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# Examining the Relationship Between Medical Concerns and Overall Mental Health Rating

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EXAMINING THE RELATIONSHIP BETWEEN MEDICAL  
CONCERNS AND OVERALL MENTAL HEALTH RATING

A Thesis  
Presented to  
The Faculty of the Department of Psychology  
Western Kentucky University  
Bowling Green, Kentucky

In Partial Fulfillment  
Of the Requirements of the Degree  
Master of Arts

By  
Sarah Wilson

May 2017

EXAMINING THE RELATIONSHIP BETWEEN MEDICAL  
CONCERNS AND OVERALL MENTAL HEALTH RATING

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## EXAMINING THE RELATIONSHIP BETWEEN MEDICAL CONCERNS AND OVERALL MENTAL HEALTH RATING

Sarah Wilson

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It is widely supported that there are significant, positive relationships between the occurrence of some mental health symptoms and physical illnesses. Research indicates that the burden experienced by those with a physical and mental illness are magnified compared to individuals who do not experience an illness. More specifically, one of the burdens experienced by individuals is the monetary burden of affording the necessary health services to properly manage their illness.

This study attempts to reveal a difference between mental health symptom count for individuals who do and do not experience difficulty affording health care for their physical problems. The first hypothesis states that the indication of medical problems will be associated with greater mental health symptoms. The second hypothesis states that the relationship between medical concerns and mental health symptoms will be moderated by difficulty affording health services. Lastly, the third hypothesis states that the indication of unhealthy behaviors, such as smoking and irregular exercise, will be associated with greater mental health symptoms. All data used in this study is archived data that was gathered by the Institute for Rural Health's Mobile Health Units during free community health fairs from September 2012 to February 2014.

The first hypothesis was supported because the incidence rate of mental health symptom count was increased with the presence of some physical problems. These

findings supported previous research that indicated that the presence of physical illness increases the chance of developing a mental illness. The study results revealed that the second hypothesis was not supported since difficulty affording health services did not have a significant effect on the relationship between indicated physical illnesses and mental health symptom count. Previous research reports that there is monetary burden for individuals who experience a physical or mental illness when accessing appropriate health services. This research aimed to explore if that burden would significantly affect the relationship of those illnesses. Lastly, the third hypothesis was supported because mental health symptom count incidence rate was found to increase for individuals partaking in negative health behaviors, such as smoking, and decrease for individuals partaking in positive health behaviors, such as exercising.

## **Chapter 1**

### **Introduction**

In the traditional view of the health model, the body and the mind have been viewed as two separate entities. With the advancement of science and research, scholars are progressively supporting the view that mental health and physical health are more related than previously thought (Goodrich, Kilbourne, Nord, & Bauer, 2013; Hine, Howell & Yonkers, 2008; Welsh & McEnany, 2015). Previous literature has investigated the link between specific physical and mental health ailments (Doherty & Gaughran, 2014; Rao, 2008), barriers to accessing proper care for serious physical and mental ailments (Karlin & Fuller, 2007; Welsh & McEnany, 2015), and the physical impacts of unhealthy behaviors (Chadwick, Street, McAndrew, & Deacon, 2012). Still, research is lacking in investigating the moderating effect that health care affordability can have on the mental health of an individual who is suffering from chronic physical illness.

This study will investigate the link between physical and mental illnesses, the moderating effect of health care affordability on one's mental health, and the impact of unhealthy behaviors on one's mental health. Understanding the moderating effect of health care affordability can increase the feasibility and effectiveness of providing preventative psychological care for individuals suffering from specific, chronic physical ailments in order to decrease the psychopathology and the financial burden associated with a psychological illness.

The following literature review will discuss the relationship between mental health and physical health, and integrate how related financial burdens influence this

relationship. Finally, a description of the study and how it incorporates the previous research will be presented.

## **Mental Health**

According to Oxford University Press (2016), a person's state in regard to his or her mental and emotive welfare is considered his or her mental health. An individual's overall health can be troubled with mental illnesses. Mental illnesses include all mental disorders that entail persistent irregular changes in one's behavior, disposition, or thinking that are related to compromised performance and suffering (Centers for Disease Control and Prevention, 2011). Mental, physical, and social welfare are the components that comprise one's health according to the World Health Organization's (WHO) constitution (World Health Organization, 2014).

Mental health alone addresses an individual's welfare related to the realization of his or her full potential, and being able to successfully handle life's stressors in order to provide for his or her community and establish a societal role (World Health Organization, 2014). It is when these fundamental components of mental health are imbalanced or neglected that an individual's mental health welfare is in jeopardy. When an individual experiences an imbalance in mental health, there is an increased chance to develop a mental illness.

In the United States, half of the adult population will experience, at a minimum, one mental illness within their lifetimes (Centers for Disease Control and Prevention, 2011). The most prevalent mental illnesses amongst adults and youth in the United States are anxiety and mood disorders (Centers for Disease Control and Prevention, 2011). Anxiety disorders are any mental illness that causes an individual to feel scared, upset, or

nervous without a specific cause, or a cause that is out of proportion with reality. Mood disorders are any mental illness that causes a significant change in mood (American Psychiatric Association, 2013).

Within the United States, 21% of Americans report experiencing an anxiety disorder, and 20% experience a mood disorder in any given year (Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen, 2012). Collectively, more than 55 million adults in the United States are distressed by these incapacitating illnesses each year. Mental illnesses can greatly contribute to a decreased quality of life due to negatively impacting an individual's autonomy, interpersonal relationships, and recreation abilities (Anesetti-Rothermel & Sambamoorthi, 2011; Connaughton, Patman, & Pardoe, 2013).

Additionally, past literature has demonstrated that mental illnesses are independent risk factors for chronic diseases due to the increased stress on body systems and the increased impact on daily functioning (Ahire, Sheridan, Regbetz, Stacy, & Scott, 2012; Doherty & Gaughran, 2014; Welsh & McEnany, 2015). Regardless of whether mental illness is the cause or result of a chronic disease, it is a financial burden to the individual and to the society.

### **Physical Health**

Physical health is defined as the ability to preserve biological homeostasis through altering conditions (Huber et al., 2011). When an individual is not able to preserve his or her biological homeostasis, he or she can develop a physical illness. There is a wide range of somatic complaints that can be reported as a result of a physical illness, including both lethargy and stomach pains (Ahire et al., 2012). Similarly, some of these same somatic complaints could be due to a mental illness, or could be a result of a

combination of physical illness and mental illness. It is determining the pathology of somatic complaints that is so often unexplored.

A large percentage of patients report only somatic symptoms, which frequently results in their mental health being overlooked (Berghöfer, Roll, Bauer, Willich, & Pfennig, 2014). As opposed to less evident mental illnesses, there are some more easily identifiable physical illnesses. Some common physical illnesses include asthma, osteoporosis, diabetes, hardening of the arteries, obesity, high blood pressure, retinopathy, high cholesterol, heart disease, and stroke. Generally, individuals with mental illness experience poorer physical health (Welsh & McEnany, 2015).

Modifiable health risk behaviors are a primary focus for change by utilizing interventions. Some common risk behaviors are smoking, poor diet, and lack of exercise. Since individuals with mental illness are more likely to be overweight than the general population, diet and exercise are important factors to focus on when providing interventions. Smoking, poor diet, and physical inactivity all contribute to negative health effects like respiratory problems and metabolic syndrome (Chadwick et al., 2012; Welsh & McEnany, 2015).

### **Comorbidities**

In addition to more identifiable physical illnesses, the combination of a physical and mental illness can have a negative effect on an individual's overall health. Comorbidity is the co-occurrence of more than one illness (Welsh & McEnany, 2015). The bulk of previous epidemiological research supports the comorbidity of physical health and mental health illnesses (Ahire et al., 2012; Doherty & Gaughran, 2014; Shen, Sambamoorthi, & Rust, 2008; Spring, Yanni, & Levenson, 2007; Welsh & McEnany, 2015). The presence

of a mental health illness increases one's risk for developing a physical illness, and his or her mortality rates. Similarly, physical illnesses increase the chance of developing mental illness (Doherty & Gaughran, 2014; Rao, 2008). For example, cardiovascular disease and diabetes are two common physical illnesses that are associated with having a greater risk of developing mental illness (Doherty & Gaughran, 2014). Depression and anxiety are two mental illnesses commonly experienced by individuals with physical illness (Welsh & McEnany, 2015).

The literature supporting the comorbidities between mental and physical health is abundant. More specifically, the chances of an individual experiencing anxiety along with heart disease or stroke are doubled compared to individuals who do not experience these physical illnesses (Anesetti-Rothermel & Sambamoorthi, 2011). Additionally, 30% to 40% of individuals who have experienced a stroke will also experience depression (Rao, 2008). While research supports the causal relationship of obesity to hypertension, heart disease, and diabetes, the causal relationship between obesity and mental illnesses is not yet established; prevalence rates for the comorbidity of obesity and mental illness, however, are 40% to 60% (Shen et al., 2008; Welsh & McEnany, 2015). The effects of depression on the body doubles one's chance of dying, increases risk of heart disease by 150%, triples the risk of diabetes, with a prevalence rate of 10%, and can result in obesity when compared to the risk within the general population (Ahire et al., 2012; Doherty & Gaughran, 2014). An association between diabetes and anxiety has also been established, but greatly differs on an individual basis (Doherty & Gaughran, 2014). Along with comorbidities, individuals with mental illness are more likely to take part in risky health

behaviors such as smoking, inactivity, poor diet, and drug and alcohol use (Collins, Tranter, & Irvine, 2011; Kaufman, Mcdonell, Cristofalo, & Ries, 2012).

### **Health Care Burden**

Mental and physical illnesses can impose substantial physical, mental, and monetary burdens. Monetary constraints, poor housing, social isolation and low levels of communal backing combined with health risk behaviors can greatly contribute to physical illness (Faulkner, Taylor, Munro, Selby, & Gee, 2007).

Some of these burdens come in the form of physical or mental fatigue. Mental fatigue can be primary or secondary to the individual experiencing the illness. Emotional costs can range from the loss of autonomy and relying on others for physical or mental support to aid in daily living, to caring for others with a physical or mental illness. Some examples of monetary costs are the days missed from work, and costs of rehabilitation, aids for daily living support, medications, and surgeries (Anesetti-Rothermel & Sambamoorthi, 2011; Shen et al., 2008).

Assessing burden according to indirect costs, expenditures related to problems caused by the illness, and direct costs, expenditures related to services and treatment, expenditures exceeded \$300 billion annually (Insel, 2008). In 2011, 75% of costs spent on care for individuals with physical or mental health illness was focused on treating comorbidities (Anesetti-Rothermel & Sambamoorthi, 2011). Additionally, mental illnesses accounted for one of the three costliest conditions in the United States amongst noninstitutionalized adults, with \$69.7 billion in expenditures in 2013 (Soni & Mitchell, 2016). While cost is a large burden for individuals and society, often times expenditures

are underreported and underestimated due to the exclusion of those who do not have health coverage.

### **Affordable Care Act**

In 2010, the biggest overhaul of the health care system in the United States took place. A new health care insurance standard was signed into law, the Affordable Care Act (ACA). The ACA extended health care coverage to a wide population within the United States. This act made Medicaid available to all individuals falling below 138% of the federal poverty line, if the state one resides in expanded their Medicaid. This particular percentage is determined according to household size. Depending on household size and salary, individuals qualify for assistance with affording health care if they make between 100% to 400% above the federal poverty line, or qualify for free health care if they make 138% or less above the federal poverty line and meet specific qualifications (Manchikanti, Caraway, Parr, Fellows, & Hirsch, 2011).

Being able to expand health care to 94% of the American population was due to greatly improving the availability of quality health care to a wider variety of individuals. The ACA allowed insurance plans provided by workplaces to remain available if they chose, but they offered an abundance of improved, new programs. With the new ACA health care coverage programs, there were no penalties or disqualifiers if an individual had a preexisting condition, they offered pre-tax flex spending accounts that aided in managing funds dedicated towards health expenses, provided free preventative care and checkups without copayments, extended dependent coverage to the age of 26, and provided rebates in order to lessen the coverage gap in certain Medicare plans (Manchikanti, Caraway, Parr, Fellows, & Hirsch, 2011).

## **Institute for Rural Health**

The Institute for Rural Health (IRH) is an organization that operates under the College of Health and Human Services at Western Kentucky University. The IRH provides services to the South-Central Kentucky area via a mobile health unit and a mobile dental unit. A registered nurse and a doctor of dental medicine oversee the services provided by the mobile units. The services provided by the units include health care screenings for cholesterol, diabetes, blood pressure and bone density, influenza vaccinations, and fluoride and sealant treatments. The mobile unit staff also provides health education in the areas of heart health, diabetes prevention and control, and hypertension.

In addition to providing these services, the IRH works in collaboration with WKU's Public Health Department, Allied Health Department, Nursing Department, and many others, to ensure they provide quality health care and health education to all the individuals they serve. In addition to collaborations, they spread their passion of providing quality health care and education to others by encouraging student integration in their activities, and continuously expanding their research efforts on important topics.

## **Limitations of Previous Research**

Previous research measured the relationship between various physical and mental health illnesses and how health risk behaviors can influence them. Previous research is lacking in examining the possible impact that the burden of health care cost on individuals with a chronic physical illness can have on their mental health. Comparing individuals who have chronic physical illness and no indication of health care cost burden to individuals who have chronic physical illness and endorse health care cost burden

should be considered. Lastly, evaluating how the indication of mental health symptoms affects the likelihood of partaking in health risk behaviors is lacking in past research. Previous research is lacking that evaluates the influence that physical health care burden can have on one's mental health.

### **Current Study Rationale**

A majority of epidemiological studies supports the reciprocal connection between physical ailments and mental health issues. Introducing the factor of health care-related financial burden should be considered within these connections. Since mental health problems are often undertreated due to an individual's interpretation and presentation of his or her mental health somatic complaints (Berghöfer et al., 2014; Karlin & Fuller, 2007), the result can be complicated treatment followed by poor outcome (Doherty & Gaughran, 2014). There is support for the connection that mental and physical health illnesses have. It is imperative that professionals in the health fields be aware of an individual's symptoms that could be a result of, or could cause, comorbid illnesses (Hooper, 2014). The majority of clinical guidelines for treatment of individuals with mental illness focus on specific conditions, not on prevention (Welsh & McEnany, 2015). This failure to emphasize preventative care and early detection can cause larger expenditure for health care. By better understanding the influence that financial burden can have on an individual's overall health, agencies can better tailor treatment programs to an individual's specific needs so as to not cause further damage from financial burden.

### **Hypotheses**

**Hypothesis I:** Indication of medical problems will be associated with greater mental health symptoms.

**Hypothesis II:** The relationship between medical concerns and mental health symptoms will be moderated by difficulty affording health services, such that patients with greater difficulty affording health care who also experience medical concerns will have significantly greater mental health symptoms as compared to those who have a medical concern but do not report difficulty affording health services.

**Hypothesis III:** Indication of unhealthy behaviors, such as smoking and irregular exercise, will be associated with greater mental health symptoms.

## Chapter II

### Method

#### Database Measures

**WKU Mobile Health Unit Registration Form.** During the initial data collection, all participants were administered the WKU Mobile Health Unit Registration Form (MHURF). The MHURF was developed by the Institute for Rural Health to obtain important information for each participant. Utilizing the MUHRF was the standard procedure during the time the data was collected. The MUHRF consisted of two sections. The first section collected a participant's demographic information and specific health care provider information. The second section obtained consent. See Appendix A.

**WKU Mobile Health Unit Usual Care Screener.** During the initial data collection, all participants were administered the WKU Mobile Health Unit Usual Care Screener (MHUUCS). The MHUUCS was developed in order for the Mobile Health Unit to gain a well-rounded understanding of their client's health care needs. The screener consisted of six sections. The first section obtained information about participant's past or present indication of 11 physical illnesses or complications, including asthma, osteoporosis, diabetes, hardening of arteries, obesity, high blood pressure, retinopathy, high cholesterol, heart disease, stroke, and trouble with healing foot wounds. The second section assessed health and risk factors such as frequency of exercise, servings of vegetables and fruit consumed daily, and indication of smoking. The first two sections were answered by simply choosing *Yes* or *No*, and reporting amount of exercise as *None*, *Less than 3 a week*, or *3+ a week*. The third section obtained a rating of the client's overall physical health, and overall mental health utilizing a four-point Likert scale ranging from 1 (*Very Good*) to 4 (*Poor*). The fourth section contained four questions

adapted from the Primary Care Evaluation of Mental Disorders (PRIME-MD) that assessed indication of mental health concerns by simply choosing *Yes* or *No*. A sample statement from this section is “Little interest or pleasure in doing things.” The fifth section obtained information about health care cost burden participants were experiencing. Statements from this section include “Cost of health care” and “Cost of prescription drugs.” The sixth section obtained information about care that a participant utilized, or provided. Statements from this section include “Are you providing regular care/assistance for anyone” and “Do you have a regular health care provider.” See Appendix B.

### **Database Procedure**

During the initial data collection, participants were provided a MHURF and MHUUCS from a member of the Institute for Rural Health to complete before receiving services from the IRH Mobile Health Unit. The two forms took approximately 5 to 10 minutes to complete. After completing the MHURF and MHUUCS, the participants received a variety of free preventative health checks, including screenings for diabetes, cholesterol, blood pressure and bone density. Each participant was also provided verbal and tangible health education materials in the areas of cardiovascular health, hypertension and preventing and controlling diabetes.

### **Current Study Participants**

Approval was obtained from the Western Kentucky University Institutional Review Board and WKU’s Institute for Rural Health to utilize the archival data. Participants for this study were residents in South-Central Kentucky who received services from the Mobile Health Unit at community outreach events from September

2012 to February 2014. Upon registration during initial data collection, participants provided consent and information about demographic characteristics, including age, sex, race, ethnicity, education, and employment status. Data used in this study originated from a pre-collected data set that included 3,188. Due to the nature of the data collection being derived from free community outreach events, there were a small number of participants who did not fully complete their screener form. Of the 3,188 participants, 483 were excluded due to an incomplete Usual Care Screener, leaving a total of 2,705 participants included in this study. Not all participants had completed the demographic information, so I examined all of the completed demographic information of individuals who received care from the IRH mobile units and had filled out the MHURF. From September of 2012 to January of 2016, 10,082 participants received care from the IRH mobile units and provided completed demographic information. Of those 10,082 participants, roughly 70% were female and 30% male, with an average age of 44 years old (SD = 19.5 years).

### **Current Study Variables**

The MHUUCS yields a report in six different areas, four of which were evaluated: Indication of illnesses/complications, health/risk assessment, mental health symptom count and cost of medical care. The physical illness variable was created from participants indicating if they experience each physical illness in the first section of the MHUUCS. The mental health symptom count variable was created by summing the four questions from the PRIME-MD to create a total score as a measure of each individual's mental health symptom count. The possible mental health symptom count scores ranged from 0 to 4. Lastly, the difficulty affording health care variable was created from the fifth

section where participants indicating if they experience each difficulty affording their health care.

## **Chapter III**

### **Results**

#### **Hypothesis Testing**

The first hypothesis in the current study stated that the indication of medical problems would be associated with greater mental health symptoms. A series of negative binomial regressions were performed to establish the relationship between total score mental health symptom count and indication of medical concerns. This hypothesis was supported for six of the 11 indicated medical problems. The indication of a medical problem increased the incidence rate ratio of reported heightened mental health symptom count by a minimum of 35.7% (for obesity) and a maximum of 91.6% (for stroke). See Table 1.

Table 1

*Reported and Estimated Frequency Rate Percent for Indicated Physical Health Symptoms by Mental Health Symptom Count*

PH	Reported Percent Frequency of Physical Health Symptoms Per Mental Health Symptom Count					Estimated Frequency Rate Percent
	SC0	SC1	SC2	SC3	SC4	IRR
Asthma	10.3	12.1	18.5	24.3	21.7	44.2 (1.442*)
Diabetes	8.6	13.6	12.5	20.0	25.4	40.1 (1.401*)
OFW	0.6	1.2	2.1	1.7	3.6	78.2 (1.782*)
Obesity	15.1	20.6	26.7	22.6	26.1	35.7 (1.357*)
Heart Disease	5.5	9.7	9.6	17.4	17.4	43.5 (1.435*)
Stroke	1.6	2.1	2.8	7.8	9.4	91.6 (1.916*)
Osteo	5.6	7.3	4.6	6.1	10.1	-0.08 (.916)
Hard	0.9	2.7	0.7	5.2	3.6	25.7 (1.257)
HighB	30.4	36.1	34.9	40.0	44.2	-0.05 (.946)
Retino	0.8	2.7	1.8	8.7	1.4	29.0 (1.290)
HighC	22.0	28.5	26.7	31.3	40.6	12.0 (1.120)

*Note.* PH = Physical Health, SC = Symptom Count, OFW = Open Foot Wound, Osteo = Osteoporosis, Hard = Hardening of the Arteries, HighB = High Blood Pressure, Retino = Retinopathy, HighC = High Cholesterol, 0 – 4 = Indication of Mental Health Symptom, IRR = Incidence Rate Ratio. Values in parentheses are the incidence rate ratio. \*  $p < .01$

The second hypothesis stated that the relationship between medical concerns and mental health symptoms would be moderated by difficulty affording health services, such that patients with greater difficulty affording health care who also experience medical concerns will have significantly greater mental health symptoms as compared to those who have a medical concern but do not report difficulty affording health services. A series of logistic regressions were performed to determine if difficulty affording health care would impact the relationship between physical problems and mental health symptom count. This hypothesis was not supported as difficulty affording health care did not have a significant effect on the relationship between indicated physical problems and mental health symptom count. See Table 2. A Bivariate Pearson correlation was performed to measure if the dependent variable, symptom count, was correlated with the moderating factor, difficulty affording health care (Baron & Kenny, 1986). It was found that symptom count and difficulty affording health care were significantly correlated,  $r = .217$ ,  $p = < .01$ . Due to the correlation of the dependent variable and moderating factor, the actual impact of affording health care on the relationship between physical problem and mental health symptom count may not be accurately measured.

Table 2

*Moderating Effect of Affording Health Care on the Relationship  
Between Physical Illness and Mental Health Symptom Count*

Physical Illness	Coefficient	Standard Error	t-score	<i>p</i>
Asthma	0.00	.21	.00	1.00
Diabetes	0.11	0.22	0.50	0.62
OFW	0.16	0.61	0.26	0.79
Obesity	-0.30	0.16	-1.88	0.06
Heart Disease	0.06	0.24	0.23	0.82
Stroke	0.17	0.43	0.41	0.69

*Note.* OFW = Open Foot Wound

The third hypothesis stated that the indication of unhealthy behaviors, such as smoking and irregular exercise, would be associated with greater mental health symptoms. A negative binomial regression analysis was performed to establish the relationship between total score mental health symptom count and indication of health risk behaviors. This hypothesis was supported for both health risk behaviors, irregular exercise and smoking. The indication of exercising three or more times per week decreased one's incidence rate ratio of mental health symptom count by 20.2%, as compared to not exercising. Similarly, the indication of exercising one or two times per week decreased the incidence rate ratio of mental health symptom count by 13.4%. Conversely, the indication of smoking increased the incidence rate ratio of mental health symptom count by 51.3%. See Table 3.

Table 3

*Reported and Estimated Frequency Rate Percent for Indicated Health Risk Behaviors by Mental Health Symptom Count*

HRB	Reported Percent Frequency of Health Risk Behaviors Per Mental Health Symptom					Estimated Frequency Rate Percent
	SC0	SC1	SC2	SC3	SC4	IRR
E2	36.8	34.5	33.1	18.3	34.1	-20.2 (-.798*)
E1	47.1	46.7	44.1	53.0	45.7	-13.4 (-.866**)
Smoke1	10.3	15.2	18.1	20.9	24.6	51.3 (1.513*)

*Note.* HRB = Health Risk Behavior, E2 = Exercise 3+ times per week, E1 = Exercise one to two times per week, SC = Symptom Count, 0 – 4 = Indication of Mental Health Symptom, IRR = Incidence Rate Ratio. Values in parentheses are the incidence rate ratio.  
\*  $p < .01$ , \*\*  $p < .05$

## **Chapter IV**

### **Discussion**

Previous research assessing the relationship between physical illnesses and mental health symptoms has yielded consistently similar results. The studies reported that there are significant comorbidities between particular physical and mental illnesses (Anesetti-Rothermel & Sambamoorthi, 2011; Doherty & Gaughran, 2014; Rao, 2008; Welsh & McEnany, 2015). Similarly, research assessing the relationship between mental health and risky health behaviors has reported that individuals who experience mental illness are more likely to take part in risky health behaviors such as smoking, inactivity, poor diet, and drug and alcohol use (Collins, Tranter, & Irvine, 2011; Kaufman, McDonnell, Cristofalo, & Ries, 2012). The current study sought to further evaluate these relationships by exploring the possibility that difficulty affording health care may have a moderating effect on the relationship between indicated physical illness and mental health symptom count.

The first hypothesis stated that the indication of medical concerns would be associated with greater mental health symptoms. This hypothesis was supported, for six of the 11 physical illnesses: asthma, diabetes, open foot wounds, obesity, heart disease, and stroke. This result lends credence to the body of evidence within the literature concerning the comorbidity of mental and physical illnesses (Goodridge, Trepman, & Embil, 2005; Goodwin, Jacobi, & Thefeld, 2003; Lin, & Korff, 2008; Sareen, Jacobi, Cox, Belik, Clara, & Stein, 2006; Scott et al., 2007; Williams, Ghose, & Swindle, 2004), which suggests that individuals experiencing physical illness experience either anxiety or depression at a higher rate than individuals with no physical illness. These results were

similar to those by Whooley et al. (2008), who offer an alternative explanation that the relationship between depression and coronary heart disease is mediated by participating in an exercise regimen. These findings indicate that the impact of functioning on a daily basis with a physical illness can put great strain on an individual's mental health. This could be related to weakened coping skills depending on the severity of the physical illness, or lowered quality of life related to the physical illness. For the five medical problems that were not supported by the hypothesis, they are primarily managed with medication and it is believed that their impact on daily functioning and demands for daily care is not as intense as those medical problems supported by the hypothesis.

The second hypothesis stated that the relationship between medical concerns and mental health symptoms will be moderated by difficulty affording health services, such that patients with greater difficulty affording health care who also experience medical concerns will have significantly greater mental health symptoms as compared to those who have a medical concern but do not report difficulty affording health services. This hypothesis was not supported, as difficulty affording health care did not have a significant effect on the relationship between indicated physical illnesses and mental health symptom count. This result is not consistent with the existing literature surrounding the barriers to accessing health care (Sommers, Gunja, Finegold, & Musco, 2015; Weinick, Byron, & Bierman, 2005), which suggests that the high cost of out-of-pocket fees for health care remains to be a barrier that inhibits some individuals from receiving appropriate care. This could be due to the majority of the participants residing in an area that is predominantly below the poverty line and qualifying for free health care. This is supported by only 17.7% of participants indicating that they experience a

difficulty affording healthcare. Also, the correlation of mental health symptom count and difficulty affording healthcare could ultimately affect the moderating variable's impact on the relationship (Baron & Kenny, 1986). Although the Affordable Care Act that was signed into law in 2010 lessened the burden of accessing health care, the cost of health care remains to be a barrier for individuals, depending on their expected deductibles (Mitts & Fish-Parcham, 2015).

The third hypothesis stated that the indication of unhealthy behaviors, such as smoking and irregular exercise, would be associated with greater mental health symptoms. This hypothesis was supported, as participation in smoking was linked to a higher mental health symptom count, as compared to individuals who do not smoke. Additionally, a shortage of exercise was related to an increase of mental health symptom count. This result lends credence to the body of evidence within the literature concerning the relationship between risky health behaviors and mental health symptom count (Deslandes et al., 2009; Lasser et al., 2000; Whooley et al., 2008), which suggests that there is a significant relationship between individuals who participate in risky health behavior and an increase in mental health symptom count. These findings indicate that an individual who experiences mental health symptoms is more likely to smoke than individuals who do not experience mental health symptoms. Additionally, a person who participates in exercise at least one time per week experiences a decrease in mental health symptom count, as opposed to those who do not exercise. The increased incidence of smoking could be related to weakened coping skills depending on the severity of the mental health symptom count. The decrease in symptom count as associated with

exercise could be related to utilizing exercise as a coping mechanism, and to boost overall health.

### **Implications**

The findings of the current study supported the relationships between mental health symptoms, and risky health behaviors and physical illness. These results indicate that the more physical illness one has, the higher the incidence rate for experiencing mental health symptoms. This is significant because this provides support for the importance of implementing interventions that address both mental health and physical health issues that a patient may be experiencing. Furthermore, the results indicate that individuals with mental illness are more likely to smoke tobacco, but may experience an alleviation of mental health symptoms if they exercise at least once a week. This is significant because this provides support for addressing both of these topics within interventions and care plans.

Additionally, the findings of the current study imply that a common factor, within the rural population of South-Central Kentucky, influences their experienced difficulty of affording health care. It is possible that the rural residents included in the study qualify for free health care through the Affordable Care Act and are not as burdened by high out-of-pocket fees as individuals in higher income areas, or as individuals that were included in past literature before the Affordable Care Act was signed into law.

Lastly, the findings of the current study can provide additional real-world findings for local entities like the Institute for Rural Health. These findings provide support that rural individuals within the South-Central Kentucky region are suffering from mental and physical illness that are exacerbated by their comorbidities. The findings of this study can

provide support for those local entities when they are securing funding to further adapt their services, and maintain current services, to meet the needs of the population they serve.

### **Limitations**

One limitation of the present study is its lack of generalizability. The participants selected for this study were recruited within a single region during free community health fairs. This inhibits the generalizability of results to individuals of different economic and geographical areas. Given the lack of diversity in geography, it is possible that the results of this study might have differed if done with participants from different locations.

Secondly, it is important to note that the participants self-reported the indication of physical illness and mental health symptoms. There were not reviews by medical professionals to verify the diagnosis of indicated issues. In consideration of this confound, it is possible that the issues indicated by participants are experienced, but not to the extent necessitating a diagnosis.

### **Future Research**

The next step with this research could be to assess if caregiving burden has an influence on the relationship between one's mental health symptom count and physical illness. The research should include measures that address the different areas of burden. The different areas of burden can include time-dependence burden, such as how much time the care provided demands. Additionally, the different areas of burden can include physical burden, such as how much physical effort and strain is required to provide care. Also, the different areas of burden can include social burden, such as how isolating or restrictive it is to provide care. Furthermore, the different areas of burden can include

emotional burden, such as the emotional impact of caring for an individual with a terminal illness or sickness. Lastly, the different areas of burden can include developmental burden, such as feeling that providing care is inhibiting the advancement of the caregiver within his or her own life. This research would be beneficial since providing care to another individual can be very influential on one's physical and mental health. This could reveal differences that are consistent with previous research in regard to decreased physical and mental health due to caregiving burden.

### **Conclusion**

These findings of the present study support current literature regarding the relationship between mental and physical illness. They do not give support for the difficulty of affording health care having a possible moderating effect on the relationship between physical illness indications and mental health symptom count.

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## Appendix A: WKU Mobile Health Unit Registration Form

### WESTERN KENTUCKY UNIVERSITY ~ WKU MOBILE HEALTH UNIT REGISTRATION FORM

Visit Date: \_\_\_\_\_ Event Location: \_\_\_\_\_ Event County: \_\_\_\_\_

Patient Name: \_\_\_\_\_  
First Middle Last

Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Name of Parent or Legal Guardian (If Patient is a Child): \_\_\_\_\_

Social Security Number: \_\_\_\_\_ Date of Birth: \_\_\_\_\_

<b>Sex:</b>	<b>Race:</b>	<b>Employment Status:</b>
Male _____	Asian/Pacific Island _____	Employed for wages _____
Female _____	American Indian/Alaskan Origin _____	Self-employed _____
	Black/African American _____	Homemaker _____
<b>Do you have any of the following?</b>	White _____	Student _____
Dental Insurance _____	Multi Racial _____	Retired _____
Health Insurance _____		Unable to work _____
Medicaid _____	<b>Ethnicity:</b>	Out of work for more than year _____
Medicare _____	Hispanic origin _____	Out of work for less than 1 year _____
No insurance _____		

**In which country were you born?** \_\_\_\_\_  
 <12 years \_\_\_\_\_ High School/GED \_\_\_\_\_ Some College/College Grad \_\_\_\_\_

**Physician's name** \_\_\_\_\_ **Address** \_\_\_\_\_

**Dentist's name** \_\_\_\_\_ **Address** \_\_\_\_\_

May we use photographs of you or your child in publications associated with the Institute for Rural Health? Yes  No

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#### General Consent Form

By signing this consent I give permission for the following:  
*Consent for treatment:* I give permission for myself or my child to be examined and treated (if eligible) by the WKU Mobile Health Unit staff.

1. I *understand* that I am consenting to medical diagnostic procedures, screenings and/or vaccinations that may be performed by the staff of the WKU Mobile Health Unit, including, but not limited to, laboratory procedures requiring drawing blood and radiological procedures. The procedures that will be performed and their risks and potential complications have been explained to me. I recognize my responsibility for my own health care, including, but not limited to, following up to determine and act upon the results of any tests and screenings that may be done. I certify that the information provided to WKU on this registration form, as well as the medical history provided to the staff of the WKU, is correct and accurate. This consent includes testing for blood-borne infectious diseases, including, but not limited to, hepatitis, Acquired Immune Deficiency Syndrome (AIDS), and Human Immunodeficiency Syndrome (HIV).
2. I *understand* that these services will be provided by the faculty, residents, students, hygienists and staff of Western Kentucky University, and that a licensed nurse or dentist will provide coordination of the program.
3. I *understand* that the findings for all patients as a group may be reported on and/or published, and that, in this case, no person will be identified individually. While all individual records are held by Western Kentucky University as confidential, I understand that a list of children who need follow-up care is routinely provided to the Family Resource Center at their school.

**Release of information:** WKU is authorized to release information and copies of documents contained in my medical record to other healthcare providers who may be involved in my care and treatment.  
**Financial Statement:** I understand that I am responsible for the cost of any diagnostic testing, screening, and/or treatment given by WKU's Mobile Health & Wellness Mobile Clinic.  
**Privacy Notice:** I have received a copy of WKU's Notice of Privacy Practices. I understand I may contact your office for more information.

\_\_\_\_\_  
*Patient or Parent/Guardian Signature* \_\_\_\_\_  
*Date*

