied are you with yourself?	1	2	3	4	5
20.	How satisfied are you with your personal relationships?	1	2	3	4	5
21.	How satisfied are you with your sex life?	1	2	3	4	5
22.	How satisfied are you with the support you get from your friends?	1	2	3	4	5
23.	How satisfied are you with the conditions of your living place?	1	2	3	4	5
24.	How satisfied are you with your access to health services?	1	2	3	4	5
25.	How satisfied are you with your transport?	1	2	3	4	5

The follow question refers to **how often** you have felt or experienced certain things in the last two weeks.

		Never	Seldom	Quite often	Very often	Always
26.	How often do you have negative feelings, such as blue mood, despair, anxiety, depression?	1	2	3	4	5

END OF SURVEY

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