What does a Single-Item Measure of Self-Rated Mental Health tell us?

Systematic Review of Literature and Analysis of the Canadian Community Health Survey

by

Anuroop K. Jhajj

A thesis submitted in conformity with the requirements for the degree of Master of Science, Medical Science
Institute of Medical Science
University of Toronto

© Copyright by Anuroop K. Jhajj 2010
What does a Single-Item Measure of Self-Rated Mental Health tell us? Systematic Review of Literature and Analysis of the Canadian Community Health Survey

Anuroop K. Jhajj
Master of Science, Medical Science
Institute of Medical Science
University of Toronto
2010

Abstract

A single-item measure of self-rated mental health (SRMH) asks respondents to rate their mental health on a 5-point scale from ‘excellent’ to ‘poor’. SRMH is being used increasingly in research and on population health surveys. However, little is known about this item, as there are no literature reviews and few formal validation studies. The aim of this study is to understand what SRMH measures by conducting the first known systematic review of SRMH literature, followed by analysis of the Canadian Community Health Survey (CCHS 1.2). Results of the systematic review reveal SRMH has relationships with mental health scales, mental disorders, self-rated health, health problems, service utilization, and service satisfaction. Analysis of CCHS 1.2 data finds SRMH is associated with psychiatric diagnoses, distress, physical health, and sociodemographic characteristics. Both studies conclude SRMH is measuring mental health and more; however, there needs to be more research to understand the specifics of these relationships.
Acknowledgments

I would like to thank my supervisor, Dr. Arlene Bierman, for her guidance and support over these years. I have learned much and grown immensely as a person. I would also like to thank my committee members, Dr. Donna Stewart and Dr. John Cairney for their contributions to this project. They both came into the group with incredible insights that have amazed and challenged me as a student. All three of these individuals have inspired me in their own way, and I will look to their examples as motivation for my future development.

I would like to say a thank-you to my family; to my mom for her constant loving support, to my dad for never shying away from keeping me on track, and to my brother and sister for being my best friends and motivators. I would also like to thank my friends, old and new, for always caring and distracting me when I needed it.

Finally, I would like to thank all those who have provided help and guidance over the course of my study, even though I was unable to offer anything in return. These people include my defense committee, who have kindly shared their time and knowledge with me. I truly appreciate these gestures and look forward to being able to use what I have gained for the assistance of others.
# Table of Contents

Acknowledgments ........................................................................................................ iii
List of Tables .................................................................................................................... v
List of Figures ................................................................................................................... vi
List of Appendices ........................................................................................................... vii
List of Abbreviations ...................................................................................................... viii

1 Background .................................................................................................................. 1
   1.1 Population Health Surveys ..................................................................................... 1
   1.2 Importance of SRMH ............................................................................................ 3
   1.3 Need for Systematic Review and Validation of SRMH ........................................ 6
   1.4 Defining Mental Health and Diagnosing Disorders .............................................. 8
   1.5 Variables that can Affect Mental Health ............................................................. 14
   1.6 Canadian Community Health Survey 1.2 .......................................................... 19

2 Study Aim and Research Questions .............................................................................. 23

3 Manuscript 1 ............................................................................................................... 25

4 Manuscript 2 ............................................................................................................... 57

5 Discussion .................................................................................................................... 86

6 Conclusions .................................................................................................................. 92

7 Future Directions ....................................................................................................... 93

References ....................................................................................................................... 98

Appendices ..................................................................................................................... 114
List of Tables

Table 2.1 – Variations in Self-Rated Mental Health Item Wording (p. 46)

Table 2.2 – Self-Rated Mental Health Study Characteristics (p. 48)

Table 2.3 – Studies using Self-Rated Mental Health (arranged thematically) (p. 49)

Table 3.1 – Characteristics of the Analytic Sample (p. 80)

Table 3.2 – Responses to Self-Rated Mental Health for Full Sample and by Disorder Type (p. 82)

Table 3.3 – Logistic Regressions of Fair/Poor Self-Rated Mental Health (p. 83)
List of Figures

Figure 2.1 – Study Selection Flow Diagram (p. 47)
List of Appendices

Appendix 1 – Canadian Community Health Survey Interview for Distress (p. 114)

Appendix 2 – Canadian Community Health Survey diagnostic scales for depression, panic disorder, and agoraphobia (p. 116)

Appendix 3 – Canadian Community Health Survey Interview for Social Support (p. 123)
# List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAI</td>
<td>Computer-assisted interviewing</td>
</tr>
<tr>
<td>CCHS 1.2</td>
<td>Canadian Community Health Survey 1.2</td>
</tr>
<tr>
<td>CI</td>
<td>Confidence interval</td>
</tr>
<tr>
<td>CIDI</td>
<td>Composite International Diagnostic Interview</td>
</tr>
<tr>
<td>DALYs</td>
<td>Disability adjusted life years</td>
</tr>
<tr>
<td>DLI</td>
<td>Data Liberation Initiative</td>
</tr>
<tr>
<td>DSM</td>
<td>Diagnostic and Statistical Manual of the American Psychiatric Association</td>
</tr>
<tr>
<td>ECA</td>
<td>Epidemiologic Catchment Area study</td>
</tr>
<tr>
<td>GHQ</td>
<td>General Health Questionnaire</td>
</tr>
<tr>
<td>GP</td>
<td>General practitioner</td>
</tr>
<tr>
<td>ICD</td>
<td>International Statistical Classification of Diseases and Related Health Problems</td>
</tr>
<tr>
<td>K6</td>
<td>Kessler Psychological Distress Scale-6</td>
</tr>
<tr>
<td>K10</td>
<td>Kessler Psychological Distress Scale-10</td>
</tr>
<tr>
<td>MAPSS</td>
<td>Mexican-American Prevalence and Service Study</td>
</tr>
<tr>
<td>MH</td>
<td>Mental health</td>
</tr>
<tr>
<td>MOS</td>
<td>Medical Outcomes Study</td>
</tr>
<tr>
<td>MUPS</td>
<td>Medically Unexplained Physical Symptoms</td>
</tr>
<tr>
<td>OHS</td>
<td>Ontario Health Survey</td>
</tr>
<tr>
<td>PHQ-2</td>
<td>Patient Health Questionnaire-2</td>
</tr>
<tr>
<td>PUMF</td>
<td>Public Use Microdata File</td>
</tr>
<tr>
<td>RDC</td>
<td>Research Data Center</td>
</tr>
<tr>
<td>SE</td>
<td>Standard error</td>
</tr>
<tr>
<td>SCL</td>
<td>Symptoms Check List</td>
</tr>
<tr>
<td>SCAN</td>
<td>Schedules for Assessment in Clinical Neuroscience</td>
</tr>
<tr>
<td>SF-12</td>
<td>Short Form-12 Health Status Survey</td>
</tr>
<tr>
<td>SRH</td>
<td>Self-rated health</td>
</tr>
<tr>
<td>SRMH</td>
<td>Self-rated mental health</td>
</tr>
<tr>
<td>SSHRC</td>
<td>Social Sciences and Humanities Research Council of Canada</td>
</tr>
</tbody>
</table>
1 Background

Experts have developed complex, lengthy tests to assess people’s mental health, or lack thereof. However, it would seem the most direct measure could simply ask one question: “How would you rate your mental health?” While this type of question does not give much diagnostic information to a mental health clinician, it is still important. If people feel they are in poor mental health, then by their standards there is a problem. Furthermore, mental health can be a largely subjective experience, and we should therefore be able to collect mental health assessments through use of subjective measures (McMichael & Hetzel, 1974). By this rationale, single-item measures of self-rated mental health (SRMH) are steadily gaining use, particularly on population health surveys. However, it is not entirely clear what people’s responses to the item are telling us.

1.1 Population Health Surveys

Population health surveys (also called epidemiologic surveys) are used to collect data about health status and patterns of health determinants in a population. Researchers analyze this data and use it to inform programs and policies to improve health care and reduce health inequities (Mathers et al., 2003). The World Health Organization defines health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (Preamble to the Constitution., 1948). By this standard, population health surveys contain a mixture of items addressing physical health, mental health, social factors, and demographic information.

Countries around the world have created their own versions of these epidemiologic surveys. Popular surveys in the United States include the Medical Expenditure Panel Survey (Cohen et al., 1996) and the Epidemiologic Catchment Area Study (Eaton et al., 1984). A major survey in Canada is the Canadian Community Health Survey (Gravel & Béland, 2005b), which will be discussed further in Section 1.6. The surveys listed here are of interest because they also include a measure of SRMH. A common format of the SRMH item reads:
In general, would you say your mental health is:

1. Excellent
2. Very good
3. Good
4. Fair
5. Poor

Variations of this question use the same response scale, but ask about ‘overall mental health,’ ‘mental health at the present time,’ or ‘emotional health.’ It seems this item first appeared around 1970 (Jegede, 1980; McMichael & Hetzel, 1974). In 1981 it was used as part of the National Institute of Health Diagnostic Interview Schedule, which was developed based on criteria from the Diagnostic and Statistical Manual of Mental Disorders-III. It was later adapted into the World Mental Health Composite International Diagnostic Interview (WMH-CIDI) and now appears on national epidemiologic surveys. The SRMH question is usually found in a general health section of the survey, which tends to be the first or second section. Most surveys are conducted verbally (in person or over the phone), and interviewers do not require special psychiatric training to administer the item.

An important characteristic of population health surveys is their capacity for measuring group health, rather than individual health. Individual health pertains to a particular person’s state of health, while population surveys measure the overall health of a large group, city, or nation. Population health can be assessed by combining many pieces of individual data (such as by counting cases of a disease), but population health surveys have the advantage of gathering vast amounts of data about a variety of different variables. These variables can be used to monitor and make comparisons across groups or over time (Mathers et al., 2003).

Population health surveys are not administered to every person in a region of study, and therefore resulting measurements are only estimates of population health. Statistically speaking, the more people that respond to the survey, the more likely the data is representative of the population at large. To maximize responses (or minimize respondent burden), surveys are designed to be as short as possible. This is accomplished by selecting priority areas for assessment, and by using the fewest number of questions necessary for accurate measurement.
Lengthy scales developed for collecting individual data are distilled to a few basic items for population assessment. If more detail is required, surveys can incorporate screener items that determine whether a respondent will be asked more questions about a topic.

1.2 Importance of SRMH

Single-item measures are being used increasingly on epidemiologic surveys (Rohrer et al., 2005b). Shorter items reduce respondent burden, simplify administration, and are easier to translate for international use. Furthermore, single-item measures eliminate the problem of common methods variance, a situation arising when multi-item measures ask interrelated questions using identical response scale formats. In these cases, participants may repeat response selections out of fatigue or a desire to appear consistent (Gardner et al., 1998).

A single-item measure of self-rated health (SRH) has been used world-wide since the 1950s (Streib et al., 1958). The item is similar to SRMH and is commonly worded as follows:

In general, would you say your health is:

1. Excellent
2. Very good
3. Good
4. Fair
5. Poor

This item has been studied for six decades in relation to established health scales and variables. Reviews and meta-analyses of these studies have concluded that SRH is a strong, independent predictor of mortality (DeSalvo et al., 2005; Idler & Benyamini, 1997). SRH outperforms predictions based on physician data, physical disability, presence of health problems, and biological or lifestyle risk factors. It also has strong associations with many variables including morbidity and health care utilization (Idler & Kasl, 1991). Numerous explanations have been proposed for these robust relationships, such as the idea that SRH includes perceptions about illness severity. Another possibility is that SRH responses reflect people’s feelings about their health state, which can include pre-clinical undiagnosed conditions on top of existing diagnoses (Idler & Benyamini, 1997).
While there does not appear to be literature documentation, it seems likely that SRMH emerged as the mental health analogue of SRH. The parallel wording structure of both these items implies that SRMH could be an equally valuable population health indicator. Even though little is known about its measurement properties (Hoff et al., 1997), SRMH has been found to exhibit relationships with other mental health variables. Investigators have found relationships between SRMH and a distress scale (Fleishman & Zuvekas, 2007) and with diagnoses of depression (Hoff et al., 1997). Similar to SRH, SRMH may also be assessing perceptions, states, or factors that are not currently measured using traditional mental health measures. It is important to continue studying SRMH as a population mental health measure; especially now, given the global importance of mental health issues.

1.2.1 Importance of Mental Health

Mental disorders are becoming increasingly prevalent. According to projections, nearly one in five Canadians will experience a mental illness during their lifetime (Offord et al., 1996). This estimate will likely continue to increase, as a Canadian national sampling in 2002 revealed that approximately 11% of the population experienced a mental health disorder during the previous year alone (Tanenbaum, 2007).

While there are many different mental disorders, this section will primarily discuss depression; one of the most common and most treatable mental illnesses (Rhodes et al., 2006a). According to the World Health Organization in 2002, depressive disorders were the leading cause of years of life lost due to disability world-wide (Murray et al., 2002). By 2008 depression was ranked third out of the top ten causes of global burden of disease, overtaking ischemic heart disease and HIV/AIDS. Global burden of disease is calculated using disability adjusted life years (DALYs), which is a sum of the years lived with disability and years of life lost due to premature mortality. According to projected DALYs, depressive disorders will become the leading cause of global disease burden by 2030 (World Health Organization, 2008).

A person’s mental health is strongly connected with physical health. Research has demonstrated that individuals with fair or poor SRH are more likely to suffer from depression and have more long term health problems (Cassano & Fava, 2002). Many studies have shown that when depression co-occurs with chronic conditions such as heart disease or diabetes mellitus, the
symptoms of these disorders are amplified (Carney et al., 2002; Lustman et al., 1998). Patients are also less likely to adhere to treatments, have poorer health outcomes, and higher mortality rates (DiMatteo et al., 2000; Carney et al., 2002; Lustman et al., 1998).

Poor mental health is also associated with increased health service utilization, for both physical and mental health complaints. Extensive chart-review studies have shown that depressed individuals had two to three times more visits, pain complaints, functional complaints, anxiety complaints, and hospitalizations (Wilson et al., 1987; Wilson et al., 1983). Among Canadians, mental illness is the second leading cause of hospital use among those aged 20 to 44 (Standing Committee on Social Affairs, 2002). Frequent attendees to emergency departments are more likely to be depressed (Byrne et al., 2003), and patients with major depression are more likely to utilize primary care (Rhodes et al., 2006b).

The personal distress from mental illness results in considerable financial burden on a national level. A study by Health Canada’s Cancer Bureau calculates the economic burden of mental disorder in Canada to have been $8.4 billion in 1998, and this figure has been rising since. Mental disorders were ranked seventh out of twenty disease categories. The direct costs for treating diagnosed mental disorders was $6.3 billion ($3.9 billion for hospital care, $854 for physician care, $887 million for institutional care and $642 million for prescription medications). Consultations with psychologists and social workers outside of hospitals were not covered by public health insurance and totalled over $278 million. These numbers are considered to be under-estimates, and the economic cost of lost industrial production alone is about $35 billion a year (compiling short-term sick days, long-term disability, and premature deaths due to mental illness) (Stephens & Joubert, 2001). Analysis of American data from the National Comorbidity Survey Replication found the estimated indirect cost of mental health burden from lost earnings was $193.2 billion per year. The total was based on an extrapolation of 5,000 individuals considered to have a serious mental illness, and excluded individuals who are hospitalized or in institutions (Kessler et al., 2008).

Major depression can be effectively treated in primary care settings, but if left undiagnosed can lead to impairments in quality of life, and potentially suicide (Patten, 2000). Suicide is the eighth leading cause of death in the United States, and the third leading cause for years of life lost.
In Canada, suicide rates increased by 10% between the years 1997 and 1999, and are currently at 15 per 100,000 people. Unfortunately, many cases of depression and other mental illnesses go un-noticed, particularly in the developing world (World Health Organization, 2008).

Mental disorders other than depression also have a large impact on individuals and society. Around the world, more than one in three people in most countries meet diagnostic criteria for a mental disorder at least once in their lifetime (Andrade et al., 2000). Furthermore, anxiety disorders are the most common disorder on a national level in all the countries of the world, followed by mood disorders and substance abuse disorders (Demyttenaere et al., 2004). These statistics are believed to be underestimates due to lack of diagnosis, particularly in countries without affordable access to mental health services, and due to use of self-report data rather than structured diagnostic instruments (Andrade et al., 2000).

An important first step in identifying and monitoring these conditions is to assess them on a population level. It is necessary to have quick, reliable methods for making such measurements in large groups of people around the world. Population mental health measurements could be used to identify groups that are at greater risk of poor mental health outcomes. At-risk individuals could then be assessed further for mental illnesses, and offered appropriate treatments. Also, understanding which population groups have more mental health problems could be used to target preventative treatment and interventions, such as public health programming or increased mental health service availability. Finally, having a method for mental health surveillance of large groups could be used to monitor mental health changes over time, possibly to gauge whether programs or interventions to improve mental health have been effective.

1.3 Need for Systematic Review and Validation of SRMH

SRMH could potentially address the need for a quick, reliable measure of population mental health. As stated earlier, SRMH is already used on many national health surveys, and is being used increasingly in research investigations. However, little is known about what SRMH measures, how it may vary in different populations, and how well it performs. A useful starting point in answering these questions is to review the current literature to assess what prior work
has been done in this area, and to determine what needs to be done in the future. When investigators are looking for a summary of the current state of research evidence for a particular topic, they turn to literature reviews.

1.3.1 Systematic Reviews

A literature review is a condensed summary of critical knowledge or methodologies in a given field. A particularly useful form of review is the systematic review. Systematic reviews are structured syntheses of an entire body of literature, that use pre-defined methodologies to reduce bias in the review process. There are different types of systematic reviews, including narrative summary, thematic analysis, and meta-analysis. A narrative summary involves the selection, chronicling, and ordering of evidence. It may simply describe findings from all the articles, or contain varying levels of the authors’ interpretations. A thematic analysis is similar to a narrative summary, but differs in that studies are organized by thematic headings. A meta-analysis is a particularly rigorous form of review in which the results of several studies are combined to address a set of related research hypotheses. The process requires comparable samples and analytic techniques between reviewed studies. Results from all the included studies are usually combined into a single set of summary results using a statistical technique called meta-regression (Dixon-Woods et al., 2005).

Systematic reviews save researchers a lot of time that would otherwise be spent searching the literature and synthesizing current evidence. Reviews strengthen a field of study by making researchers aware of how variables have been studied and what gaps exist in the literature. Currently, no SRMH review articles seem to exist. Conducting a systematic review of SRMH literature is essential to understanding what research has been done in identifying what SRMH measures. Research gaps identified in this review could then be used to inform further research.

It is necessary to understand what SRMH measures so that it is used in appropriate settings with accurate interpretation of results. Although SRMH asks about mental health, it could be measuring a related, or entirely different, construct. One person may think of mental health as a measure of how good they feel day-to-day, while someone else may interpret it as a measure of how mentally “sane” they are compared to those around them. People may also interpret the question differently based on their ethnicity, sex, age, or socioeconomic status. In terms of
population measurement, it is necessary to be aware of the relationships between SRMH and other variables. This knowledge can then be used to assess the health of the population or to make predictions about future health outcomes.

1.3.2 Validation Research

Understanding what an item measures and how well it performs can be referred to as validation research. The validation process operates through a series of scientific investigations, which can include asking how well an item measures what it is supposed to measure, how well an item correlates with similar items, and how consistent an item is when administered in the same population multiple times. The more research and consensus there is regarding the properties of a measure, the more we can trust in its measurement capacity. However, there is always the chance that a future investigation will find results that are contradictory to what is currently known. Since we cannot see into the future and run every combination of experimental procedure on every population, at every possible time, a measure can never be considered completely validated.

If a population health indicator is going to be useful in drawing conclusions about populations and informing health policy, it is critical to use measures that have been well validated (Mathers et al., 2003). Unless we know what an item measures and how it is going to behave in different populations, we cannot make justified conclusions or comparisons with other groups. Therefore, it is important for research studies to analyze the properties of SRMH and to understand patterns of how it behaves in relation to other variables. Many research studies have already used SRMH, and validation work is needed to more accurately interpret results of previous and future studies. A logical starting point for understanding what SRMH measures is to look at SRMH in relation to mental health and disorders.

1.4 Defining Mental Health and Diagnosing Disorders

1.4.1 Defining Mental Health

Traditionally, mental health was considered to be an absence of mental disorder. However, health theories are moving beyond “absence of disease” and now consider positive well-being a requisite for good health (Manderscheid et al., 2010). In a general sense, mental health refers to
an individual’s emotional and psychological well-being; the manifestation of this definition varies worldwide based on culture, relative states of populations, and professional schools of thought (World Health Organization, 2001). Hales & Hales (1995) define mental health as: “the capacity to think rationally and logically, and to cope with the transitions, stresses, traumas, and losses that occur in all lives, in ways that allow emotional stability and growth” (p 34).

Mental health can be measured in individuals and populations using instruments such as the General Health Questionnaire (GHQ) (Banks et al., 2010), Symptom Checklist (SCL) (Derogatis et al., 1973), Mental Health Inventory-5 (MIH-5) (Berwick et al., 1995), and Patient Health Questionnaire (PHQ) (Spitzer et al., 1999). The goal of these instruments is to ascertain the general mental health status of an individual or population, measure quality of life, identify risk groups, or monitor changes over time.

1.4.2 Defining Mental Disorder

The fourth edition of the American Psychiatric Association’s Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) defines mental disorder as “a clinically significant behavioral or psychological syndrome or pattern that occurs in an individual and that is associated with present distress (e.g., a painful symptom) or disability (i.e., impairment in one or more important areas of functioning) or with a significantly increased risk of suffering death, pain, disability, or an important loss of freedom” (American Psychiatric Association, 2004, p. xxxi).

Since 1952, the DSM has represented the established guidelines of clinical diagnosis and practice in North America (American Psychiatric Association, 1952). The first edition of the DSM was preceded by the ICD-6 (the sixth edition of the International Statistical Classification of Diseases and Related Health Problems). The first two versions of the DSM corresponded with the development of versions seven and eight of the ICD. The two publications diverged when the focus groups developing the DSM-III and ICD-9 disagreed on the focus of the manual. Developers of the DSM chose to focus on medical nomenclature for clinical diagnosis, while the ICD continued to define disorder categories for the collection of basic health statistics. The main difference between these two publications is the addition of diagnostic criteria and a multi-axial system in the DSM, which is not present in the ICD (American Psychiatric Association, 2000).
While there are disputes regarding the diagnostic criteria presented in the DSM, it is still the North American clinical standard in mental health (Mayes & Horwitz, 2005).

Depression can generally be characterized by presence of a depressed mood. The DSM defines depression as a single major depressive episode in the absence of psychotic spectrum disorders (eg. schizophrenia). If more than one single episode has occurred, the disorder is classified as being recurrent (DSM-IV-TR, 374-376). A major depressive episode is defined by the presence of five or more of the following criteria occurring over the same 2-week period, representing a departure from previous functioning:

1) Depressed mood most of the day, nearly every day, as indicated by either subjective report or observation made by others.
2) Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day.
3) Significant weight loss or weight gain.
4) Insomnia or hypersomnia nearly every day.
5) Psychomotor agitation or retardation nearly very day (observable by others, not merely subjective).
6) Fatigue or loss of energy nearly every day
7) Feelings of worthlessness or excessive or inappropriate guilt nearly every day
8) Diminished ability to think or concentrate, or indecisiveness, nearly every day
9) Recurrent thoughts of death, recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide.

(DSM-IV-TR, 356)

In addition, the symptoms must not meet the criteria for Mixed Episode, must cause clinically significant distress or impairment in social, occupational, or other important areas of functioning, must not be due to the direct physiological effects of a substance or general medical condition, must not be better accounted for by a culturally acceptable response to a loss (such as a death), and at least one of the symptoms must be depressed mood or loss of interest or pleasure (DSM-IV-TR, 356).

The DSM defines generalized anxiety disorder as a difficult to control, “excessive anxiety and worry, occurring more days than not, for at least 6 months, about a number of events or activities (such as work or school performance)” (DSM-IV-TR, 476). In addition, three of the following six symptoms must be present:

1) Restlessness or feeling keyed up or on edge
2) Being easily fatigued
3) Difficulty concentrating or mind going blank
4) Irritability
5) Muscle tension
6) Sleep disturbance

(DSM-IV-TR, 476)

The symptoms must cause clinically significant distress in one or more areas of functioning, and must not be due to the direct physiological effects of a general medical condition or substance. Also, symptoms must not occur with a mood, psychotic, or developmental spectrum disorder. Generalized anxiety disorder is diagnosed in the absence of other anxiety disorders, including panic disorder, agoraphobia and social phobia. Finally, the symptoms must not occur as the result of another mental disorder, or from ingesting a chemical substance.

Panic disorder is defined by recurrent unexpected panic attacks (where a panic attack is an abrupt development of four out of 10 symptoms including heart palpitations, sweating, trembling, shortness of breath, feelings of choking, chest pain, nausea, dizziness, chills, and fear of dying). A person with panic disorder has persistent concern about having more panic attacks and worries about the consequences of these attacks. This can lead to a significant change in behavior relating to the attacks. Also, the panic attacks cannot have been caused by a chemical substance or other mental disorder.

Panic disorder can be classified as being with or without agoraphobia. Agoraphobia refers to anxiety about being in places or situations from which escape may be difficult or embarrassing, or in which help may not be available in the event of having panic symptoms or a panic attack. Agoraphobic fears can arise from being outside the home, standing in line, being in a crowd, being on a bridge, or traveling in a vehicle. Again, these fears must arise in the absence of a chemical substance or other disorder.

Social phobia is classified as a persistent fear of social or performance situations in which a person is exposed to unfamiliar people. The individual feels he or she will act in a way that will be embarrassing or humiliating, and exposure to the situation provokes anxiety (which could take the form of a panic attack). The person realizes the fear is unreasonable or excessive, but feared situations are avoided or endured with immense distress. The avoidance, anxiety, or distress associated with feared situations must interfere significantly with the person’s normal
routine, functioning and relationships. Also, this fear cannot be caused by the direct effect of chemical substances or other mental disorder.

Finally, the DSM criteria for Substance Dependence require that a patient demonstrate three of the following signs:

1) Tolerance (as marked by a need for increased amounts of the substance to achieve the desired effect, or by a markedly diminished effect following continued use)
2) Withdrawal (as marked by characteristic withdrawal syndrome related to the particular substance, or by taking the same or a related substance to avoid withdrawal symptoms)
3) Unintended escalation of quantity
4) A diminished capacity to control one’s substance use
5) Excessive time expenditure on activities necessary to obtain or use the substance, or to recover from its effects
6) Forfeiture of important social, occupational, or recreational activities because of substance use
7) Continued substance use in full knowledge of its having become physically and/or psychologically problematic for the patient

(DSM-IV-TR, 197).

While the DSM applies the same criteria for different substances, each substance is considered to be a different disorder. Examples include alcohol, amphetamine, cannabis, illicit drug, prescription drug, and hallucinogen dependence.

1.4.3 Diagnosing Mental Disorders

ICD disorder definitions and DSM diagnostic criteria have been used to develop diagnostic scales for identifying disorders in patients (the DSM is more commonly used in North America, while the ICD is typically used outside of North America). Contrary to the general well-being assessments of mental health scales, these disorder scales are designed to make clinical diagnoses. Two common examples of diagnostic scales are the Schedule for Clinical Assessment in Neuropsychiatry (SCAN) (Wing et al., 1990), or the Composite International diagnostic Interview (CIDI) (Wittchen, 1994).

The CIDI was developed by the World Health Organization and is based on the DSM-III and IV criteria, as well as the ICD-10. The core version of the CIDI is available in 16 languages and is a fully structured instrument administered by trained lay interviewers. The scale can make 76 ICD and 56 DSM IV diagnoses, and is designed for use in epidemiologic surveys, research
investigations, and clinical settings. There are 276 symptom questions, many of which are accompanied by probe questions for evaluating symptom severity. Further questions are used to assess help-seeking behavior and psychosocial impairments. Not all questions are posed to each respondent, as screening questions are used to skip irrelevant sections.

A strength of the CIDI is that it is highly standardized. The scale is made up of set questions and responses, which improves the consistency of assessment and the reliability of diagnoses. All respondents are asked the same questions using identical wording, responses come from pre-set categories, and there are defined algorithms for arriving at a diagnosis. A sample question from the Depression module asks “How often during that episode were you unable to carry out your daily activities because of your lack of interest? – often, sometimes, rarely, or never?” Based on its rigorous development and standardization, the CIDI is a well-established diagnostic instrument that performs consistently in a variety of settings (Wittchen, 1994).

1.4.4 Measuring Distress and Severity

Disorder severity can be measured using a self-report inventory called the Kessler Psychological Distress Scale-10 (Kessler et al., 2002). The scale was developed in 1992 for use in population health surveys and is available as a 6 or 10-item version (the K6 and K10, respectively). It is a short non-specific distress screening instrument used to detect cases of DSM-IV disorders, and to provide an indication of distress and disorder severity. A study of the Australian National Survey of Mental health and Well-Being found the K10 was able to discriminate subjects with mood or anxiety disorders from those without mental disorders (Furukawa et al., 2003).

There is also a lesser but significant association between the K10 and other mental disorder categories (Andrews & Slade, 2001). Based on data from CCHS 1.2, the K6 and K10 were found to have similar screening properties for depression in the general population (Cairney et al., 2007). Another study using CCHS 1.2 data found that the K6 had somewhat similar screening performance for depression, social phobia, manic episodes, and panic disorder. However, its performance was considerably better for individuals with comorbid disorders, and worse for those with agoraphobia (Veldhuizen et al., 2007).
The scales ask questions about feelings such as nervousness, hopelessness, depression, and psychological fatigue in the 4-week period immediately preceding testing. For instance, a sample question reads: “In the last four weeks, about how often did you feel tired out for no good reason?” Responses are marked on a 5-point scale ranging from “none of the time” to “all of the time”. Lower scores correspond to feelings of distress that may be normal, while higher scores could indicate distress associated with varying levels of anxiety or depression. This scale has performed repeatedly well in validations against other measures of mental health and disorder in a variety of populations (Hides et al., 2007; Kessler et al., 2003; Kessler et al., 2002; Spies et al., 2009)

1.5 Demographic and Social Factors that can Affect Mental Health

Mental health status and the presence of psychiatric disorders often result from a series of complex interactions between factors such as environment, social status, genetics, personality, and coping strategies. It can be difficult to identify causal relationships between these variables, but it is important to pay attention to all the variables that may influence an outcome. For instance, if we are looking at SRMH, we may find that being less educated and having depression are both associated with lower SRMH. However, research has found that people who are less educated are also more likely to suffer from depression. Therefore, being less educated increases the odds of being depressed, which can lead to poorer SRMH.

When trying to assess why people rate their mental health differently, we look at which variables make people different from each other. Since there are hundreds of thousands of such variables, a more customized tactic is to look at those variables that are robust predictors of mental health outcomes. These variables can include sex, ethnicity, level of education, and age. With respect to SRMH, Zuvekas & Fleishman (2008) found lowest SRMH ratings among those who had a lower income, were less educated, female, or aged 41-60. Another study found respondents with fair or poor SRMH were less likely to have a highschool education, and had more self-reported mental or physical conditions (Druss & Rosenheck, 2000). The following sections describe some of the variables known to affect SRMH and mental health.
1.5.1 Income

There is a significant association between depression and lower levels of income. Data from the US National Comorbidity Survey found that people were significantly more likely to suffer from major depressive disorder if they earned less than $20,000 a year, and that the likelihood of suffering depression decreased as income increased (Regier et al., 1988). Another study found a high correlation between unemployment and suicide in both the general public and psychiatric populations (Crawford et al., 2008). A lower income is associated with stresses such as financing day-to-day living and worrying about being able to provide for one’s dependents. These stresses are persistent, and can lead to mental disorders (Hales & Hales, 1996). Data from population health surveys often track household income, which can have an overall effect on all residents of a particular dwelling. In North America, depression and anxiety disorders are twice as common among families with low income as compared to families with high incomes (Algeria et al., 2000, Wang et al., 2000).

1.5.2 Age

Being of a certain age group can increase susceptibility to different mental disorders. Those who are younger are considered more likely to suffer from alcohol or drug dependence. In one analysis, those aged 15 to 34 were nearly nine times more likely to suffer from alcohol dependence, and around 50 times more likely to suffer a drug dependence than the rest of the population (Swendsen et al., 2009). Depression is also associated with age; however, contrary to previous beliefs, aging is not associated with increased rates of depressive disorders. Current studies suggest that incident cases of major depressive disorder are significantly lower in people aged 45 and older (Bland et al., 1988; Regier et al., 1988). In another study of participants aged 65-97, depression did not correlate with age (Fassino et al., 2002). A national study of CIDI diagnoses among Americans found prevalences of mood, anxiety, and substance disorders decreased with increasing age. Disorder prevalences were highest among those aged 30-44, and lowest among those over the age of 60 (Kessler et al., 2005)

1.5.3 Sex

It is commonly found that women are more likely to suffer from mood and anxiety disorders, while men are more likely to have impulse-control and substance disorders (Kessler et al.,
A theory behind this relationship is that women are inclined to internalize their negative feelings, while men externalize them with aggression and substance use (Hales & Hales, 1996). Although, women do suffer from substance disorders and studies have found that treatment programs need to be sex-specific, due to differences in biology and psychiatric comorbidity. Female substance users were found to have more comorbid depression, panic disorder, and phobia than males (Brady & Carrie, 1999).

There are a number of studies about sex differences in how external causes can affect whether people are diagnosed with disorders. The heterosexual marriage dynamic can highlight sex differences in depression when men and women are faced with equivalent situations. One study found a reciprocal relationship in depressive symptoms between spouses; husbands’ strokes and high blood pressure were related to increased depressive symptoms among wives, while husbands did not have increased depressive symptoms in relation to their wives’ health (Ayotte et al., 2010).

1.5.4 Education

People’s level of education can also affect psychiatric outcomes. Generally, having less education is associated with an increase in mental disorders. Swendsen et al. (2009) found those with less than a high school education were 15 times more likely to suffer from a drug dependence. A meta-analysis of depression studies found that lower levels of education and socioeconomic status were associated with increased rates of depression (Lorant et al., 2003). Having lower levels of education has also been associated with increased prevalence of psychiatric disorders around the world (Andrade et al., 2000).

Education seems to have a protective mechanism against mental disorders. Those who are more educated tend to be of higher socioeconomic status, which is associated with having better coping styles, less stress exposure, and stronger social support (Turner & Lloyd, 1999). Education can also affect cognition, problem solving skills, and access to information. One study found that for each additional level of education, respondents were 12% more likely to see a family doctor, 15% more likely to see a psychiatrist, and 16% more likely to see a social worker about a mental health problem (Steele et al., 2007). Conversely, it is also possible that
people with poor mental health or developing disorders may have been unable to continue on with their educations.

1.5.5 Immigrant Status

Research into physical health has revealed that new immigrants exhibit what is called the “healthy immigrant effect”. Based on various health measurements, these immigrants seem to have better health than the rest of Canadians and use the health care system less frequently (Chen et al., 1996). An explanation for this phenomenon is that Canada’s immigration policy screens out potential immigrants that may endanger the health of other Canadians or burden the health care system (Ali, 2002). Another explanation is that immigrants who follow through with the process of relocating to a new country generally have to be mentally healthy and motivated to do so. However, over time immigrants’ physical health and health system utilization begins to match that of the Canadian population. This same pattern has been observed with respect to mental health.

A Statistics Canada study found that immigrants from Africa and Asia had lower rates of depression and alcohol dependence than the Canadian population. However, immigrants who had been in Canada for more than ten years had rates of depression similar to the rest of the Canadian population. The study’s author concludes the better mental health experienced by recent immigrants may be due to a selection effect, since immigrants generally tend to be among the wealthier, more educated members of their home society (Ali, 2002). The decrease in mental health after a number of years in a new country could arise from hardships faced during the settling process, such as finding employment and creating social support networks. This phenomenon is not unique to Canada; similar mental health relationships have also been found for immigrants in the United States and Australia (Stephen et al., 1994).

1.5.6 Limitations in ADLs and IADLs

Whether a person can move around and feels like he or she is able to engage in daily activities can affect mental health. An index of disability distinguishes between activities of daily living (ADL), and instrumental activities of daily living (IADL). ADLs refer to personal day-to-day functioning, such as eating, washing, dressing, taking medication and moving around inside the house. Conversely, IADLs involve activities that are more intensive and procedure-oriented,
such as meal preparation, getting to appointments, everyday housework, and heavy chores (Katz et al., 1963). People requiring assistance with ADLs also require assistance with IADLs, but the reverse is not necessarily true (Chen & Wilkins, 1998).

While ADLs are generally associated with physical limitations, a study looking at adults aged 65-97 found that 4.8% of the sample cited psychiatric problems to be the cause of their ADL dependence. This same study found higher levels of ADL dependence were correlated with depression and anxiety (Fassino et al., 2002). A possible explanation for this relationship is that becoming dependent upon others for tasks of daily living is a difficult adjustment. Conversely, having poor mental health may affect a person’s ability to carry out ADLs and IADLs.

1.5.7 Social Support

Social support is the physical and emotional comfort derived from family, friends, and peers. People who feel higher levels of social support often feel as though they are part of a community that loves, cares, and thinks well of them. One scale for measuring this quality is the social support scale of the Medical Outcomes Study (MOS). The MOS is a 19-item self-report measure that covers four domains of support: informational support, tangible support, positive social interaction, and affection. Questions ask respondents how often a type of support is available to them (e.g. someone who shows love and affection, someone to get together with for relaxation). A sample of a question on this scale asks: “How often do you have someone to help you if you are confined to bed?” with responses ranging from “all of the time” to “none of the time”. Responses are scored between 1 and 5, and a final mean score is calculated for the entire scale (Sherbourne & Stewart, 1991).

It is believed that social support acts as a buffer against stressful conditions. One study examining why there are increased psychiatric risk factors among groups of lower socioeconomic status found a large part of the relationship was explained by weaker social support, poorer coping styles, stress, and ongoing life events (Lorant et al., 2003). A review article found consistent evidence that social support is significantly associated with well-being and absence of psychological distress, which leads to fewer psychiatric outcomes (Kessler et al., 1985). Social support has also been shown to buffer the psychological impact of health
problems, such as breast cancer, which could potentially prevent development of more severe mental disorders (Kornblith et al., 2001).

1.5.8 Physical Health

The relationship between mental and physical health as already been mentioned previously in the context of depression. The Canadian Mental Health Association warns that mental health conditions can adversely affect physical health (CMHA, 2006). For instance, stress and anxiety have been known to cause headaches, hypertension, and stomach ulcers (Chapman et al., 2005). One review of mental health literature found that stress and anxiety were associated increased asthma symptoms, weakened immune systems, and a higher likelihood of developing arthritis. Furthermore, people reporting chronic anxiety were at a greater risk of developing heart disease (Chapman et al., 2005).

The relationship between mental and physical health seems to work both ways; poor mental health can cause poor physical health, or vice versa. Patients with physical chronic conditions such as cardiovascular diseases (Pratt et al., 1996) and diabetes (Anderson et al., 2001) are found to have higher prevalences of depressive disorders. Also, individuals with arthritis, cancer, asthma, diabetes, and heart disease have reported intensified feelings of anxiety, depression, and stress (Keaton, 2003).

1.6 Canadian Community Health Survey 1.2

Each year, Statistics Canada (the national statistical agency) conducts cross-sectional data collection for the Canadian Community Health Survey (Statistics Canada, 2002a). This data is collected on a two-year cycle; year one is a general population health survey, and year two focuses on a particular health topic. In 2002 the health topic of focus for Cycle 1.2 was mental health and well-being. CCHS 1.2 is a unique resource in that it incorporates CIDI diagnostic scales with all the previously discussed health and sociodemographic variables.

1.6.1 Content Development

Content for CCHS 1.2 was developed using a selection of disorders covered by the CIDI. The questions and algorithms from the CIDI were optimized to meet the needs of the CCHS. Some items were shortened to reduce respondent burden and clarify concepts. Mental disorders were
partly coded onto the DSM-IV only, and not the ICD. These changes were made in collaboration with the World Mental Health team that is developing a new version of the CIDI, and some of these changes will be reflected in the new CIDI. Most of the content for physical health and sociodemographic questions was taken from the previous survey cycle (CCHS 1.1).

The CCHS 1.2 questionnaire was reviewed and tested in the field using pretests and focus groups conducted in English and French. Qualitative testing was used to evaluate respondents’ understanding and willingness to respond to questions. The samples included individuals with known mental disorders and members of the general population. The testing revealed general acceptance and support for the study. Some questions were considered to be too long and too broad; these findings were used to make a shorter, respondent-friendly questionnaire.

1.6.2 Sample

CCHS 1.2 covers approximately 98% of the population over the age of 15 who are living in private dwellings in the 10 Canadian provinces. The sample excluded those living in the three territories, on Indian Reserves or Crown lands. Also excluded were those who were institutionalized, full-time members of the Canadian forces, or residents of remote areas. Sampling was accomplished by using a multi-stage stratified cluster design. In the first stage of this design, each province was divided into three types of regions: major urban centres, cities, and rural regions. Each of these regions was divided into geographic or socioeconomic strata. Within these strata, 150 to 200 dwellings were grouped to make clusters. A random sampling method was then used to select six clusters from each stratum. The final sample was obtained by a systematic sampling of dwellings within each of the selected cluster. One person was surveyed from each selected household. This process ensured that those being surveyed were representative of the entire population.

1.6.3 Data Collection

Data collection occurred between May 2002 and December 2002. The survey was administered by trained lay interviewers in English, French, Chinese or Punjabi. Efforts were made to have face-to-face interviews, but when it was not possible the interview was done over the phone (ultimately, 14% of the interviews were held over the phone). Proxy responses were not permitted, and interviews were conducted using computer assisted interviewing (CAI). Using
CAI made it possible to tailor question flow based on respondents’ answers. CAI also ensured data quality through on-screen prompts that notified interviewers of invalid data entries. The average length of each interview was less than 70 minutes and a 77% response rate was achieved (n = 36, 940).

### 1.6.4 Data Release

Data from this survey is housed in Ottawa at Statistics Canada, and at a number of Research Data Centers (RDC) across the country. Researchers can gain access to the data using an application process through the Social Sciences and Humanities Research Council of Canada (SSHRC). The six-month process requires submission of a research proposal, evidence of appropriate resources and investigative experience, security clearance, and specialized training at the RDC. Alternatively, a Public Use Microdata File (PUMF) can be accessed by post-secondary students at participating institutions through the Data Liberation Initiative (DLI). The PUMF is available for encrypted access over the internet. For respondent confidentiality, Statistics Canada does not release the full data set in the PUMF. Some variables that could potentially identify a respondent, such as race and age, are removed or grouped into larger categories (Statistics Canada, 2002b).

### 1.6.5 Utility of Secondary Data

Data that was not originally collected by an investigator is referred to as secondary data. There are many advantages to using secondary data from epidemiologic surveys, including having access to a large sample size, eliminating the time required to develop and conduct a new survey, and decreased cost. Epidemiologic surveys incorporate a large number of variables that can be used to study the complex nature of mental health relationships. The relatively large sample sizes in these surveys allow for more detailed analyses of sub-populations, such as older adults or specific ethnic groups. Furthermore, nationally representative survey data can be used to create reliable population estimates (Bierman & Bubolz, 2003).

As with any experimental technique, there are some limitations to secondary data analysis. For instance, researchers are restricted to information that was collected using the survey and are bound by the data limitations of the original survey methodology. Also, sample sizes may not be
very large with respect to certain variables (e.g. the number of children diagnosed with a mental disorder), which means researchers need to be cognisant of sample sizes and plan analyses accordingly (Bierman & Bubolz, 2003).
2 Study Aim and Research Questions

A single-item measure of self-rated mental health (SRMH) is being used increasingly in the literature and on population health surveys. However, few studies have done formal validation work assessing this measure. While there are a number of studies that have used SRMH, there are no literature reviews that have integrated our knowledge to date. Therefore, it is difficult to understand what SRMH is measuring and how it should be used.

The general aim of this study is to learn more about what SRMH measures. This will be accomplished in a two-part study, of which the first part is a systematic review of the literature. This review will synthesize existing research that has used or investigated SRMH. Results of the review will tell us what is currently known about SRMH, and will highlight areas that require further study.

Research gaps identified in the systematic review will be used to inform an analytic study that further investigates the measurement properties of SRMH. The study will look at the relationships SRMH has with distress and psychiatric diagnoses. Distress will be measured using the Kessler Psychological Distress Scale-10 (K10), and psychiatric diagnoses will be made using the Composite International Diagnostic Interview (CIDI). Physical health and sociodemographic covariates will also be assessed in relation to SRMH. The following sections describe research questions for the CCHS 1.2 analytic study.

2.1 Question 1: Is there an association between SRMH and CIDI psychiatric diagnoses for depression, anxiety disorders (social phobia, panic disorder, agoraphobia), and substance dependence (alcohol or drug dependence)?

Since SRMH is a mental health measure, it is important to understand its relationship with diagnoses of mental disorders. No known studies have looked at the association between SRMH and CIDI diagnoses, and only one study has looked at the relationship between SRMH and a mental disorder. This study found that SRMH correlates with current and future incident cases of major depression (Hoff et al., 1997).
2.2 **Question 2**: Is there a relationship between SRMH and distress, as measured by the K10?

This second question is important to understanding how SRMH is associated with existing mental health measures. This relationship has not yet been tested on a Canadian sample using the K10. A previous study by Fleishman et al. (2007) found that SRMH was associated with the K6 in an American sample.

2.3 **Question 3**: Is there an association between SRMH and sociodemographic characteristics and physical health status?

There has been little investigation into how SRMH may vary within populations by other factors that can be related to mental health, such as sociodemographic characteristics and physical health status. Answering this question will provide more information about what SRMH is measuring, and will inform us of how SRMH may vary depending on population groups.

2.4 **Question 4**: Do levels of distress, as measured by the K10, affect the relationships between SRMH and mental disorders, sociodemographic characteristics, and physical health status?

There has been no previous investigation into how feelings of psychological distress affect whether there are associations between SRMH and sociodemographic characteristics, mental disorders, and physical health. While it is important to identify the variables SRMH is related with, it is also necessary to understand if there are common factors that underlie or cause these relationships.
3 Manuscript 1

Systematic Review: A Single Item Measure of Self-Rated Mental Health
ABSTRACT

Background: A single-item measure of self-rated mental health (SRMH) is being used increasingly in research and on population health surveys. The item asks respondents to rate their mental health on a five-point scale from excellent to poor. This study presents the first known review of the SRMH literature.

Objective: To conduct a systematic review of the literature and to assess the current state of knowledge about what SRMH is measuring.

Methods: We ran keyword searches in Medline, CINAHL, PsycINFO, EMBASE and Cochrane Reviews. Two independent reviewers coded articles for inclusion or exclusion based on whether articles included SRMH. Each study was coded by theme and data were extracted about study design, sample, variables, and results.

Results: Thirty-eight studies included SRMH. SRMH correlated moderately with the following mental health scales: K6 scale of psychological distress, Patient Health Questionnaire (PHQ-2), mental health subscales of the SF-12 Health Status Survey, Behaviour and Symptom Identification Scale (BASIS-24©), and Diagnostic Interview Schedule (DIS). Poor SRMH was associated with poor self-rated health, physical health problems, increased health service utilization and less likelihood of being satisfied with mental health services. Few of these studies focused on formal validation of SRMH. However, synthesizing the literature base has given us important information about the relationships SRMH has with other variables.

Conclusions: SRMH is associated with multi-item measures of mental health, self-rated health, health problems, service utilization, and service satisfaction. Given these relationships and its use on epidemiologic surveys, SRMH may have value as a population health measure. More studies need to analyze relationships between SRMH and mental health or disorder scales.
Longitudinal analyses should look at whether SRMH is predictive of future mental health problems.
BACKGROUND

Epidemiologic surveys are evolving toward using shorter scales to measure physical and mental health of populations (Rohrer et al., 2005c). Scales using fewer items to make valid assessments reduce respondent burden, simplify administration, are easier to translate, and quickly provide global health indications. Single-item measures are seeing increased use, including the following measure of self-rated mental health (SRMH):

In general, would you say your mental health is:

Excellent?

Very good?

Good?

Fair?

Poor?

It seems this item first appeared around 1970 (Jegede, 1980; McMichael & Hetzel, 1974). In 1981 it was used as part of the National Institute of Health Diagnostic Interview Schedule, which was developed based on criteria from the Diagnostic and Statistical Manual of Mental Disorders-III. It was later adapted into the World Mental Health Composite International Diagnostic Interview (WMH-CIDI) and currently appears in national epidemiologic surveys (eg. Canadian Community Health Survey, Medical Expenditure Panel Survey). It is used internationally in primary research investigations and secondary analyses of population data. However, there seems to be limited formal validation research into what this item measures.

Despite limited knowledge about what it is measuring, SRMH use has been increasing. It has been used as a stand-alone indicator of mental health (Raleigh et al., 2007), as part of diagnostic scales (Eisen et al., 2007; Haug et al., 1999; Jegede, 1980), and as a construct to validate another mental health measure (Eisen et al., 2007). Researchers have used SRMH to study differences in mental health (O'Donnell, 2000), health care utilization patterns (Nabalamba & Millar, 2007), adherence to treatment plans (Olfson, 2006), and more. However, without proper knowledge about what SRMH is measuring, these findings cannot be properly interpreted or used to inform healthcare surveillance and reform.
Once its psychometric properties are understood, SRMH could become even more useful. A single item measure of self-rated health (SRH) has been used world-wide since the 1950s (Streib et al., 1958). This item is similar to SRMH and asks individuals to rate their health on the same 5-point scale ranging from excellent to poor. SRH is a stronger predictor of mortality, care utilization, and morbidity than physician data or presence of chronic conditions (Idler & Kasl, 1991). The parallel wording structure of both these items implies that SRMH could measure aspects of mental health as robustly as the physical health indications provided by SRH.

Understanding SRMH is important to be able to evaluate previous studies using the item, and to provide a basis for future work. Since there are no known reviews of SRMH, we are compiling the first systematic synthesis of studies that have either used or analyzed SRMH. The goal of this review is to integrate current knowledge, identify research gaps, and recommend further investigations.

METHODS

Search Strategy

We searched Medline, CINAHL, PsycINFO, EMBASE and Cochrane Reviews from their inception to October 2009, including published and unpublished studies. Keyword searches were run on titles and abstracts for any of the following word combinations: self rated mental, self perceived mental, self assessed mental, self reported mental, or global mental. Manual searches were conducted using the reference sections of identified articles. An additional strategy searched the aforementioned databases using the keywords mental health along with titles of surveys known to use the item: Canadian Community Health Survey (CCHS), Epidemiologic Catchment Area study (ECA), Medical Expenditure Panel Survey (MEPS), National Latino and Asian American Study, National Health Services Postal Questionnaire, Mexican American Prevalence and Services Study (MAPSS), Ontario Health Survey (OHS) Mental Health Supplement, and the World Mental Health Composite International Diagnostic Interview (WMH-CIDI).
Eligibility Criteria

Articles qualified for inclusion if they mentioned self rated mental health, self reported mental health, self assessed mental health, self perceived mental health, or individual global mental health. The study needed to contain a single item asking for a general mental health rating on a four or five point scale. Acceptable variations of this question asked about overall mental health, mental health at the present time, mental health, and emotional health (Table 1). Articles were excluded if SRMH was measured using multiple items, or if the single item asked about a specific disorder. We included all original research and secondary data analyses. Qualitative studies, literature reviews, and meta-analyses were included but no studies were found. The search encompassed all international English literature from selected databases, and no exclusions were made by sex, gender, ethnicity, geographic location, or age.

Two independent reviewers (FA and AJ) considered abstracts for inclusion or exclusion. A coding scheme was established based on study objectives and the first 15 abstracts in the database. The scheme was pilot tested on the first 30 articles and reviewers achieved 100% consensus on which articles to extract for full-text review. Remaining abstracts were evenly divided for coding. Forty randomly selected abstracts were coded by both reviewers to calculate inter-rater reliability (κ= 0.80). The quality of each study’s methods and results section was assessed using the STROBE statement checklist for observational studies. No studies were excluded due to poor quality.

Data Synthesis

We extracted information about each study’s design, country of origin, data source, and sample characteristics (sample size, gender distribution, age range, population type and ethnicity). We identified variables that were studied in relation to SRMH, and isolated the results of these analyses. Studies were classified by whether they used SRMH in 1) a validation study, 2) as an outcome or principal independent variable, or 3) as a covariate.

Since there was such heterogeneity between articles’ methods and analyses, a meta-analysis could not be performed. Instead, a thematic analysis is presented. Studies were grouped by the variables they analyzed alongside SRMH: mental health conditions, physical health, health
service utilization, health service satisfaction, social determinants of health, and SRMH in specific populations. These categories were not mutually exclusive, and two studies fit under multiple themes (Druss & Rosenheck, 2000; Zuvekas & Fleishman, 2008).

**RESULTS**

The literature search revealed 322 unique abstracts, 94 of which were extracted for full-text review. Twenty-five articles qualified for inclusion and 10 new additions were found by searching the aforementioned databases by scales known to contain the SRMH item. Three more articles were found by searching reference sections, for a total of 38 relevant articles. Figure 2.1 describes the literature review and search process.

**Study characteristics**

Table 2 presents overall study characteristics. Of the 38 investigations, three examined SRMH in a validation study, 25 used it an outcome or principal independent variable, and 10 included SRMH as a covariate. Twelve studies were primary research investigations, and the rest were secondary analyses of data from population health surveys. Most of the studies were cross-sectional, while five were prospective. The most commonly used surveys were the CCHS (11 studies) and MEPS (7 studies). Seventeen studies used SRMH as the only indicator of mental health. Twenty-three studies examined both SRMH and SRH.

Seventeen studies were conducted in the United States, 12 in Canada, 2 in China, 2 in Singapore, and the remaining 5 in England, Nigeria, Puerto Rico, Sri Lanka, and Turkey. Sixteen studies did not report the ethnic composition of their sample, and the remaining looked at Chinese, Hispanics, blacks, whites, ‘non-whites’, Turks, Puerto Ricans, Sri Lankans and Nigerians. Eight of these studies were ethno-specific, and five made ethnic comparisons.

Sample sizes ranged from 121 to 120,559. Thirteen studies had over 10, 000 participants. All investigations included men and women, except for one that looked only at men (O'Donnell, 2000). Thirteen studies did not report the proportion of males and females in their sample, 9 conducted a gender-based analysis, and 6 examined gender differences in SRMH. Seven studies examined adults aged 60+ and none examined children under the age of 12. Seven studies were limited to individuals with psychological or psychiatric disorders, four examined individuals
with medical problems, and 19 studied a general population. Table 3 gives key data and findings from each study.

**SRMH Validation Studies**

Three papers analyzed relationships between SRMH and clinical mental health measures. Fleishman and Zuvekas (2007) used well-validated measures, multivariate analyses, and a large representative American sample. Using MEPS data, they examined correlations between SRMH, SRH, physical and mental health subscales of the SF-12 health status survey, K6 scale of psychological distress, and Patient Health Questionnaire (PHQ-2) depression screener. The multi-item measures were more strongly correlated with each other ($r > .69$) than with SRMH (correlations ranged between 0.33 and 0.49). SRH correlated more strongly with physical health subscales of the SF-12, and SRMH with mental health subscales of the SF-12, PHQ-2, and K6.

A second study used mental health inpatient and outpatient SRMH to assess construct validity of the BASIS-24© Behavior and Symptom Identification Scale. The BASIS-24© is a brief mental health measure useful for assessing the outcome of mental health treatment. The correlation between SRMH and the BASIS-24© summary score was $r = 0.65$ for inpatients and $r = 0.76$ for outpatients. The highest subscale correlation with SRMH was ‘depression/ functioning’ ($r = 0.65$ for inpatients, $r = 0.75$ for outpatients). “Alcohol/drug use,” and “psychosis” subscales were least strongly correlated with SRMH (Eisen et al., 2004). While the authors validated their measure against SRMH, they did not provide information about its psychometric properties.

Data from the Epidemiologic Catchment Area study were used to examine the relationship between SRMH and incidence of major depression the following year. Depression was measured using the Diagnostic Interview Schedule (DIS), which is based on DSM-III criteria. Logistic regression analyses revealed that more positive levels of SRMH were associated with decreased risk of major depression. Individuals with poor SRMH were 4.57 times more likely to have a major depressive episode than those with fair SRMH, and 9.97 times more likely than those with excellent SRMH. The effect held constant when controlling for age, gender, or a past history of depression. The authors concluded SRMH could be used to identify groups at higher risk for major depression, even in the absence of other risk factors (Hoff et al., 1997).
SRMH and Mental Health Conditions

Six articles studied SRMH in relation to mental health conditions. A multivariate analysis of MEPS data found blacks and Hispanics were more likely than whites to report excellent SRMH, and less likely to report poor SRMH (even when they had low scores on the mental component summary of the SF-12). The authors concluded whites are more likely than blacks or Hispanics to translate mental symptoms into recognition of mental health status (Zuvekas & Fleishman, 2008). Alternative explanations that should be considered are whether black and Hispanic cultures have a dispositional optimism, or if they may worry about stigmas surrounding poor mental health and therefore rate themselves as being in a better state of mental health.

A multivariate prospective analysis of MEPS data found patients with fair or poor SRMH were almost twice as more likely to be among the 26.7% of the sample who continued antidepressant therapy beyond 90 days. Results were adjusted for race, age, sex, and pre-treatment mental health status (Olfson et al., 2006). Multivariate analyses by Tiwari & Wang found Chinese participants were more likely than other Asians or whites to have fair or poor SRMH. However, Chinese and other Asians had lower prevalence rates of mental and substance use-related disorders (Tiwari & Wang, 2006).

Three studies used SRMH as a covariate. Olfson & Marcus used age, sex, race, family income, and SRMH as covariates when looking at national patterns in anti-depressant treatment between 1996 and 2005 (Olfson & Marcus, 2009). Harman et al. also used SRMH as a covariate in their study analyzing the influence of chronic comorbid conditions on depression care for the elderly (Harman et al., 2005). Neither of these studies provided information about why SRMH was chosen as a covariate or what is known about its psychometric properties. Finally, a descriptive study about social anxiety disorder found those with the disorder had lower ratings of SRMH than the rest of the population (Shields, 2004).

SRMH and Physical Health

Four studies found relationships between poor physical health and fair or poor SRMH. Multivariate analyses of a group of asthmatics found that physically active asthmatics had significantly greater SRMH and fewer chronic conditions than those who were not physically
active (Dogra & Baker, 2006). A descriptive study found that people with medically unexplained physical symptoms (MUPS) were more likely than those without MUPS to rate their mental health as fair or poor (Park & Knudson, 2007). Two studies using SRMH as a covariate found people with multiple sclerosis had less than excellent SRMH (Peterson et al., 2007) and those with restless leg syndrome had worse SRMH than control groups (Sevim et al., 2003).

**SRMH and SRH**

Twenty-three studies using SRMH included SRH, often as a covariate in models. Variables associated with poor SRMH also had associations with poor SRH, although the magnitude of relationships varied. Fleishman & Zuvekas (described earlier) were the only authors to quantify the relationship between SRH and SRMH. They found both variables had a stronger association with each other \( r = .54 \) than with other physical and mental health scales. However, SRMH had unique associations with the mental health scales, even when adjusting for SRH. There may be some overlap between what these items are measuring, or a correlation between physical and mental health constructs (Fleishman & Zuvekas, 2007).

**SRMH and Health Service Utilization**

Eleven studies looked at the relationship between SRMH and health services utilization. A multivariate analysis of health utilization behaviours among Canadians found people with fair or poor SRMH were more likely to visit a general practitioner or specialist. A significant effect was maintained after adjusting for age, sex, ability to converse in English or French, household income, urban/rural residence, and having a family doctor (Nabalamba & Millar, 2007).

In a multivariate analysis comparing utilization of outpatient mental health care between Ontario and the US, Katz et al. found the relationship between fair or poor SRMH and medical, psychiatric or social service use was twice as strong for Ontarians than for Americans. Controlling for perceived need (self-motivated visits or feeling the need to seek help) eliminated the differences between both countries. Other control variables included sex, urban location, and age. SRMH was the second highest predictor of service use, followed by presence of an
affective disorder. Anxiety disorders, substance dependence, and comorbid mental health conditions were less predictive (Katz et al., 1997).

Zuvekas & Fleishman (outlined previously), found fair or poor SRMH was predictive of ambulatory mental health visits and purchasing medications for mental health treatment. Analyses were controlled for scores on a mental health scale, sociodemographic factors, health insurance coverage, chronic physical health conditions, and supply of psychiatrists (Zuvekas & Fleishman, 2008). A multivariate prospective analysis of Puerto Ricans found that gender alone was not predictive of mental health service utilization in the following year, but the interaction between SRMH and gender was significantly predictive for men (Albizu-Garcia et al., 2001). Most study participants were Puerto Ricans of low socioeconomic status, limiting the study’s generalizability.

A multivariate analysis of people with mental disorders examined use of complementary services (eg. chiropractic, acupuncture, massage). After adjusting for fair or poor SRMH, chronic medical conditions, total number of conditions, and demographic variables, authors found people with mental disorders were 1.27 times more likely to make a complimentary care visit (Druss & Rosenheck, 2000). A study of depressive and anxiety disorders among Singaporean adults used multivariate analyses to assess factors related to help-seeking behaviours (visits to a general practitioner for mental health reasons, or seeing a psychologist, psychiatrist, or social worker). Fair or poor SRMH and acknowledging having a mental illness were predictive of help-seeking, while health beliefs and social support were not (Ng et al., 2008). Another multivariate analysis of Singaporean elderly found fair or poor SRMH was an independent predictor of using the aforementioned mental health services (Nyunt et al., 2009).

Five studies used SRMH as a covariate. One study did not report on SRMH, but combined SRMH, presence of a mental disorder, and reported disability to create a single need variable (Lin et al., 1998). A study of help-seeking behaviour among Mexicans with DSM-III-R diagnoses found that poor SRMH had a much greater effect of increasing physician and mental health provider utilization among U.S. born than for Mexican-born immigrants (Vega et al., 2001). A seniors’ community-based health promotion program found attendance patterns were not affected by SRMH or SRH (Watkins & Kligman, 1993). A study of mental health service
use among youth with mental disorders found that those who rated their mental health as fair or poor were four times more likely to use a service, compared to those perceiving their mental health to be excellent (Bergeron et al., 2005). A study of medical service utilization for mental health reasons found increased utilization among those with poor SRMH (Vasiliadis et al., 2005).

**SRMH and Health Service Satisfaction**

Three studies looked at SRMH and health service satisfaction. A study of American Medicaid patients used multivariate analyses to determine the relationship between mental health service satisfaction, SRMH, and life satisfaction. The authors found correlations between all three variables for schizophrenics but not for those with affective, anxiety or adjustment disorders (Rohland et al., 2000). Follow-up study is needed to identify whether other variables could be responsible for this effect.

A study of mental health service users in England used multivariate analyses to find that people with fair or poor SRMH were less likely to be satisfied with mental health services. SRMH was the strongest predictor among all study variables (ethnicity, age, living alone, employment status, and hospital admissions) (Raleigh et al., 2007). A multivariate analysis of managed behavioural care users found that evaluations of managed behavioural health plans varied by SRMH. Those with excellent or good SRMH gave higher ratings to the plan than those with fair or poor SRMH (Eselius et al., 2008).

**SRMH and Social Determinants of Health**

Six studies looked at SRMH in relation to social determinants of health. A descriptive study about community belonging among Canadians found that stronger feelings of belonging were associated with substantially better SRMH (Statistics Canada, 2005). Another descriptive analysis about job satisfaction found low satisfaction was related to fair or poor SRMH (Shields, 2006).

Two studies of a geriatric outpatient sample in China used multivariate techniques to analyze social factors in relation to SRH and SRMH. The first study found predictors of low SRMH were age, perceived family respect, number of diseases, neighbourhood relations, percentage of
income spent on rent, preference to live with a son, and personal monthly income (Yu et al., 1997). The second found people with very high and very low levels of education had lower SRMH than blue collar workers, civil servants, and white-collar workers. A potential explanation for low SRMH among highly educated individuals is the effect of a communist regime (Yu & Wang, 1993).

Two studies that were outlined previously also examined SRMH in relation to social determinants of health. Zuvekas & Fleishman found poorer SRMH among those who had a lower income, were less educated, female, or aged 41-60 (Zuvekas & Fleishman, 2008). Druss & Rosenheck found respondents with fair or poor SRMH were older, less likely to have a highschool education, and had more self-reported mental or physical conditions (Druss & Rosenheck, 2000).

**SRMH in Specific Populations**

Eight studies reported on SRMH of specific population groups. A prospective study of caregivers for the elderly found SRMH to have declined during the 2-year study period. Decline in SRMH was predicted by poor baseline SRMH and decline in SRH (Haug et al., 1999). In a study comparing Alberta medical residents to the rest of Canada, multi-variate analyses revealed the medical residents had lower SRMH than the rest of the Canadian population. More males reported excellent SRMH than females in both samples (Cohen & Patten, 2005). A descriptive analysis of mental health among Nigerian university students found SRMH was related with neuroticism, SRH, and having problems to discuss with a doctor (Jegede, 1980).

A multi-variate analysis looking at SRMH between male veterans and non-veterans found that veterans were less likely to report fair or poor SRMH. However, controlling for demographic, socioeconomic, and health-related factors eliminated the differences in SRMH between both groups (O'Donnell, 2000). This study sought to study mental health of veterans and non-veterans, but SRMH was the only mental health variable used in the comparison.

A study of social support and health among Latin Americans used multivariate analyses to show that family support was strongly associated with positive SRMH (Mulvaney-Day et al., 2007). A multivariate analysis looking at neighbourhood environment and SRMH in Southern Sri Lanka
found that environmental stressors (nuisance from neighbours or drug users, shortage of water, or having poor water/ sewage drainage system) were associated with fair or poor SRMH, but not with fair or poor SRH (Perera et al., 2009). A study of smoking among Nova Scotians using SRMH as a covariate found that more people with poor SRMH smoke compared to those with poor SRH (Nova Scotia Department of Health, 2004).

**DISCUSSION**

Our systematic review of the literature reveals that a number of investigations included SRMH. SRMH correlated moderately with mental health scales, but there seem to be ethnic differences in responses to the item. Poor SRMH was associated with poor SRH, physical health problems, increased health service utilization, and a lower likelihood of being satisfied with mental health services. Some studies found age and gender disparities in SRMH but others did not. Despite the fact that few studies conducted formal validations of what SRMH is measuring, its use in the literature has given us important information about its relationship with other variables.

This study is the first systematic review of SRMH literature. We optimized the number of articles we found by using a broad, structured search strategy. However, a limitation of our research is that SRMH terminology is not yet standardized, and some studies may not have been captured by the selected keywords. We tried to minimize this limitation by running a second search of survey titles known to use SRMH. A limitation of the SRMH research base is that it is relatively small. Currently there are not enough similar studies to conduct meta-analyses, so our results were not based on empirically comparable studies. Also, many of the studies using SRMH did not provide information about what we do, or do not know about the measure. Being unaware of a measure’s psychometric properties could lead to inappropriate use, thus limiting the strength of these investigations. Finally, a major research gap is that only one study (Hoff et al., 1997) investigated the association between SRMH and a mental disorder (in this case, depression). Given that SRMH is a mental health measure, it is important to understand how it relates to mental health and disorder outcomes.

The moderate correlations between SRMH and mental health scales indicate these measures are related but not interchangeable. SRMH may be measuring factors outside the scope of mental health scales, but based on current literature it is unclear what these other factors could be.
Given the similar wording and correlation between SRMH and SRH, we may be able to look toward SRH literature for hypotheses. When SRH was first investigated, researchers found moderate correlations between SRH and current health status (Streib et al., 1958). When longitudinal studies were conducted, SRH ended up being a stronger predictor of mortality, morbidity, and health service utilization than conventional assessments. Similarly, SRMH may be capturing developing mental health problems, beyond existing disorders. Studies in this systematic review have shown relationships between SRMH and health service utilization, and Hoff et al. (1997) have demonstrated that SRMH can evaluate risk of future depression. These results are preliminary and more investigation is needed before such a relationship can be established.

SRMH should continue to be investigated. Its use on epidemiologic surveys and the relationships identified in this review indicate that SRMH could be a robust population mental health measure. SRMH may also hold clinical value as a screener for future problems, but research is limited thus far. Some of the studies in this review used SRMH as their sole proxy for measuring mental health, and many did not report about the current state of knowledge regarding what SRMH is telling us. Studies using SRMH should inform readers about its associated knowledge and gaps so that results of these studies are interpreted accordingly.

In conclusion, SRMH is seeing increased use in research and on population health surveys. This systematic review points to a number of relationships between SRMH and mental, physical, social, and utilization variables. SRMH may also be predictive of future mental morbidity. However, more work needs to be done before these relationships can be firmly established. Future research should investigate how SRMH is related with various mental disorders and mental health outcomes. More longitudinal research is needed to determine whether SRMH is predictive of future mental health status. Studies should also look at how SRMH may vary in different population by sociodemographic characteristics (sex, ethnicity, age, socioeconomic status). Finally, qualitative analysis could be useful in understanding individual response mechanisms behind this item.
REFERENCES


Table 2.1 – Variations in Self-Rated Mental Health Item Wording

<table>
<thead>
<tr>
<th>Item Wording</th>
<th>Source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>In general, would you say your mental health is:</td>
<td>MEPS, CCHS</td>
</tr>
<tr>
<td>1. Excellent?</td>
<td></td>
</tr>
<tr>
<td>2. Very Good?</td>
<td></td>
</tr>
<tr>
<td>3. Good?</td>
<td></td>
</tr>
<tr>
<td>4. Fair?</td>
<td></td>
</tr>
<tr>
<td>5. Poor?</td>
<td></td>
</tr>
<tr>
<td>How would you rate your overall mental health?</td>
<td>WMH-CIDI, OHS Mental Health Supplement</td>
</tr>
<tr>
<td>1. Excellent?</td>
<td></td>
</tr>
<tr>
<td>2. Very Good?</td>
<td></td>
</tr>
<tr>
<td>3. Good?</td>
<td></td>
</tr>
<tr>
<td>4. Fair?</td>
<td></td>
</tr>
<tr>
<td>5. Poor?</td>
<td></td>
</tr>
<tr>
<td>At the present time, would you say your emotional health is:</td>
<td>ECA</td>
</tr>
<tr>
<td>1. Excellent?</td>
<td></td>
</tr>
<tr>
<td>2. Very Good?</td>
<td></td>
</tr>
<tr>
<td>3. Good?</td>
<td></td>
</tr>
<tr>
<td>4. Fair?</td>
<td></td>
</tr>
<tr>
<td>5. Poor?</td>
<td></td>
</tr>
<tr>
<td>How do you rate your mental health at the present time?</td>
<td>Primary data collection</td>
</tr>
<tr>
<td>1. Excellent?</td>
<td>(Peterson et al., 2007)</td>
</tr>
<tr>
<td>2. Good?</td>
<td></td>
</tr>
<tr>
<td>3. Fair?</td>
<td></td>
</tr>
<tr>
<td>4. Poor?</td>
<td></td>
</tr>
<tr>
<td>How do you rate your mental health?</td>
<td>Primary data collection</td>
</tr>
<tr>
<td>1. Poor</td>
<td>(Yu et al., 1993; 1997)</td>
</tr>
<tr>
<td>2. Fair</td>
<td></td>
</tr>
<tr>
<td>3. Good</td>
<td></td>
</tr>
<tr>
<td>4. Very Good</td>
<td></td>
</tr>
<tr>
<td>5. Excellent</td>
<td></td>
</tr>
</tbody>
</table>
FIGURE 2.1. Study selection flow diagram.

322 abstracts from keyword search

Abstracts reviewed: 228 exclusions*

94 studies pulled for full-text review

Methods sections reviewed: 74 exclusions*

n = 25

6 duplicates removed

n = 35

3 citations added from reference sections of selected articles

309 studies from search by survey titles

Methods sections reviewed: 292 exclusions*

n = 17

*Exclusions: Study is measuring something other than SRMH; or item is a multi-item measure; or item measures a specific area of mental health (e.g., depression). The same exclusion criteria were applied to abstracts and methods sections reviews.
TABLE 2.2 – Self-Rated Mental Health Study Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th># of studies (N = 38)*</th>
<th>Characteristic</th>
<th># of studies (N = 38)*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Country:</strong></td>
<td></td>
<td><strong>Sample Size:</strong></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>17</td>
<td>&lt;500</td>
<td>6</td>
</tr>
<tr>
<td>Canada</td>
<td>12</td>
<td>500-10,000</td>
<td>19</td>
</tr>
<tr>
<td>Other(^{b})</td>
<td>9</td>
<td>&gt;10,000</td>
<td>13</td>
</tr>
<tr>
<td><strong>Data Type:</strong></td>
<td></td>
<td><strong>Study Populations:</strong></td>
<td></td>
</tr>
<tr>
<td>Primary data collection</td>
<td>11</td>
<td>Children ≤12 yrs</td>
<td>0</td>
</tr>
<tr>
<td>Secondary data analysis</td>
<td>27</td>
<td>Adults 60+</td>
<td>7</td>
</tr>
<tr>
<td><strong>Study Design:</strong></td>
<td></td>
<td>Individuals with medical conditions(^{g})</td>
<td>4</td>
</tr>
<tr>
<td>Cross sectional</td>
<td>32</td>
<td>Psychological or psychiatric disorders</td>
<td>7</td>
</tr>
<tr>
<td>Cohort</td>
<td>5</td>
<td>Mental health service users</td>
<td>2</td>
</tr>
<tr>
<td>Case-control</td>
<td>1</td>
<td>Caregivers for the elderly</td>
<td>1</td>
</tr>
<tr>
<td><strong>Sex:</strong></td>
<td></td>
<td>Veterans</td>
<td>1</td>
</tr>
<tr>
<td>Mixed-sex sample</td>
<td>37</td>
<td>General sample</td>
<td>21</td>
</tr>
<tr>
<td>Male-only sample</td>
<td>1</td>
<td><strong>Research Theme(s) in relation to SRMH:</strong></td>
<td></td>
</tr>
<tr>
<td>Female-only sample</td>
<td>0</td>
<td>Mental health conditions</td>
<td>6</td>
</tr>
<tr>
<td>Analysis of gender differences in SRMH</td>
<td>6</td>
<td>Physical health</td>
<td>4</td>
</tr>
<tr>
<td><strong>Secondary Data Sources used in Multiple Studies:</strong></td>
<td></td>
<td>Health service utilization</td>
<td>11</td>
</tr>
<tr>
<td>Canadian Community Health Survey</td>
<td>11</td>
<td>Health service satisfaction</td>
<td>3</td>
</tr>
<tr>
<td>Medical Expenditure Panel Survey</td>
<td>7</td>
<td>Social determinants of health</td>
<td>6</td>
</tr>
<tr>
<td>Mental Health Supplement to the Ontario Health Survey</td>
<td>2</td>
<td>SRMH in specific populations</td>
<td>8</td>
</tr>
<tr>
<td><strong>Use of SRMH in study:</strong></td>
<td></td>
<td><strong>Use of SRMH in study:</strong></td>
<td></td>
</tr>
<tr>
<td>Validation study</td>
<td>3</td>
<td>Outcome or principal independent variable</td>
<td>25</td>
</tr>
<tr>
<td>Covariate</td>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^{a}\)Categories under some headings are not mutually exclusive; column totals do not always add to 38.

\(^{b}\)Other: China (2), Singapore (2), England (1), Nigeria (1), Puerto Rico (1), Sri Lanka (1), Turkey (1).

\(^{g}\)Medical conditions: Asthma, medically unexplained physical symptoms, multiple sclerosis, restless leg syndrome.
<table>
<thead>
<tr>
<th>Study</th>
<th>Theme</th>
<th>Use of SRMH</th>
<th>Data Source</th>
<th>Sample</th>
<th>MH Variables studied with SRMH</th>
<th>Other Variables studied with SRMH</th>
<th>Findings in relation to SRMH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Validation Studies:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fleishman, J.A., &amp; Zuvekas, S.H. (2007)</td>
<td>Mental health</td>
<td>3</td>
<td>MEPS (2004)</td>
<td>USA n = 11,109 Age 18+</td>
<td>Scores from SF-12 Health Status Survey, K6 scale of non-psychologic distress, Patient Health Questionnaire (PHQ-2) depression screener</td>
<td>SRH</td>
<td>K6, PHQ-2 &amp; MH subscales of the SF-12 were more strongly correlated with each other (r &gt; .69), than with SRMH (r ≈ .33 to .49). Authors concluded SRMH reflects psychologic distress or depression, but not exclusively.</td>
</tr>
<tr>
<td>Eisen, S.V., et al. (2004)</td>
<td>Mental health</td>
<td>3</td>
<td>Primary data collection</td>
<td>USA n = 5,878 18+</td>
<td>BASIS-24© summary &amp; subscale scores, SF-12</td>
<td>Inpatient or outpatient status</td>
<td>Correlation between BASIS-24© summary score &amp; SRMH was 0.65 for inpatients, 0.75 for outpatients. Highest subscale correlation was for depression/ functioning.</td>
</tr>
<tr>
<td>Hoff, R.A., et al. (1997)</td>
<td>Mental health</td>
<td>3</td>
<td>Epidemiologic Catchment Area Study (1980)</td>
<td>USA n = 3,684 Age 18+</td>
<td>Measures of subclinical depression, previous or current depression diagnosis</td>
<td></td>
<td>Positive SRMH was associated with decreased risk of a depressive episode in following year (adjusted for age, gender).</td>
</tr>
<tr>
<td><strong>Observational Studies:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olfson, M., et al. (2009)</td>
<td>Mental conditions</td>
<td>1</td>
<td>MEPS (1996, 2005)</td>
<td>USA n = 47,438 Age 18+</td>
<td>National rate of anti-depressant use</td>
<td></td>
<td>SRMH, age, sex, ethnicity, annual family income &amp; insurance status were adjusted for to measure rate of anti-depressant use for 1996 &amp; 2005.</td>
</tr>
<tr>
<td>Study</td>
<td>Theme</td>
<td>Use of SRMH</td>
<td>Data Source</td>
<td>Sample</td>
<td>MH Variables studied with SRMH</td>
<td>Other Variables studied with SRMH</td>
<td>Findings in relation to SRMH</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------------------------------</td>
<td>-------------</td>
<td>----------------------</td>
<td>-----------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Zuvekas, S.H. &amp; Fleishman, J.A. (2008)</td>
<td>Mental conditions, health service utilization, social determinants</td>
<td>2</td>
<td>MEPS (2000-2004)</td>
<td>USA n = 36,459 Age 18+</td>
<td>SF-12 mental component summary (MCS), MH ambulatory visits, psychotropic medication usage</td>
<td>Ethnicity, sex</td>
<td>SRMH related to ambulatory MH treatment visits &amp; purchase of drugs for MH conditions. Blacks &amp; Hispanics were more likely than whites to report excellent SRMH (even when MCS scores were low) &amp; less likely to report poor. Women, the elderly, low-income &amp; less educated were more likely to report poor SRMH</td>
</tr>
<tr>
<td>Olfson, M., et al. (2006)</td>
<td>Mental conditions</td>
<td>2</td>
<td>MEPS (1996-2001)</td>
<td>USA n = 829 age 18+</td>
<td>Antidepressant use, type of antidepressant</td>
<td></td>
<td>Continuing anti-depressant treatment beyond 90 days was associated with f/p SRMH; f/p SRH; treatment with an SSRI or SNRI. Results adjusted for age, race, sex &amp; pre-treatment MH.</td>
</tr>
<tr>
<td>Tiwari, S.K., Wang, J.L. (2006)</td>
<td>Mental conditions</td>
<td>2</td>
<td>CCHS 1.2 (2002)</td>
<td>Canada n = 35,245</td>
<td>WMH-CIDI diagnosis of a mental or substance use disorder</td>
<td>Ethnicity (white, Chinese, other Asian)</td>
<td>Chinese were more likely to have f/p SRMH than Whites or other Asians. Chinese &amp; other Asians had lower prevalences of mental &amp; substance use disorders (prevalences were similar to China’s)</td>
</tr>
<tr>
<td>Harman, M., et al. (2005)</td>
<td>Mental conditions</td>
<td>1</td>
<td>MEPS (2000-2001)</td>
<td>USA n = 498 Age 65+</td>
<td>Adequacy of depression treatment (number of psychotherapy sessions, anti-depressant refills)</td>
<td>chronic medical conditions (heart disease, diabetes, arthritis, hypertension)</td>
<td>SRMH, race, supplemental insurance, income, education, sex &amp; marital status were adjusted for to determine odds of receiving adequate depression care across 4 chronic conditions.</td>
</tr>
<tr>
<td>Study</td>
<td>Theme</td>
<td>Use of SRMH</td>
<td>Data Source</td>
<td>Sample</td>
<td>MH Variables studied with SRMH</td>
<td>Other Variables studied with SRMH</td>
<td>Findings in relation to SRMH</td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------------------</td>
<td>-------------</td>
<td>-------------</td>
<td>-------------------------------------</td>
<td>---------------------------------</td>
<td>----------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Shields, M. (2004)</td>
<td>Mental conditions</td>
<td>1</td>
<td>CCHS 1.2</td>
<td>Canada n = 36,984 Age 15+</td>
<td>Social anxiety disorder</td>
<td>SRH</td>
<td>People with social anxiety disorder had lower ratings of SRMH &amp; SRH</td>
</tr>
<tr>
<td>Park, J. Knudson, S.  (2007)</td>
<td>Physical health</td>
<td>2</td>
<td>CCHS 2.1</td>
<td>Canada n = 2,562 Age 12+</td>
<td>SRH, medically unexplained physical symptoms (chronic fatigue, fibromyalgia, multiple chemical sensitivity).</td>
<td>Those with medically unexplained physical symptoms were more likely to have f/p SRMH &amp; SRH.</td>
<td></td>
</tr>
<tr>
<td>Peterson, E. W., et al. (2007)</td>
<td>Physical health</td>
<td>1</td>
<td>Primary data collection</td>
<td>USA (older adults with multiple sclerosis) n = 1,064 Age 45-90</td>
<td>Fear of falling, activity curtailment</td>
<td>People with multiple sclerosis reporting less than excellent SRMH were more likely to report activity curtailment due to a fear of falling.</td>
<td></td>
</tr>
<tr>
<td>Dogra, S. &amp; Baker, J. (2006)</td>
<td>Physical health</td>
<td>2</td>
<td>CCHS 2.1</td>
<td>Canada (asthmatics) n = 11, 243 Median age: 40-44</td>
<td>SRH, physical activity</td>
<td>Physically active asthmatics had greater SRMH &amp; SRH than those who were inactive.</td>
<td></td>
</tr>
<tr>
<td>Sevim, S., et al. (2003)</td>
<td>Physical health</td>
<td>1</td>
<td>Primary data collection</td>
<td>Turkey n = 3, 234 Age 18-78</td>
<td>SRH, restless leg syndrome</td>
<td>Those with restless leg syndrome had worse SRMH &amp; SRH than a control group.</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Theme</td>
<td>Use of SRMH</td>
<td>Data Source</td>
<td>Sample</td>
<td>MH Variables studied with SRMH</td>
<td>Other Variables studied with SRMH</td>
<td>Findings in relation to SRMH</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------------------------</td>
<td>-------------</td>
<td>----------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Ng, T., \textit{et al.} (2008)</td>
<td>Health service utilization</td>
<td>2</td>
<td>National Mental Health Survey of Adults in Singapore (2003-04)</td>
<td>Singapore n = 2,801 Age 20-59</td>
<td>Acknowledgement of having a mental illness</td>
<td>Health beliefs, social support, service utilization (GP, psychologist, psychiatrist, social worker, MH counselor)</td>
<td>F/p SRMH &amp; acknowledging having a mental illness were predictive of MH service use, health beliefs &amp; social support were not.</td>
</tr>
<tr>
<td>Nabalamba, A. &amp; Miller, W. (2007)</td>
<td>Health service utilization</td>
<td>2</td>
<td>CCHS 3.1 (2005)</td>
<td>Canada n = 120,559 Age 18+</td>
<td>SRH, number of chronic conditions, visits to a GP or specialist</td>
<td>Those with f/p SRMH were more likely to visit a GP, visit a GP 4+ times, or visit a specialist. Association existed for SRH as well. Controlled for age, sex, language, income, urban/rural residence &amp; having a family doctor.</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Theme</td>
<td>Use of SRMH</td>
<td>Data Source</td>
<td>Sample</td>
<td>MH Variables studied with SRMH</td>
<td>Other Variables studied with SRMH</td>
<td>Findings in relation to SRMH</td>
</tr>
<tr>
<td>-------</td>
<td>-------</td>
<td>-------------</td>
<td>-------------</td>
<td>--------</td>
<td>---------------------------------</td>
<td>-----------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Bergeron, E.P. <em>et al.</em> (2005)</td>
<td>Health service utilization</td>
<td>1</td>
<td>CCHS 1.2 (2002)</td>
<td>Canada (youth with mental disorders) n = 1,092 Age 15-24</td>
<td>Mood, substance or anxiety disorder, use of MH services (hospitalization, psychiatrists, psychologists, GPs, nurses, social workers, support groups, help lines, alternative care, clergy.</td>
<td>Youth with <em>excellent</em> SRMH were 4 times more likely to use any MH service during the 1-year period than were those who perceived it as excellent.</td>
<td></td>
</tr>
<tr>
<td>Vega, W. A., <em>et al.</em> (2001)</td>
<td>Health service utilization</td>
<td>1</td>
<td>Mexican American Prevalence and Services Study</td>
<td>USA (Mexicans) n = 507 Age 18+</td>
<td>Having 1 or more DSM III disorder</td>
<td>Poor SRMH among American-born Mexicans had a much greater effect of increasing medical provider use than among Mexican-born immigrants.</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Theme</td>
<td>Use of SRMH</td>
<td>Data Source</td>
<td>Sample</td>
<td>MH Variables studied with SRMH</td>
<td>Other Variables studied with SRMH</td>
<td>Findings in relation to SRMH</td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------------------------------------------------------------------</td>
<td>-------------</td>
<td>-----------------</td>
<td>---------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Druss, B.G., et al.</td>
<td>Health service utilization, social determinants</td>
<td>2</td>
<td>MEPS (1996)</td>
<td>USA n = 16,038 Age 18+</td>
<td>MH conditions (psychiatric disorder, affective, anxiety, substance use, adjustment, other)</td>
<td>Use of complimentary medicine (eg. chiropractic, massage, nutritionist)</td>
<td>SRMH &amp; mental conditions were not associated with an increase in use of complimentary services. Having a mental condition was predictive of service use when controlling for fair/poor SRMH, chronic medical conditions, total number of conditions, &amp; demographic variables.</td>
</tr>
<tr>
<td>Lin, E., et al.</td>
<td>Health service utilization</td>
<td>1</td>
<td>MH Supplement to the Ontario Health Survey</td>
<td>Canada n = 9, 953 Age 15+</td>
<td>Having a mental disorder</td>
<td>Reported disability</td>
<td>SRMH, having a mental disorder &amp; reported disability were combined in a single variable representing need.</td>
</tr>
<tr>
<td>Katz, S.J., et al.</td>
<td>Health service utilization</td>
<td>2</td>
<td>Ontario Health Survey, Mental Health Supp.</td>
<td>Canada, USA n = 11,654 Age 15+</td>
<td>Use of medical, psychiatric or social services, mental disorders (affective, anxiety, substance dependence, comorbid conditions)</td>
<td>Perceived need (self-motivated visit for MH services, feeling need to seek help in past 12 months)</td>
<td>Relationship between f/p SRMH &amp; medical/psychiatric service use was twice as strong in ON than USA. Fair/poor SRMH was 2nd best predictor of service use, following having an affective disorder. Controlled for perceived need eliminated differences between countries. Adjusted for age, sex, urban location &amp; country.</td>
</tr>
<tr>
<td>Watkins, A.J. &amp; Kligman, E.W.</td>
<td>Health service utilization</td>
<td>1</td>
<td>Primary data collection</td>
<td>USA n =224 Age 60+</td>
<td>SRH, attendance to a health-promotion program</td>
<td></td>
<td>Attendance to the seniors health-promotion program was not affected by SRMH or SRH.</td>
</tr>
<tr>
<td>Study</td>
<td>Theme</td>
<td>Use of SRMH</td>
<td>Data Source</td>
<td>Sample</td>
<td>MH Variables studied with SRMH</td>
<td>Other Variables studied with SRMH</td>
<td>Findings in relation to SRMH</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------------------------</td>
<td>-------------</td>
<td>--------------------------------------------------</td>
<td>---------------------------------</td>
<td>--------------------------------</td>
<td>----------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Eselius, L.L., <em>et al.</em> (2008)</td>
<td>Health service satisfaction</td>
<td>2</td>
<td>Experience of Care and Health Outcomes Survey (2001)</td>
<td>USA n = 4,068, Age 18+</td>
<td>Evaluation of managed behavioural health plan</td>
<td>Evaluations of managed behavioural health plans were lower for those with f/p SRMH (compared to those with more positive SRMH).</td>
<td></td>
</tr>
<tr>
<td>Raleigh, V., <em>et al.</em> (2007)</td>
<td>Health service satisfaction</td>
<td>2</td>
<td>Primary data collection</td>
<td>England n = 26,555</td>
<td>MH service satisfaction</td>
<td>Ethnicity, age, living alone, employment status, hospital admissions</td>
<td>Those with f/p SRMH were less likely to be satisfied with MH services. SRMH was the strongest predictor of all the study variables.</td>
</tr>
<tr>
<td>Rohland, B.M., <em>et al.</em> (2000)</td>
<td>Health service satisfaction</td>
<td>2</td>
<td>Primary data collection</td>
<td>USA n = 815</td>
<td>Schizophrenia, affective disorders, anxiety disorders, adjustment disorders</td>
<td>Service satisfaction</td>
<td>Service satisfaction was correlated with SRMH among persons with schizophrenia but not among those with affective or anxiety disorders.</td>
</tr>
<tr>
<td>Statistics Canada (2005)</td>
<td>Social determinants</td>
<td>2</td>
<td>CCHS 3.1 (2005)</td>
<td>Canada n = 68,000, Age 12+</td>
<td>Sense of community belonging</td>
<td>Feelings of community belonging were associated with substantially better SRMH</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Theme</td>
<td>Use of SRMH</td>
<td>Data Source</td>
<td>Sample</td>
<td>MH Variables studied with SRMH</td>
<td>Other Variables studied with SRMH</td>
<td>Findings in relation to SRMH</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------------------</td>
<td>-------------</td>
<td>----------------------</td>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------</td>
<td>-------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Yu, L.C., et al. (1997)</td>
<td>Social determinants</td>
<td>2</td>
<td>Primary data collection</td>
<td>China n = 240 Age 65-94</td>
<td>Age, perceived family respect, number of diseases, neighbourhood relations, percentage of income spent on rent, preference to live with a son, monthly income</td>
<td>Predictors of low SRMH were age, perceived family respect, number of diseases, neighbourhood relations, percentage of income spent on rent, preference to live with a son, monthly income</td>
<td></td>
</tr>
<tr>
<td>Yu, L.C. &amp; Wang, M. (1993)</td>
<td>Social determinants</td>
<td>2</td>
<td>Primary data collection</td>
<td>China n = 213 Age 65-94</td>
<td>Job type (blue collar, white collar, civil servant, intellectual), illiteracy</td>
<td>Chinese intellectuals &amp; illiterates had lower SRMH than blue collar workers, civil servants &amp; white-collar workers</td>
<td></td>
</tr>
<tr>
<td>Perera, B., et al. (2009)</td>
<td>Specific Population</td>
<td>2</td>
<td>Primary data collection</td>
<td>Sri Lanka n = 2,077 Age 18-85</td>
<td>Stressors (nuisance from neighbours, nuisance from drug users, shortage of water, poor water/sewage drainage)</td>
<td>SRH</td>
<td>The stressors listed were all associated with SRMH. None were associated with SRH</td>
</tr>
</tbody>
</table>
### Study

<table>
<thead>
<tr>
<th>Study</th>
<th>Theme</th>
<th>Use of SRMH</th>
<th>Data Source</th>
<th>Sample</th>
<th>MH Variables studied with SRMH</th>
<th>Other Variables studied with SRMH</th>
<th>Findings in relation to SRMH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohen, J.S., Patten, S. (2005)</td>
<td>Specific Population</td>
<td>2</td>
<td>Primary data collection</td>
<td>Canada (Alberta medical residents) n = 415 Age 24-49</td>
<td>Gender, being in a medical residency</td>
<td>Medical residents had lower SRMH than rest of Canada. More male residents rated their MH as excellent than females (which also occurred in the rest of Canada)</td>
<td></td>
</tr>
<tr>
<td>O'Donnell, J.C. (2000)</td>
<td>Specific Population</td>
<td>2</td>
<td>MEPS (1996)</td>
<td>USA (elderly males) n = 1,068 Age 65+</td>
<td>Veteran or non-veteran</td>
<td>Military service is not a risk factor for poorer SRMH (after controlling for demographic, socioeconomic &amp; health-related factors)</td>
<td></td>
</tr>
<tr>
<td>Haug, M.R. (1999)</td>
<td>Specific Population</td>
<td>2</td>
<td>Medicare Use of Services Survey</td>
<td>USA n = 121 Age 35+</td>
<td>SRH, providing care for elderly</td>
<td>SRMH &amp; SRH declined over course of study. Predictors of decrease in SRMH: poorer MH to begin with, decline in SRH</td>
<td></td>
</tr>
<tr>
<td>Jegede, R. O. (1980)</td>
<td>Specific Population</td>
<td>2</td>
<td>Primary data collection</td>
<td>Nigeria (Nigerian university students) n = 870 Age ~20-35</td>
<td>Neuroticism</td>
<td>SRMH was related with neuroticism, SRH &amp; having problems to discuss with a doctor.</td>
<td></td>
</tr>
</tbody>
</table>

*Use of SRMH in study: “1” as a covariate; “2” as an outcome or principal independent variable; “3” as the subject of a validation study
MH: mental health; f/p: fair or poor; GP: general practitioner
4 Manuscript 2

A Single-Item Measure of Self-Rated Mental Health: Associations with Mental Disorders and Distress
ABSTRACT

Background: A single-item measure of self-rated mental health (SRMH) asks respondents to rate their general mental health on a scale of excellent to poor. This item is being used increasingly in research and on population health surveys. The emerging literature base has begun to give us an idea of what SRMH is measuring. However, there are still many gaps in our knowledge.

Objective: To analyze the association of SRMH with psychiatric diagnoses and feelings of distress in a large, nationally representative Canadian sample. Also, to examine how SRMH is related to sociodemographic characteristics and physical health status.

Methods: Data were obtained from the Canadian Community Health Survey: Mental Health and Well-Being (CCHS 1.2). The analysis included depression, anxiety disorders (panic disorder, social phobia, agoraphobia), and substance dependence (alcohol, drug). Twelve-month psychiatric diagnoses were made using the World Mental Health Composite International Diagnostic Interview (CIDI), and distress was measured using the K10 Psychological Distress Scale. We ran a series of logistic regressions examining the association of psychiatric disorders, sociodemographic characteristics, and physical health on SRMH.

Results: SRMH was associated with all the psychiatric diagnoses, distress, and having comorbid mental disorders. Scores on the K10 explained part of the associations SRMH had with depression and anxiety disorders, and fully accounted for the relationship between SRMH and substance disorders. Being female, less educated, and having low or middle income were associated with fair or poor SRMH, but this relationship was largely accounted for by physical health, mental disorders, and distress. Having higher levels of social support, being older and being a recent immigrant decreased odds of reporting fair or poor SRMH. As the study variables
only accounted for part of the variance in SRMH, there are likely other factors contributing to people’s responses.

**Conclusions:** SRMH captures more than mental disorders and distress in the population.
BACKGROUND

A single-item measure of self-rated mental health (SRMH) is being used increasingly in literature and on national health surveys (Systematic Review, 2010). The item asks respondents to rate their general mental health on a scale of excellent, very good, good, fair, or poor. SRMH has been used world-wide as an indicator of mental health (Raleigh et al., 2007) and in research investigating relationships between mental (Tiwari & Wang, 2006), physical (Park & Knudson, 2007) and social variables (Yu & Wang, 1993). Despite such widespread use, there has been less investigation into what this item is measuring and how well it performs.

Single-item measures are increasingly used on population health surveys (Rohrer et al., 2005a). Scales using fewer questions to make valid assessments reduce respondent burden, are cost-effective, simplify administration, and are easier to translate for worldwide use. A single item measure of self-rated health (SRH) has been validated globally since the 1950s (Streib et al., 1958). The item prompts a general health rating using the same response scale as SRMH. SRH is a well-established predictor of mortality, care utilization, and morbidity (Idler & Kasl, 1991). The identical format of these items implies SRMH could be an equally robust indicator of mental health as SRH is of physical health.

There is a need for simple mental health measures on epidemiologic surveys. Mental health issues are reaching epidemic proportions and can underlie physical health, social well-being, and daily functioning. The World Health Organization projects depression to become the leading cause of global disease burden by 2030 (World Health Organization, 2008). Having a quick, reliable method to assess population mental health could inform targeted diagnostic testing, treatments, and public health programs. SRMH could potentially serve this purpose, but not enough is known about its measurement properties.

A number of studies have examined SRMH, but large research gaps remain (for a complete literature synthesis, see Systematic Review, 2010). Fleishman and Zuvekas found that SRMH correlated moderately with the mental health subscales of the SF-12 health status survey, K6 scale of psychological distress, and Patient Health Questionnaire Depression Screener. They also concluded that SRMH and SRH are related, yet conceptually distinct measures (Fleishman & Zuvekas, 2007). An investigation using the Diagnostic Interview Schedule revealed people
with poor SRMH were nearly 10 times more likely to be diagnosed with depression in the following year (Hoff et al., 1997). Another study found SRMH correlated most with the depression/functioning subscale of the BASIS-24® and least with the alcohol/drug use subscale (Eisen et al., 2004).

These studies provide some information about what SRMH measures, but more investigation is needed. If SRMH is to be used as a mental health indicator, it is important to understand its relationship with mental disorders. A significant gap in our knowledge is that there have been no investigations into the association between SRMH and disorders aside from depression (for example, anxiety disorders or substance disorders).

There is also a need for more knowledge regarding how SRMH responses can vary within populations based on sociodemographic characteristics and physical health status. Variables such as age (Swendsen et al., 2009), sex (Kessler et al., 2005), level of education (Lorant et al., 2003), social support (Kessler et al., 1985), income (Regier et al., 1988) and physical health status (Keaton, 2003) have been consistently shown to affect mental health outcomes. Therefore, it is reasonable to expect these same variables will also be associated with SRMH. Previous research has found that that poorer SRMH is associated having lower income, being less educated, female, or aged 41-60 (Zuvekas & Fleishman, 2008). Worse SRMH is also associated with having more self-reported physical conditions (Druss & Rosenheck, 2000), being a physically inactive asthmatic (Dogra & Baker, 2006), having medically unexplained physical symptoms (Park & Knudson, 2007), having multiple sclerosis (Peterson et al., 2007), or restless leg syndrome (Sevim et al., 2003).

Finally, there has not been any prior research into how feelings of psychological distress affect whether there are associations between SRMH and sociodemographic characteristics, mental disorders, and physical health. While it is important to identify the variables SRMH is related with, it is also necessary to understand if there are common factors that can underlie or cause these relationships. Research involving the K6 and K10 scales of psychological distress has found that distress is associated with a number of DSM-IV diagnoses (Veldhuizen et al., 2007). Therefore, the relationship between SRMH and the K10 should be tested.
The purpose of this investigation is to explore the association between SRMH and a diverse set of correlates in a large, nationally representative Canadian sample. In particular, we will explore the association of SRMH with depression, anxiety, substance disorders, and distress. We will also examine how SRMH is related to sociodemographic characteristics and physical health.

**METHODS**

**Canadian Community Health Survey**

Data come from the Public Use Microdata File (PUMF) of the Canadian Community Health Survey: Mental Health and Well-being (CCHS 1.2) (Gravel & Béland, 2005a). CCHS 1.2 was a cross-sectional community mental health survey conducted by Statistics Canada (the national statistics agency) between May 2002 and December 2002. The nationally representative target population included non-institutionalized individuals aged 15 and older. Participants were selected using multistage, stratified random sampling procedures.

Trained lay administrators performed computer-assisted interviews with one respondent per sampled dwelling. Interviews were held in person and over the phone in multiple languages. Proxy responses were not permitted. The survey was completed by 36,984 individuals, yielding a 70.0% response rate. The PUMF contains most of the original survey data, with the exception of a few sensitive variables that have been regrouped, capped, or deleted for respondent anonymity. The file includes a list of grouped variables and summary scores calculated by Statistics Canada.

**Dependent Variable**

The CCHS 1.2 item assessing SRMH read: “In general, would you say your mental health is: excellent, very good, good, fair, or poor?” Responses range on a scale from 1 (excellent) to 5 (poor).

**Distress**

Distress was measured using the Kessler Psychological Distress Scale-10 (K10) (Kessler et al., 2002). The scale was developed in 1992 for use in population health surveys and is available as a 6 or 10-item version (the K6 and K10, respectively). It is a short non-specific distress
screening instrument used to detect cases of DSM-IV disorders, and to provide an indication of distress and disorder severity. A study of the Australian National Survey of Mental health and Well-Being found the K10 was able to discriminate subjects with mood or anxiety disorders from those without mental disorders (Furukawa et al., 2003).

There is also a lesser but significant association between the K10 and other mental disorder categories (Andrews & Slade, 2001). Based on data from CCHS 1.2, the K6 and K10 were found to have similar screening properties for depression in the general population (Cairney et al., 2007). Another study using CCHS 1.2 data found that the K6 had somewhat similar screening performance for depression, social phobia, manic episodes, and panic disorder. However, its performance was considerably better for individuals with comorbid disorders, and worse for those with agoraphobia (Veldhuizen et al., 2007).

The K10 yields an overall distress score based on ten questions regarding feelings such as nervousness and hopelessness during the four weeks leading up to the interview. A sample question from the scale reads: “In the last 4 weeks, how often did you feel that everything was an effort?” Responses range from “none of the time” to “all of the time” and were scored between 0 and 5 (for a total score between 0 and 40). Higher scores indicate greater psychological distress. Internal consistency for the K10 within the CCHS 1.2 study population is $\alpha = 0.87$. See Appendix 1 for full scale.

Mental Disorders

CCHS 1.2 contains diagnostic measures for depression, mania, three anxiety disorders (panic disorder, agoraphobia, and social phobia) alcoholism, and illicit drug dependence. These measures are based on the World Mental Health Composite International Diagnostic Interview (CIDI) (see Appendix 2 for samples of questionnaires). The CIDI is widely used in psychiatric research (Wittchen, 1994) and based DSM-IV diagnostic criteria. Disorder prevalences were calculated based on symptoms during the 12 months prior to the interview date. Alcohol and drug dependence were combined into a single substance dependence variable, and the three anxiety disorders were also grouped. Mania was excluded from the analysis due to the small number of people who met the diagnostic criteria for the disorder ($n = 393$).
Sociodemographic characteristics

Highest level of education was measured as being less than secondary school, secondary school graduate, some post-secondary education, or post-secondary degree/diploma. Household income was categorized as low, middle, or high based on Statistics Canada designations accounting for the number of people per household. Nine percent of respondents did not report their household income, so a “missing” category was included in the analyses. Immigrant status was defined as being recent (0-9 years in Canada), settled (10+ years in Canada), or Canadian-born.

Social support was measured using the Medical Outcomes Study (MOS) (Sherbourne & Stewart, 1991). The social support scale of the MOS contains 19 items and covers four domains: informational support, tangible support, positive social interaction, and affection. Questions ask how often a person has a specific type of support available to them (e.g. someone to confide in or talk to about problems). Answers range from “none of the time” to “all of the time” and are scored on a scale from 1 to 5. All items were added up, and then divided by the total number of items on the scale to produce a mean score. This final mean ranged from 1 to 5, with higher scores indicating greater levels of social support. The scale’s internal consistency is $\alpha = 0.98$ among the CCHS 1.2 study population. See Appendix 3 for full questionnaire.

Physical Health

Total number of physical chronic conditions was generated from yes or no questions asking if respondents suffered from any of the following: asthma, arthritis or rheumatism, back problems, high blood pressure, migraine headaches, chronic bronchitis, emphysema, diabetes, epilepsy, heart disease, cancer, stomach or intestinal ulcers, effects of a stroke, bowel disorder, cataracts, glaucoma, or a thyroid condition. Self-rated health (SRH) was measured by asking respondents to rate their overall health on a five-item scale ranging from excellent to poor. This variable was reverse-coded so that 1 represented poor and 5 represented excellent.

A measure of functional disability was derived from a list of questions asking if respondents needed help with certain tasks. The new variable categorized basic activities of daily living (ADL) (eating, washing, dressing, taking medication and moving around inside the house) and instrumental activities of daily living (IADL) (meal preparation, getting to appointments,
running errands, everyday house work and heavy chores). Most people requiring assistance with ADL need help with IADL, but the reverse is not necessarily true (Chen & Wilkins, 1998). Individuals were considered to need help with ADL if they needed assistance with any one or more of the ADL tasks. The same method was used to classify if people needed help with IADL. Therefore, the variables measured whether or not help was needed, irrespective of the number of activities requiring assistance.

Analysis

Since SRMH is often found to be skewed, it can be converted from ordinal to a binary (excellent to good versus fair/poor) variable. Data were therefore analyzed using a series of binary logistic regressions with fair/poor as the main category of interest, and good/very good/excellent as the reference category. We also analyzed the measure as a five-category variable, using ordinal logistic regressions.

Five models were created. The first two look at how SRMH varies by sociodemographic variables and by psychiatric diagnoses. The third model includes psychiatric diagnoses and physical health indicators. The fourth model looks at the combined contributions of sociodemographics, psychiatric diagnoses, and physical health. The fifth (full) model tests the relationship between SRMH and psychological distress, along with the potential mediating effect distress may have on associations between SRMH and mental disorders, sociodemographic characteristics, and physical health. It includes all variables from Model 4, along with the K10.

Pseudo $R^2$ values are presented for each model to estimate how much of the total variance can be explained by each set of variables. While there is no true $R^2$ for logistic regression (Norman & Streiner, 2008), these values are still useful for making relative comparisons between models that use the same data set and outcome variable (UCLA, 2010). They can also give a general idea about whether a model is explaining small, moderate, or large amounts of variance. Our results table presents both the Cox and Snell $R^2$, and Nagelkerke $R^2$. Maximum values for the Cox and Snell $R^2$ can vary below 1, making the statistic difficult to interpret. The Nagelkerke $R^2$ is calculated by dividing the Cox and Snell $R^2$ by its maximum value, allowing the range of
possible values to extend to 1 (UCLA, 2010). Therefore, variances will be discussed using the Nagelkerke $R^2$.

CCHS 1.2 used a multistage stratified cluster design to select eligible households. To account for the survey’s complex sampling design, estimates of variance should be adjusted using a re-sampling technique such as bootstrapping. In order to do this, access to design effect information must be provided. However, for respondent confidentiality, the PUMF does not contain design information regarding stratification and clustering.

To correct for underestimation of variances due to the design effect, the original sample weights provided by Statistics Canada were adjusted in two steps. First, each weight was divided by the mean sample weight so that the weights equalled the actual sample size of 36,984. Then, the resulting sample weights were divided by the overall survey design effect (Cairney et al., 2004). The results provide a more robust estimate of variance, but likely overcorrect for the problem of inflated standard errors. Unless otherwise specified, all calculations used the rescaled sample weights. Data was analyzed using PASW Statistics 18.

**RESULTS**

Table 1 presents characteristics of the analytic sample. The weighted percentage of respondents reporting excellent SRMH was 27.8%, while 5.7% and 1.2% rated their SRMH as fair or poor, respectively. Most respondents were between the ages of 15 and 55, with 27.6% over the age of 55. The sample was 49.2% female, 9.3% were from low-income households, and 47.2% had at least a post-secondary degree or diploma. The majority of the sample (77.9%) was Canadian born.

Mean score (SE) for the MOS was 4.40 (0.01), and for the K10 was 5.34 (0.04). According to 12-month CIDI diagnoses, 4.8% of the sample suffered from a major depressive episode, 4.8% experienced an anxiety disorder, and 3.1% had a substance disorder. Just over 2% reported having more than one mental disorder. Fourteen percent of the sample had more than three physical chronic conditions, and 1.8% reported having both ADL and IADL limitations. SRH was rated as excellent by 23.3%, and poor by 2.5%.
Table 2 shows weighted percentages of SRMH responses by disorder type, using both ordinal and bivariate response scales. Fair/poor SRMH was reported by 6.9% of the full sample, 43.1% of those experiencing a major depressive episode, 34.1% of those with an anxiety disorder, and 16.9% of those with a substance dependence. Binary and ordinal logistic regressions produced similar results, so we present only the binary regressions (Table 3).

**SRMH and Sociodemographic Characteristics**

Model 1 shows the effects of sociodemographic factors in predicting SRMH. Being female, having low or middle income, and being less educated increased the likelihood of reporting fair/poor SRMH. Those who were younger (age 15-34 or 35-54) were significantly more likely to report fair/poor SRMH than those over the age of 75. Recent immigrants were less likely to report fair/poor SRMH than those who were born in Canada. Finally, people reporting higher levels of social support were also less likely to report fair/poor SRMH. Sociodemographic characteristics accounted for approximately 10% of the variance in responses to SRMH.

**SRMH and Mental Disorders**

The second model examines the relationship between SRMH and mental disorders. Individuals who had a major depressive episode in the past 12 months were 9.31 times more likely to report fair/poor SRMH (p < 0.001). Those reporting a substance disorder or any of the three anxiety disorders were also more likely to report fair/poor SRMH. However, substance dependence had the lowest odds ratio among the disorders (OR = 1.75, p < 0.001).

In a separate model looking at the relationship between number of mental disorders and SRMH (not shown), those with any psychiatric disorder were 6.44 times more likely to have fair/poor SRMH than those with no disorder (95% CI, 5.84-7.09, p < 0.001). Furthermore, people with two or more psychiatric disorders 25.04 times more likely to report fair/poor SRMH (95% CI, 21.59-29.04, p < 0.001). Mental disorders were more predictive of SRMH than sociodemographic variables (R² = 0.17).
SRMH and Mental Disorders, Physical Health

Model 3 builds on Model 2 through addition of several indicators of physical health. Having chronic conditions was associated with fair/poor SRMH, though the effect did not differ much between those with one or multiple conditions. Decreasing levels of SRH were associated with increasing odds of having fair/poor SRMH. In a separate analysis (not shown) we found there was no colinearity between SRMH and SRH (VIF = 1.00). People with poor SRH were 21.78 times more likely to have fair/poor SRMH (p < 0.001). Odds ratios for depression and the anxiety disorders dropped 20% and 17%, respectively, due to the addition of physical health indicators. Model 3 accounted for approximately 29% of the variance in SRMH.

Combined Effects of Sociodemographics, Mental Disorders and Physical Health

Model 4 combines all the previous models by looking at the contributions of sociodemographic characteristics, psychiatric disorders, and physical health in predicting SRMH. Among the sociodemographic variables, being female and less educated were no longer significant. Odds ratios for psychiatric disorders dropped further due to the contribution of sociodemographic variables. Having chronic conditions became slightly more predictive of fair/poor SRMH. The relationship between SRMH and SRH remained significant. Adding sociodemographic characteristics into this model caused only a 3% increase in explained variance compared to the previous model.

SRMH and Distress

The fifth model contains all the study variables, and builds upon Model 4 by adding the K10. Once the K10 was added, having low or middle income levels or chronic conditions were no longer significant predictors of SRMH. Higher levels of social support maintained a protective effect of decreasing odds of fair/poor SRMH, as did being a recent immigrant. Those between the ages of 15 and 54 were still more likely to report fair/poor SRMH. Adding the K10 also dropped odds ratios for anxiety and depression by 54% and 45%, respectively; and substance disorders were no longer significant in the model. SRH remained significant, but having poor SRH was 38% less predictive of fair/poor SRMH compared to Model 4. Needing help with
ADLs and IADLs was not significant here, nor in any of the previous models. The full set of study variables accounted for approximately 38% of the variance in responses to SRMH.

The previous model had found that being female and less educated were no longer predictive of fair/poor SRMH once mental disorders and physical health were accounted for. A separate model was run to test the relationship between sociodemographic characteristics and the K10 (not shown). We found that the K10 also explained the relationship of fair/poor SRMH among women and those with less education.

There was a positive relationship between distress and fair/poor SRMH (OR = 1.14; 95% CI 1.13-1.15, p < 0.001). It is important to note that the K10 was scored between 0 and 40. Therefore, to estimate the effect of the full scale, the odds ratio must be multiplied by 40, which gives a value of 45.6. A separate model (not shown) was created to look at the relationship between the K10 and SRMH (OR = 1.22, 95% CI 1.21-1.24, p < 0.001). In this model, distress accounted for approximately 28% of the variance in SRMH.

**DISCUSSION**

**Overall Results**

In our analysis of CCHS 1.2 data, SRMH was associated with psychiatric diagnoses and distress. We found significant relationships between SRMH and depression, anxiety disorders (panic disorder, social phobia, agoraphobia), substance dependence (alcohol dependence, illicit drug dependence), psychiatric comorbidity, and the K10. Scores on the K10 decreased the association of SRMH with depression and anxiety diagnoses, and eliminated the association between SRMH and substance dependence. While the full combination of study variables was responsible for less than half of the observed variance in SRMH, distress made up a large portion of this accounted variance.

Fair/poor SRMH was associated with being female, having low or middle income, being less educated, and having chronic conditions; however, these relationships were explained by scores on the K10. In the cases of sex and education, relationships with SRMH were also explained by poor physical health and having mental disorders. Being a recent immigrant, having higher
levels of social support, and being older were associated with decreased odds of reporting fair/poor SRMH. Poor SRH was related to fair/poor SRMH, but this association decreased when accounting for distress. While SRMH and SRH were strongly related, they were not found to be collinear.

**Strengths and Limitations**

A limitation of the study is that CCHS 1.2 data was cross-sectional, which means that causal relationships could not be drawn. Another limitation is that we could not analyze a broader range of mental disorders. Sample sizes were not large enough to study effects of specific anxiety disorders, and the survey did not contain a measure of generalized anxiety disorder. Similarly, the only mood disorder we could study was depression, since the sample size for mania was too small and bipolar disorder was not included in the survey. Although general samples tend to have low prevalences of certain disorders, it is still advantageous to use them. Results from a nationally representative sample are more likely to represent the entire population, and therefore can be generalized to those who did not participate in the survey.

The results of the analyses may have been affected by treating SRMH as a binary variable (“excellent, very good, good” versus “fair, poor”). This method may have eliminated information about differences across the five response categories. Similar results were achieved when ordinal logistic regressions were run. However, treating SRMH as an ordinal variable is limited by the skewed nature of responses to the item. Another data limitation was that we were unable to calculate exact variances using the PUMF. Instead, we used a conservative technique to rescale the survey weights, which avoided false-positive results. However, this cautious approach may have masked some significant results at the p = 0.05 level. An advantage of this study is that it is the first to study the relationship between SRMH and a range of psychiatric diagnoses (depression, anxiety, and substance disorders).

Furthermore, this study is the first to assess how the relationship between SRMH and mental disorders can be affected by distress, sociodemographic variables, and physical health. Aside from making novel contributions to the literature base, we have also replicated some previous results. This study adds support to research indicating that SRMH is associated with depression (Hoff et al., 1997), has a stronger relationship with depression than with alcohol and drug
dependence (Eisen et al., 2004), and is a well-correlated yet distinct measure from SRH (Fleishman et al., 2007).

**Relationship between SRMH and Psychiatric Disorders**

The results of this research indicate SRMH is measuring psychiatric disorders in the population, thus adding strength to the item’s construct validity. The relationship between SRMH and depression and anxiety disorders was higher than that of SRMH and substance dependencies. Logically, one would expect that people will rate their SRMH lower if there is a real or perceived problem with their mental health. The finding for substance disorders is interesting, since it poses questions about whether the self-medicating effect of using substances causes individuals to feel better about their mental health.

Conversely, it is possible that people may be using substances as a form of distraction to deny the existence of an aversive situation or mental health problem. This behaviour may be used to avoid real mental health issues that need to be addressed. Therefore, in this case SRMH may not reflect a true mental state. It is important to note that these potential explanations are theoretical, and more research is needed to understand why alcohol and drug dependence translate less strongly into SRMH.

**Distress and SRMH**

While we could not do a causal analysis, it appears symptoms of distress may contribute to higher probabilities of reporting fair/poor SRMH. Those with depression or anxiety were likely to report fair/poor SRMH, but being distressed magnified the strength of the relationship. This result makes sense, since it is expected that people’s appraisals of their mental health state would factor in disorders and symptom severity (distress). Although those with substance dependence were also more likely to report fair/poor SRMH, this association disappeared when distress scores were added to the regression model. Again, the reasons for this could be that substances are used to self-medicate against a mental health problem, or to deny the existence of such a problem. Once the acknowledged feelings of distress were factored out of a person’s addiction, the disorder itself no longer has a relationship with SRMH.
When looking at sociodemographic and physical health variables, distress once again affected SRMH ratings. For instance, the significant relationship between chronic conditions and fair/poor SRMH was eliminated when we controlled for a person’s feelings of distress. This distress may have arisen from suffering associated with these conditions, or some of the conditions may have been caused by distress. Regardless, SRMH is measuring a distress state rather than a physical health state.

We also observed that relationships between SRMH and low or middle income levels disappeared when distress was included in the model. Again, this makes sense since people with lower levels of income have more distress associated with their situations (Hales & Hales, 1996). The distressing problems can range from having food insecurity to worrying about providing for themselves and their dependents (Turner & Lloyd, 1999).

The relationship between SRMH and education similarly disappeared when accounting for distress, but also disappeared when accounting for mental disorders and physical health status. This observation poses questions about whether distress is a proxy for mental disorders and physical health. Conversely poor physical health and mental disorders may be causing a state of distress, which in turn lead to poor perceptions of mental well-being.

Protective Effects of Social Support and Recent Immigration

Those who had more social support or immigrated to Canada less than ten years ago were less likely to have fair/poor SRMH. This effect held constant even when considering the combined effects of having mental disorder, having a physical health problem, or being distressed. An explanation for this relationship is that social support is known to be associated with well-being and an absence of psychological distress (Kessler et al., 1985). In theory, even those with a mental disorder would experience less distress if they have a social support network providing assistance, comfort, and affection. Since this study has found that distress increases the likelihood of reporting fair/poor SRMH, having higher levels of social support would protect against reporting lower levels of SRMH.

The finding that recent immigrants have a lower likelihood of reporting fair/poor SRMH conforms to a phenomenon called the healthy immigrant effect. Based on various health
measurements, more recent immigrants seem to have better health than the rest of the population, and use the health care system less frequently. However, once immigrants have settled in the country for a number of years, their health and utilization patterns match the rest of the population (Chen et al., 1996).

There are a number of reasons why this relationship may exist for SRMH. One explanation is the effect of a selection bias; people who emigrate from their home countries tend to be more educated and of higher socioeconomic status (Ali, 2002). Also, they need to be in good physical and mental health to complete such a lengthy and arduous process. However, over the years this kind of relocation could take a psychological toll. These people leave family and loved ones to start a new life in a foreign country, where they have to learn new languages and skills, may need to change professions, and are exposed to a different style of living.

Another explanation is that these immigrants may be coming from collectivist cultures. Collectivist cultures value group needs over individual needs, and are centralized around large social support networks (Parks & Anh, 1994). Immigrants who are new to the Western world usually encounter a largely individualistic society. These people tend to be more driven by personal goals and motivations, and there is an understanding that the individual is responsible for his or her success and failures (Parks & Anh, 1994). This large drop in social support could lead to distress among settled immigrants, resulting in higher likelihoods of reporting fair/poor SRMH. Being from a collectivist culture has also been found to be related to lower likelihoods of seeking help for mental health problems, such as depression (Yu, 2001). Not seeking out professional help for mental disorders could lead to poor mental health outcomes over time.

Explained and Unexplained Variance in SRMH

As mentioned earlier, pseudo $R^2$ is not a true indication of explained variability in logistic regression. However, since the same data and outcome variable were used for all models, the $R^2$ of all five models can be used for relative comparisons. Adding more variables to each successive model resulted in higher $R^2$ values; distress alone was responsible for nearly three quarters of the variance explained by our study variables. This result, in combination with its consistent mediating effects, means that distress has a fairly robust association with SRMH.
According to the Nagelkerke $R^2$, the full combination of study variables accounted for 38% of the variance in SRMH. Due to the limitations of pseudo $R^2$, we cannot be sure how accurate this figure is. However, without any other statistical alternative, pseudo $R^2$ is the best available estimate of explained variance. At the very least, this percentage indicates that distress, mental disorders, sociodemographic characteristics and physical health are only some of the factors affecting ratings of SRMH. There still seems to be a fairly large portion of unexplained variance in people’s responses to SRMH.

Given the very general nature of the question, it is possible that SRMH is assessing dimensions of mental health outside the scope of current measures. There is little research into what else may be affecting ratings of SRMH, but two studies have proposed theories. Hoff et al. (1997) suggest that SRMH may reflect, or be a proxy for mental health history, pre-clinical depression, or personality traits. SRMH may also be a proxy for cognitive processes that put people at risk for depression, or an indicator of cognitive integration systems that have not yet been discovered. Fleishman et al. (2007) add that SRMH may reflect perceptions of cognitive functioning, or positive affect (such as happiness and serenity).

The results of this study imply that SRMH may measure perceived mental suffering, as caused by mental, physical, or sociodemographic factors. People with the same mental or physical ailments may have varying degrees of distress resulting from comorbidities, optimism, coping styles, ethnicity, sex, age, or socioeconomic status. These perceptions of distress could be a symptom, or cause, of poor current or future mental health.

**CONCLUSION**

In conclusion, SRMH captures mental disorders and distress in the population, with stronger feelings of distress resulting in an increased likelihood of reporting fair or poor SRMH. Sociodemographic characteristics and physical health are also associated with SRMH, but many of these relationships can be mediated by feelings of distress. While the study variables explained some of the variance in SRMH, there are still unknown dimensions that are involved in ratings of SRMH. This study has added new relationships to the growing literature base, and researchers should continue to investigate SRMH as a population mental health measure. More research is needed about the relationship between SRMH and mental disorders, possibly in
psychiatric populations that have larger sample sizes for specific disorders. Also, given this study’s focus on distress and disorder, future studies may analyze how SRMH is associated with measures of well-being.
REFERENCES


*Canadian Journal of Psychiatry, 52,* 256-259.


TABLE 3.1 – Characteristics of the Analytic Sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Unweighted n</th>
<th>Weighted Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self rated mental health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>9602</td>
<td>27.8</td>
</tr>
<tr>
<td>Very good</td>
<td>14,422</td>
<td>39.2</td>
</tr>
<tr>
<td>Good</td>
<td>9967</td>
<td>26.1</td>
</tr>
<tr>
<td>Fair</td>
<td>2448</td>
<td>5.7</td>
</tr>
<tr>
<td>Poor</td>
<td>521</td>
<td>1.2</td>
</tr>
<tr>
<td>Sociodemographic Characteristics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-34</td>
<td>11,444</td>
<td>32.8</td>
</tr>
<tr>
<td>35-54</td>
<td>12,748</td>
<td>39.6</td>
</tr>
<tr>
<td>55-74</td>
<td>9,169</td>
<td>21.5</td>
</tr>
<tr>
<td>75+</td>
<td>3,623</td>
<td>6.1</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>16,773</td>
<td>50.8</td>
</tr>
<tr>
<td>Female</td>
<td>20,211</td>
<td>49.2</td>
</tr>
<tr>
<td>Household income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>4968</td>
<td>9.3</td>
</tr>
<tr>
<td>Middle</td>
<td>19,863</td>
<td>51.4</td>
</tr>
<tr>
<td>High</td>
<td>8717</td>
<td>29.9</td>
</tr>
<tr>
<td>Missing</td>
<td>3436</td>
<td>9.4</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than secondary school</td>
<td>10,592</td>
<td>25.5</td>
</tr>
<tr>
<td>Secondary school graduate</td>
<td>6497</td>
<td>19.0</td>
</tr>
<tr>
<td>Some post-secondary</td>
<td>3050</td>
<td>8.4</td>
</tr>
<tr>
<td>Post-secondary degree/diploma</td>
<td>16,614</td>
<td>47.2</td>
</tr>
<tr>
<td>Immigration status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recent immigrant (0-9 years)</td>
<td>1274</td>
<td>6.2</td>
</tr>
<tr>
<td>Settled immigrant (10+ years)</td>
<td>4325</td>
<td>15.9</td>
</tr>
<tr>
<td>Canadian born</td>
<td>31,152</td>
<td>77.9</td>
</tr>
<tr>
<td>Social support –MOS (weighted mean)</td>
<td>36,238</td>
<td>4.40</td>
</tr>
<tr>
<td>Distress</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distress– K10 (weighted mean)</td>
<td>36,831</td>
<td>5.34</td>
</tr>
<tr>
<td>12-Month CIDI Diagnoses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major depressive episode</td>
<td>1944</td>
<td>4.8</td>
</tr>
<tr>
<td>Panic disorder, social phobia or agoraphobia</td>
<td>1803</td>
<td>4.8</td>
</tr>
<tr>
<td>Alcohol or drug dependence</td>
<td>1215</td>
<td>3.1</td>
</tr>
<tr>
<td>Any 1 mental/substance disorder</td>
<td>3064</td>
<td>8.1</td>
</tr>
<tr>
<td>2 or more mental/substance disorders</td>
<td>974</td>
<td>2.3</td>
</tr>
<tr>
<td>Physical Health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of physical chronic conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>14,860</td>
<td>45.1</td>
</tr>
<tr>
<td>1</td>
<td>9616</td>
<td>26.3</td>
</tr>
<tr>
<td>2</td>
<td>5819</td>
<td>14.6</td>
</tr>
<tr>
<td>3+</td>
<td>6689</td>
<td>14.0</td>
</tr>
<tr>
<td></td>
<td>Un-weighted n</td>
<td>Weighted Percentage (%)</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td><strong>Disability</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No disability</td>
<td>30,987</td>
<td>87.0</td>
</tr>
<tr>
<td>IADL only</td>
<td>5180</td>
<td>11.2</td>
</tr>
<tr>
<td>ADL including IADL</td>
<td>817</td>
<td>1.8</td>
</tr>
<tr>
<td><strong>Self rated health</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>7868</td>
<td>23.3</td>
</tr>
<tr>
<td>Very good</td>
<td>13,745</td>
<td>37.6</td>
</tr>
<tr>
<td>Good</td>
<td>10,316</td>
<td>28.0</td>
</tr>
<tr>
<td>Fair</td>
<td>3806</td>
<td>8.6</td>
</tr>
<tr>
<td>Poor</td>
<td>1238</td>
<td>2.5</td>
</tr>
</tbody>
</table>
**TABLE 3.2** – Responses to Self-Rated Mental Health for Full Sample and by Disorder Type

<table>
<thead>
<tr>
<th></th>
<th>Weighted n</th>
<th>Excellent (%)</th>
<th>Very Good (%)</th>
<th>Good (%)</th>
<th>Fair (%)</th>
<th>Poor (%)</th>
<th>SRMH (bivariate)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Excellent, Very Good, Good (%)</td>
<td>Fair, Poor (%)</td>
</tr>
<tr>
<td>Full sample</td>
<td>24,996,593</td>
<td>27.8</td>
<td>39.2</td>
<td>26.1</td>
<td>5.7</td>
<td>1.2</td>
<td>93.1</td>
<td>6.9</td>
</tr>
<tr>
<td>Major depressive episode</td>
<td>1,192,353</td>
<td>5.5</td>
<td>16.8</td>
<td>34.7</td>
<td>28.4</td>
<td>14.7</td>
<td>56.9</td>
<td>43.1</td>
</tr>
<tr>
<td>Panic disorder, social phobia or agoraphobia</td>
<td>1,161,035</td>
<td>8.0</td>
<td>21.6</td>
<td>36.3</td>
<td>24.0</td>
<td>10.1</td>
<td>65.9</td>
<td>34.1</td>
</tr>
<tr>
<td>Alcohol or drug dependence</td>
<td>761,338</td>
<td>16.3</td>
<td>32.6</td>
<td>34.2</td>
<td>12.8</td>
<td>4.1</td>
<td>83.1</td>
<td>16.9</td>
</tr>
</tbody>
</table>

Mental disorders assessed using the CIDI (12-month prevalences). All percentages are weighted.
<table>
<thead>
<tr>
<th>TABLE 3.3. Logistic Regressions of Fair/Poor Self-Rated Mental Health</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model 1: Sociodemographics</strong></td>
</tr>
<tr>
<td><strong>Odds Ratio (95% CI)</strong></td>
</tr>
<tr>
<td><strong>Age</strong></td>
</tr>
<tr>
<td>15-34</td>
</tr>
<tr>
<td>35-54</td>
</tr>
<tr>
<td>55-74</td>
</tr>
<tr>
<td>75+</td>
</tr>
<tr>
<td><strong>Odds Ratio</strong></td>
</tr>
<tr>
<td><strong>Odds Ratio</strong></td>
</tr>
<tr>
<td><strong>Odds Ratio</strong></td>
</tr>
<tr>
<td><strong>Odds Ratio</strong></td>
</tr>
<tr>
<td><strong>Physical chronic conditions</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

* Significant at 0.05 level
† Significant at 0.01 level
‡ Significant at 0.001 level
§ Not significant
TABLE 3.3. Contd.

<table>
<thead>
<tr>
<th></th>
<th>Model 1: Sociodemographics Odds Ratio (95% CI)</th>
<th>Model 2: Mental Disorders Odds Ratio (95% CI)</th>
<th>Model 3: Mental Disorders, Physical Health Odds Ratio (95% CI)</th>
<th>Model 4: Full Model Without Distress Odds Ratio (95% CI)</th>
<th>Model 5: Full Model with Distress Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IADL only</td>
<td>1.10 (0.90-1.34)</td>
<td>1.17 (0.95-1.44)</td>
<td>1.01 (0.81-1.25)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADL including IADL</td>
<td>1.00 (0.69-1.47)</td>
<td>1.18 (0.79-1.75)</td>
<td>0.83 (0.54-1.27)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No disability</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self rated health</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very good</td>
<td>1.74 (1.27-2.39)¥</td>
<td>1.65 (1.20-1.28)¥</td>
<td>1.59 (1.15-2.20)¥</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>4.32 (3.18-5.85)¥</td>
<td>3.72 (2.73-5.08)¥</td>
<td>3.14 (2.29-4.31)¥</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>14.32 (10.31-19.87)¥</td>
<td>12.43 (8.87-17.44)¥</td>
<td>9.57 (6.77-13.55)¥</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>21.78 (14.58-32.53)¥</td>
<td>19.64 (12.94-29.79)¥</td>
<td>12.09 (7.81-18.72)¥</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>1.09</td>
<td>0.05¥</td>
<td>0.01¥</td>
<td>0.25¥</td>
<td>0.03¥</td>
</tr>
<tr>
<td>Cox &amp; Snell R²</td>
<td>0.04</td>
<td>0.07</td>
<td>0.11</td>
<td>0.12</td>
<td>0.15</td>
</tr>
<tr>
<td>Nagelkerke R²</td>
<td>0.10</td>
<td>0.17</td>
<td>0.29</td>
<td>0.32</td>
<td>0.38</td>
</tr>
</tbody>
</table>

*P<0.05, ¥P<0.01, ¥¥P<0.001
5 Discussion

5.1 Research Findings

This study sought to gain a better understanding of what a single-item measure of self-rated mental health (SRMH) measures. This item has been used increasingly in research and on population health surveys, but with little discussion or knowledge about what the item is measuring and which variables are associated with it. It was important to gain a deeper understanding about SRMH so that previous and future research could be interpreted accurately. Also, since the item is already being used on population health surveys, understanding what SRMH measures could provide useful information about the mental health of populations. Areas for further research will be discussed in Chapter 6.

Results of the systematic review found that a number of investigations included this single-item measure. SRMH correlated moderately with mental health scales. Poor SRMH was associated with poor SRH, physical health problems, increased health service utilization, and a lower likelihood of being satisfied with mental health services. Despite the limited number of formal validation studies looking at what SRMH is measuring, its use in the literature gave us important information about its relationships with other variables. However, a number of large research gaps were identified, including a need for investigation into the relationship between SRMH and diagnoses of mental disorders.

Multivariate analysis of CCHS 1.2 data found SRMH was associated with psychiatric diagnoses and distress. There were significant relationships between SRMH and depression, anxiety disorders (panic disorder, social phobia, agoraphobia), substance dependence (alcohol dependence, illicit drug dependence), psychiatric comorbidity, and the K10. Scores on the K10 decreased the association of SRMH with depression and anxiety diagnoses, and eliminated the association between SRMH and substance dependence.

Fair or poor SRMH was associated with being female, having low or middle income, being less educated, and having chronic conditions; however, these relationships were explained by scores on the K10. In the cases of sex and education, relationships with SRMH were also explained by poor physical health and having mental disorders. Being a recent immigrant, having higher
levels of social support, and being older were associated with decreased odds of reporting fair or poor SRMH. Poor SRH was related to fair/poor SRMH, but this association decreased when accounting for distress. While SRMH and SRH were strongly related, they were not found to be collinear. The full combination of study variables accounted for a portion of the variance in SRMH, but there are still other unknown factors involved in these ratings.

This study addressed all four research questions. In response to the first question about whether there is an association between SRMH and psychiatric disorders, fair or poor SRMH was in fact related to CIDI psychiatric disorders. However, the relationship was stronger for depression and anxiety disorders, and weaker for alcohol or drug dependencies. The second question asked if there was a relationship between SRMH and the K10. The data analysis revealed that fair or poor SRMH was directly related to stronger feelings of distress. The third question asked about whether SRMH was associated with sociodemographic characteristics and physical health status. SRMH was in fact related with a number of sociodemographic characteristics and physical health indicators. Finally, the fourth question asked whether distress mediated relationships between SRMH and mental disorders, sociodemographic characteristics, and physical health. Higher levels of distress were associated with an increased likelihood of reporting fair or poor SRMH among those with mental disorders and physical health conditions. Some relationships between SRMH and sociodemographic characteristics were accounted for by feelings of distress, but being young-to-middle aged, not being a recent immigrant, and having low social support maintained their associations with fair or poor SRMH.

5.2 Importance of These Investigations

It was important to conduct the first systematic review of SRMH literature so that all previous knowledge regarding SRMH could be synthesized in one place. This synthesis categorized current findings to provide an organized summary of the literature, thus formalizing the state of research in this area. An important result from this study was the identification of gaps in our knowledge and directions for future research. One of the gaps identified in the review was that only one study had assessed the association between SRMH and a mental disorder (Hoff et. al., 1997). For SRMH to be a useful measure of mental health, it is important to understand its relationships with other mental health variables, such as psychiatric diagnoses. Therefore, it was
proposed that future studies look at the relationship between SRMH and a range of psychiatric disorders in the population.

The analysis of CCHS 1.2 data addressed this literature gap by studying the relationship between SRMH and depression, anxiety disorders, and substance dependencies. This study provided important information that confirmed SRMH was assessing aspects of mental health. Performing this investigation provided novel contributions to the literature base, and also replicated results from studies identified in the systematic review. Namely, that SRMH is associated with depression, as found by Hoff et al., 1997; that SRMH has a stronger relationship with depression than with alcohol and drug dependence (Eisen et al., 2004); that SRMH is correlated but distinct from SRH (Fleishman et al., 2007); that SRMH is associated with distress (Fleishman et al., 2007); and that SRMH is associated with lower income, being less educated, being female, and having more self-reported mental or physical conditions (Zuvekas & Fleishman, 2008); (Druss & Rosenheck, 2000). Based on new information from the CCHS 1.2 data analysis, we can now hypothesize that that relationships of SRMH with sociodemographic characteristics and physical health conditions found by Zuvekas and Fleishman (2008) and Druss & Rosenheck (2000) may have been attributable to levels of distress experienced by these groups.

5.3 Assessment of Study Aim

Overall, the study aim of gaining a better understanding of what SRMH measures was met. The systematic review synthesized a broad literature base to present patterns about how SRMH has been researched and what findings have emerged. All the studies fell into six basic themes that gave us important information about what SRMH is measuring. The CCHS 1.2 data analysis added more information based on gaps identified in the systematic review. It is becoming clear that SRMH is measuring aspects of mental health. While the research studies presented in this thesis make a contribution to our current knowledge about what SRMH measures, there is still room for more research before a complete answer can be formed. As more research is conducted, more information will be added to the emerging definition of what SRMH is revealing to us.
5.4 Study Limitations

Conducting a systematic review followed by an analytic study yields a well-informed, thorough investigation into SRMH. The systematic review revealed what is known, and what is not known about the item, and the analysis built up the knowledge and gaps identified in the literature. However, there are still limitations in this analytic approach that come from limitations associated with the review process and data analysis.

A limitation of the systematic review was that SRMH terminology is not yet standardized, and some SRMH studies may not have been captured by the keywords used during the search process. Efforts were made to minimize this limitation by using a broad keyword search strategy, followed by manual reviews of abstracts and methods sections of articles. Also, a second search strategy was used to search all mental health studies that used population health surveys known to contain SRMH. The purpose behind this extra search was to capture articles that may have used different SRMH terminology, or not mentioned the item in their study’s abstract or title.

Another limitation of the systematic review was that the SRMH literature base is relatively small and quite heterogeneous in terms of study purposes and methodologies. Therefore, a meta-analysis could not be conducted and study results could not be directly compared to each other with as much rigor. However, this type of heterogeneity is expected in a new area of research, and using a thematic review technique still synthesized important research themes and results.

A limitation of the data analysis study is that CCHS 1.2 data was cross-sectional, which meant that causal relationships could not be drawn. Another limitation was that the general study population examined by CCHS 1.2 did not have large enough sample sizes to study the association between some disorders and SRMH. This meant that the specific anxiety disorders were combined into one variable, and mania had to be excluded from the study altogether. Furthermore, CCHS 1.2 did not contain diagnostic scales for a full range of mental disorders, including general anxiety disorder, eating disorders, psychosis, and so on.

Another data limitation of the analytic study was that it was not possible to calculate exact variances using the PUMF. Instead, a conservative technique was used to rescale survey
weights, which avoided false-positive results. The drawback of this cautious approach is that some results that could have been significant at the $p = 0.05$ level may have appeared to be non-significant.

5.5 SRMH as a Population Mental Health Measure

Based on results of the systematic review and CCHS 1.2 data analysis, SRMH is demonstrating measurement capacity in terms of mental health and psychiatric disorders. There also seem to be associations with variables that can be influenced by mental health, such as physical health and mental health service utilization. These results in combination with its simple, quick administration and easy translatability point to SRMH as being a useful population mental health indicator. It is important to keep in mind that these results are preliminary, and require further investigation and replication. However, it seems SRMH could be used to identify groups that require attention, such as increased access to primary care providers and mental health services. These groups may also need to be targeted for diagnostic testing, or monitored for future mental morbidity.

The increased likelihood or reporting fair or poor SRMH among those experiencing distress is information that could be useful on a population level. Socioeconomic groups with poorer SRMH might be targeted for increased community support and public health programming. These people may simply be in need of reliable social networks or education about community resources that they can access. Assisting people with low SRMH early enough may prevent future mental morbidity, thereby resulting in better mental health outcomes and decreasing burden on the health care system.

5.6 Other Factors Contributing to SRMH Ratings

Results from a number of studies, including the CCHS 1.2 data analysis, have only been able to explain portions of the variation in how people respond to SRMH. So far, the indicator does not seem to be a perfect proxy for any existing mental health measures or variables. This finding is interesting, because it is likely that SRMH is tapping into a dimension or dimensions of mental health that are currently outside the scope of what current measures can access.
While there is little research into what else may be affecting ratings of SRMH, two studies have proposed theories. Hoff et al. (1997) propose that SRMH may reflect or be a proxy for mental health history, pre-clinical depression, or personality traits. SRMH may also be a proxy for cognitive processes that put people at risk for depression, or an indicator of cognitive integration systems that have not yet been discovered. Fleishman et al. (2007) add that SRMH may reflect perceptions of cognitive functioning, or positive affect (such as happiness and serenity).

Similar to SRMH, SRH does not seem to be identical to clinical diagnoses. Given the parallel wording structure and strong correlations between both items, it is possible there is a set of overlapping qualities that both these items are measuring; qualities that are distinct from those that can be assessed through use of clinical scales. Examples of such factors may include assessments of disorder severity, non-specific symptoms, pre-clinical diagnoses, perceived mental health trajectory, coping abilities, or spiritual orientation. Such qualities could affect incidence or severity of mental disorders, or they could manifest as a “general feeling” that respondents have, but can only be quantified through SRMH.

5.7 Clinical and Research Implications

While these two studies have revealed important information, researchers should continue investigating SRMH to learn more about what it is measuring and to strengthen previous results through replication. SRMH seems to be a useful population mental health measure, but should not be considered a proxy measure for mental health or psychiatric disorder. Studies measuring mental health outcomes should not use SRMH as their only mental health variable. Furthermore, researchers using SRMH in studies should include information regarding its associated knowledge and limitations. SRMH may be useful in clinical settings as a screening tool to identify people at risk for future cases of depression, but more research is required before conclusions can be drawn.
6 Conclusions

In conclusion, SRMH seems to be measuring certain aspects of mental health and more. The systematic review points to a number of relationships between SRMH and mental health, physical health, sociodemographic characteristics, care utilization, and service satisfaction. SRMH may also be predictive of future mental morbidity, but more research is needed.

Results of the CCHS 1.2 data analysis reveal that SRMH captures CIDI mental disorders in the population (specifically, depression, anxiety, and substance dependence), as well as distress (as measured by the K10). SRMH is also associated with sociodemographic characteristics and physical health status. Many of these relationships with SRMH can be mediated by feelings of distress. Scores on the K10 explained a significant proportion of the variance accounted for by the study variables; however, there are still unknown factors involved in SRMH ratings.

SRMH demonstrates utility as a population measure of mental health. While these studies have identified and synthesized a number of findings regarding SRMH, there are still many areas that require further research. The SRMH literature base is still being developed, and more studies are needed to improve the robustness and generalizability of the preliminary findings presented here.
7 Future Directions

Conducting an analytic study and the first known systematic review of SRMH literature has identified a number of areas requiring further investigation. Based on the current state of literature, what we don’t know about SRMH can be considered as important as what we do know. There are many remaining questions about what SRMH measures, how it may behave in different populations, and what can influence people’s responses to the item. The following sections outline major areas of investigation, although there are many more areas of research inquiry.

7.1 Qualitative Analysis of SRMH

Qualitative analyses such as cognitive interviewing techniques could help us understand what SRMH is measuring. Cognitive interviewing aims to comprehend how people interpret a question, and what processes they use to come to a response. Understanding the meaning and response processes people assign to SRMH could direct investigators to look for relationships within corresponding sets of variables.

Since SRMH is such a general question, people will likely interpret it in different ways. It may be possible that there is a specific style of interpretation and response patterns that occur based on personal characteristics (e.g., sex, race, level of education, etc). For instance, one race may interpret SRMH to be asking about mental well-being, while another may consider it a question about presence of disorder. Styles of interpreting and responding to SRMH may affect which variables the item correlates with or predicts. This kind of knowledge could be useful for understanding what SRMH is indicative of in different population groups.

7.2 Testing for Interaction Effects

If there is a pattern of SRMH interpretation and response styles, it is unlikely to be as simple as looking at one population characteristic to determine which interpretation and response style people will adopt. It is more probable that there will be an interaction effect of multiple variables (such as women of a certain age and race having a specific interpretation of what SRMH means). Therefore, it is important that future investigations also study how interaction
effects factor into SRMH responses, and into the association SRMH has with other variables. Mental health is a complex, dynamic construct that is affected by many internal and external factors at the same time; and it likely that self-ratings of mental health are affected by an equally large variety of factors. To gain a true understanding of how SRMH is operating, we will need to study how interactions can affect relationships and outcomes.

7.3 Variations in SRMH by Sociodemographic Characteristics

Gaining an understanding of the interaction effects governing SRMH also means understanding which sociodemographic factors affect SRMH ratings and relationships. The analysis of CCHS 1.2 data revealed variables for sex, income, education, and immigration status were related to SRMH ratings, but that the former three were explained by their associations with distress. It is important to continue studying which sociodemographic characteristics are associated with better or worse ratings of SRMH in different types of populations, and to also pay attention to which underlying variables may be effecting these relationships (through causal pathways, interaction effects, or confounding). Studies of new populations and replications studies on previously investigated populations are needed before we can come to general expectations of how SRMH is assessed by different groups of people.

7.4 Relationship between SRMH and Mental Disorders

The CCHS 1.2 data analysis study was the first known study to investigate the relationship between SRMH and different psychiatric diagnoses. A previous study by Hoff et al. (1997) had looked at the relationship between SRMH and depression, but did not look at other disorders. Given that SRMH is a mental health indicator, it is important to understand how well it can detect mental health and disorder states. Both studies thus far have found relationships between SRMH and psychiatric disorders, but there is still a need for more research in this area.

Future studies should look at disorders that were not covered by these two investigations, such as generalized anxiety disorder, schizophrenia, obsessive-compulsive disorder, bipolar disorder, suicidality, eating disorders, and so on. It is possible that not all psychiatric disorders will have relationships with SRMH, but it is important to understand which ones do, which do not, and what the strength of these relationships are. This knowledge will help further understand what
SRMH is measuring, based on characteristics of the disorders it does, or does not, have relationships with. Also, knowing which disorders have relationships with SRMH can inform future investigators about whether SRMH is a suitable measure for their particular topic of study.

7.5 Longitudinal Analysis of SRMH

Most of the studies identified in the systematic review were cross-sectional, and therefore limited in their identification of causal relationships. It is important to understand whether SRMH is an appraisal made based on current mental health states, or if it is a belief that can influence future mental health outcomes. A third possibility is that SRMH is measuring pre-clinical disorder and distress states that could eventually lead to psychiatric diagnoses. Hoff et al. (1997) found that SRMH was associated with a 10-fold increase in risk of major depression for the following year. Investigators should continue assessing the relationship between SRMH and future cases of depression. They should also look at how predictive SRMH is of other mental disorders, such as anxiety, substance dependence, bipolar disorder, and so forth. If SRMH is a robust predictor of future mental states, those with fair or poor ratings could be targeted for mental health treatments and preventative measures before a psychiatric episode occurs.

7.6 SRMH as a Measure of Well-Being

While disorders receive a considerable amount of attention in mental health research, looking at well-being is also important. When studying SRMH, we need to consider its measurement capacity for both disorders and for well-being. Our CCHS 1.2 analytic study found a relationship between SRMH and the K10 psychological distress scale. Fleishman & Zuvekas (2007) found a moderate correlation between SRMH and the 6-item version of the K10 in their study (K6). These scales measure distress in the population by asking questions consistent with mood and anxiety disorders. While these scales are not meant to diagnose disorders, they are essentially measuring a lack of well-being.

It is also important to look at how scales testing the presence of well-being relate to SRMH. Fleishman & Zuvekas (2007) and Zuvekas & Fleishman (2008) looked at the Mental
Component Summary (MCS) of the SF-12 Health Status Survey. The MCS is comprised of six questions, two of which ask about the presence of well-being (feeling calm and peaceful, and having energy), and four ask about the absence of well-being (feeling downhearted and depressed, interference with social activities, and so on). Both studies found relationships between SRMH and the MCS.

There needs to be study into how SRMH relates to scales whose purpose is to measure presence of well-being, rather than absence of well-being. The CCHS 1.2 contains a Psychological Well-Being Manifestation Scale (WBMMS) (Massé et al., 1998). The scale provides an overall psychological well-being score by asking about variables such as happiness, self confidence, ambition, and emotional balance. We were unable to include the measure in our study because, compared to the K10, we did not feel that enough studies had analyzed or formally validated the measure to be certain about its psychometric properties. However, we ran some analyses to get an idea of what we may expect when comparing SRMH to a well-being scale.

We found a correlation of $r = 0.49$ ($p < 0.001$) between SRMH and the WBMMS. When the WBMMS was included in our regression models, it did not exhibit quite the same association as with the K10. When looking at relationships between the study variables and SRMH, accounting for feelings of distress decreased or eliminated a number of associations. From this, we concluded that distress is a mediating variable that increases the likelihood of reporting fair or poor SRMH. However, when the WBMMS was included in our models, psychological well-being did not have a protective effect of decreasing the likelihood of reporting fair or poor SRMH. Therefore, we may not necessarily be able to consider a lack of psychological well-being to be the opposite construct of the presence of well-being. Analyses using scales that measure presence of well-being are necessary to determine how positive well-being may affect SRMH.

### 7.7 Relationships Between SRMH and SRH

As mentioned in the introduction, SRMH shares a parallel wording structure with SRH. Our analytic study found that among all our study variables, SRMH and SRH had the strongest association with each other, even after controlling for distress and number of chronic conditions. However, no statistical collinearity was found. Similarly, Fleishman & Zuvekas (2007) found
both variables were associated with one another, but that SRMH had unique associations with the mental health scales, even when adjusting for SRH. Results from our systematic review found that among studies using both SRMH and SRH, variables associated with poor SRMH usually had associations with poor SRH; although, the magnitude of relationships varied.

There do not seem to be any further analyses into the relationship between SRMH and SRH. While our results seem to indicate SRMH and SRH are distinct measures, there is evidently some overlap between them. Future studies should assess the statistical covariance between SRMH and SRH. Understanding how and when these variables overlap could provide further insights into what SRMH is measuring. Also, our knowledge about how these variables are similar could be used to make deductions about how other variables would behave with respect to SRMH (since there is already a large amount of knowledge about variables that are associated with SRH). Finally, it may be useful to study qualitatively whether people are making conceptual distinctions between SRMH and SRH. This could be accomplished by understanding which criteria people are using to arrive at self-ratings of physical versus mental health.
References


Appendices

Appendix 1. Canadian Community Health Survey Interview for Distress

Source: Kessler Scale of Psychological Distress-10 (K10)

The following questions deal with feelings you may have had during the past month.

During the past month, that is, from (date one month ago to yesterday) about how often did you feel:

1...tired out for no good reason?
   All of the time
   Most of the time
   Some of the time
   A little of the time
   None of the time

2... nervous?
   All of the time
   Most of the time
   Some of the time
   A little of the time
   None of the time

3... so nervous that nothing could calm you down?
   All of the time
   Most of the time
   Some of the time
   A little of the time
   None of the time

4... hopeless?
   All of the time
   Most of the time
   Some of the time
   A little of the time
   None of the time

5... restless or fidgety?
   All of the time
   Most of the time
   Some of the time
   A little of the time
   None of the time

6... so restless you could not sit still?
   All of the time
   Most of the time
   Some of the time
   A little of the time
   None of the time
During the past month, about how often did you feel:

7…sad or depressed?
   All of the time
   Most of the time
   Some of the time
   A little of the time
   None of the time

8…so depressed that nothing could cheer you up?
   All of the time
   Most of the time
   Some of the time
   A little of the time
   None of the time

9 …that everything was an effort?
   All of the time
   Most of the time
   Some of the time
   A little of the time
   None of the time

10…worthless?
   All of the time
   Most of the time
   Some of the time
   A little of the time
   None of the time
Appendix 2 – Canadian Community Health Survey Diagnostic Scales for Depression, Panic Disorder and Agoraphobia.

Source: Developed based on World Mental Health Composite International Diagnostic Interview (WMH-CIDI)

DEPRESSION

For the next questions, think about the period of 2 weeks or longer during the past 12 months when your feelings of being sad, discouraged or uninterested were most severe and frequent.

During this period, how often did you feel cheerful?
- Often
- Sometimes
- Occasionally
- Never

How often did you feel as if you were slowed down?
- Often
- Sometimes
- Occasionally
- Never

How often could you enjoy a good book or radio or TV program?
- Often
- Sometimes
- Occasionally
- Never

During this period, how often did you still enjoy the things you used to enjoy?
- As much as usual
- Not quite as much as usual
- Only a little
- Not at all

How often could you laugh and see the bright side of things?
- As much as usual
- Not quite as much as usual
- Only a little
- Not at all

How often did you take interest in your physical appearance?
- As much as usual
- Not quite as much as usual
- Only a little
- Not at all

How often did you look forward to enjoying things?
- As much as usual
- Not quite as much as usual
- Only a little
Not at all

Think about the period of time that lasted one month or longer when your feelings of being sad, discouraged or uninterested were most severe in the past 12 months. Please tell me what number best describes how much these feelings interfered with each of the following activities. For each activity, answer with a number between 0 and 10; 0 means "no interference" while 10 means "very severe interference".

In the past 12 months, how much did your feelings of being sad, discouraged or uninterested interfere with your home responsibilities, like cleaning, shopping and taking care of the house or apartment?

|   |   | Number (MIN: 0) (MAX: 10)

How much did your feelings interfere with your ability to attend school?

|   |   | Number (MIN: 0) (MAX: 10)

How much did they interfere with your ability to work at a job?

|   |   | Number (MIN: 0) (MAX: 10)

Again thinking about that period of time lasting one month or longer during the past 12 months when your feelings of being sad, discouraged or uninterested were most severe, how much did they interfere with your ability to form and maintain close relationships with other people? (Remember that 0 means "no interference" and 10 "very severe interference".)

|   |   | Number (MIN: 0) (MAX: 10)

How much did they interfere with your social life?

|   |   | Number (MIN: 0) (MAX: 10)

In the past 12 months, about how many days out of 365 were you totally unable to work or carry out your normal activities because of your feelings of being sad, discouraged or uninterested? (You may use any number between 0 and 365 to answer.)

|   |   | Number (MIN: 0) (MAX: 365)

During the past 12 months, did you receive professional treatment for your feelings of being sad, discouraged or uninterested?

1 Yes

2 No

During the past 12 months, were you ever hospitalized overnight for your feelings of being sad, discouraged or uninterested?

1 Yes

2 No
PANIC DISORDER

Earlier, you mentioned having attacks of fear or panic when all of a sudden you felt very frightened, anxious or uneasy. Think of a bad attack like that. During that attack, tell me which of the following problems you had.

PAD_Q01A Did your heart pound or race?
   1 Yes
   2 No

Were you short of breath?
   1 Yes
   2 No

Did you feel nauseous or sick to your stomach?
   1 Yes
   2 No

Did you feel dizzy or faint?
   1 Yes
   2 No

Did you sweat?
   1 Yes
   2 No

Did you tremble or shake?
   1 Yes
   2 No

Did you have a dry mouth?
   1 Yes
   2 No

Did you feel like you were choking?
   1 Yes
   2 No

Did you have pain or discomfort in your chest?
   1 Yes
   2 No

Were you afraid that you might lose control of yourself or go crazy?
   1 Yes
   2 No

Did you feel that you were "not really there", like you were watching a movie of yourself?
   1 Yes
   2 No

Did you feel that things around you were not real or like a dream?
   1 Yes
   2 No
Were you afraid that you might pass out?
  1 Yes
  2 No

Were you afraid that you might die?
  1 Yes
  2 No

Did you have hot flushes or chills?
  1 Yes
  2 No

Did you feel numbness or have tingling sensations?
  1 Yes
  2 No

PAD_Q03 During your attacks, did the problems like begin suddenly and reach their peak within 10 minutes after the attacks began?
  1 Yes
  2 No

Attacks of this sort can occur in 3 different situations. The first situation is when the attacks occur unexpectedly, "out of the blue". The second situation is when a person has an unreasonably strong fear. For example, some people have a terrible fear of bugs or of heights or of being in a crowd. The third situation is when a person is in real danger, like a car accident or a bank robbery.

Which of these 3 situations describes your attack? Did it occur:
  1 … unexpectedly, “out of the blue”?
  2 … in a situation where you had a strong fear?
  3 … in a situation of real danger?

At any time in the past 12 months, did you have one of these attacks?
  1 Yes
  2 No

PAD_QINT13 After one of these attacks, tell me if you ever had any of the following experiences?

INTERVIEWER: Press <Enter> to continue.
A month or more when you often worried that you might have another attack?
  1 Yes
  2 No

A month or more when you worried that something terrible might happen because of the attacks, like having a car accident, having a heart attack or losing control?
  1 Yes
  2 No

A month or more when you changed your everyday activities because of the attacks?
  1 Yes
  2 No

A month or more when you avoided certain situations because of fear about having another attack?
  1 Yes
  2 No
Unexpected attacks sometimes occur as a result of a physical illness or injury or the use of medication, drugs or alcohol. Do you think any of your attacks ever occurred as the result of physical causes, medication, drugs or alcohol?

1 Yes
2 No

How much did your attacks or worry about the attacks interfere with your home responsibilities, like cleaning, shopping and taking care of the house or apartment?

| ||| Number (MIN: 0) (MAX: 10)

How much did it interfere with your ability to attend school?

| ||| Number (MIN: 0) (MAX: 10)

How much did it interfere with your ability to work at a job?

| ||| Number (MIN: 0) (MAX: 10)

Again think about that period of time lasting 1 month or longer when your attacks or worry about the attacks were most severe, how much did they interfere with your ability to form and maintain close relationships with other people? (Remember that 0 means “no interference” and 10 means “very severe interference”.)

| ||| Number (MIN: 0) (MAX: 10)

PAD_Q44D How much did it interfere with your social life?

| ||| Number (MIN: 0) (MAX: 10)

In the past 12 months, about how many days out of 365 were you totally unable to work or carry out your normal activities because of your attacks or the worry about the attacks? (You may use any number between 0 and 365 to answer.)

| ||| Number of days (MIN: 0) (MAX: 365)

During the past 12 months, did you receive professional treatment for your attacks?

1 Yes
2 No

During the past 12 months, were you ever hospitalized overnight for your attacks?

1 Yes
2 No
AGORAPHOBIA

Earlier you mentioned having a strong fear of things like being in crowds, going to public places, travelling by yourself or travelling away from home. The next questions are about which of these things you feared. Tell me if you have strongly feared any of the following situations in the past 12 months.

Being home alone?
   Yes
   No

Being in crowds?
   Yes
   No

Travelling away from home?
   Yes
   No

Travelling alone or being alone away from home?
   Yes
   No

Did you ever strongly fear using public transportation?
   Yes
   No

Driving a car?
   Yes
   No

Standing in a line in a public place?
   Yes
   No

Did you ever strongly fear being in a department store, shopping mall or supermarket?
   Yes
   No

Being in a movie theatre, auditorium, lecture hall or church?
   Yes
   No

Being in a restaurant or any other public place?
   Yes
   No

Being in a wide, open field or street?
   Yes
   No

Was the reason for your fear ever because you felt very shy, afraid or uncomfortable in social or performance situations, or being with other people?
   Yes
   No
Was your fear of these situations always because you felt shy, afraid or uncomfortable in social or performance situations, or being with other people?
   Yes
   No

How much did your fear or avoidance of these situations ever interfere with either your work, your social life or your personal relationships?
   Not at all
   A little
   Some
   A lot
   Extremely

Was there ever a time in your life when you felt emotionally upset, worried or disappointed with yourself because of your fear or avoidance of these situations?
   Yes
   No

At any time in the past 12 months, did you either strongly fear or avoid any of these situations?
   Yes
   No

During the past 12 months, think about the period of time that lasted one month or longer when your fear or avoidance of situations was most severe. Please tell me what number best describes how much your fear or avoidance of situations interfered with each of the following activities. For each activity, answer with a number between 0 and 10; 0 means “no interference”, while 10 means “very severe interference”.

How much did your fear or avoidance of situations interfere with your home responsibilities, like cleaning, shopping and taking care of the house or apartment?
   [_____] Number
   (MIN: 0) (MAX: 10)

How much did it interfere with your ability to attend school?
   [_____] Number
   (MIN: 0) (MAX: 10)
Appendix 3 – Canadian Community Health Survey Interview for Social Support

Source: Social support scale from the Medical Outcomes Study (MOS)

Next are some questions about the support that is available to you.

People sometimes look to others for companionship, assistance or other types of support.

How often is each of the following kinds of support available to you if you need it:

1… someone to help you if you were confined to bed?
   None of the time
   A little of the time
   Some of the time
   Most of the time
   All of the time

2… someone you can count on to listen to you when you need to talk?
   None of the time
   A little of the time
   Some of the time
   Most of the time
   All of the time

3… someone to give you advice about a crisis?
   None of the time
   A little of the time
   Some of the time
   Most of the time
   All of the time

4… someone to take you to the doctor if you needed it?
   None of the time
   A little of the time
   Some of the time
   Most of the time
   All of the time

5… someone who shows you love and affection?
   None of the time
   A little of the time
   Some of the time
   Most of the time
   All of the time
Again, how often is each of the following kinds of support available to you if you need it:

6... someone to have a good time with?
   None of the time
   A little of the time
   Some of the time
   Most of the time
   All of the time

7... someone to give you information in order to help you understand a situation?
   None of the time
   A little of the time
   Some of the time
   Most of the time
   All of the time

8... someone to confide in or talk to about yourself or your problems?
   None of the time
   A little of the time
   Some of the time
   Most of the time
   All of the time

9... someone who hugs you?
   None of the time
   A little of the time
   Some of the time
   Most of the time
   All of the time

10... someone to get together with for relaxation?
    None of the time
    A little of the time
    Some of the time
    Most of the time
    All of the time

11... someone to prepare your meals if you were unable to do it yourself?
    None of the time
    A little of the time
    Some of the time
    Most of the time
    All of the time

12... someone whose advice you really want?
    None of the time
    A little of the time
    Some of the time
    Most of the time
    All of the time
Again, how often is each of the following kinds of support available to you if you need it:

13…. someone to do things with to help you get your mind off things?
   None of the time
   A little of the time
   Some of the time
   Most of the time
   All of the time

14…. someone to help with daily chores if you were sick?
   None of the time
   A little of the time
   Some of the time
   Most of the time
   All of the time

15…. someone to share your most private worries and fears with?
   None of the time
   A little of the time
   Some of the time
   Most of the time
   All of the time

16…. someone to turn to for suggestions about how to deal with a personal problem?
   None of the time
   A little of the time
   Some of the time
   Most of the time
   All of the time

17…. someone to do something enjoyable with?
   None of the time
   A little of the time
   Some of the time
   Most of the time
   All of the time

18…. someone who understands your problems?
   None of the time
   A little of the time
   Some of the time
   Most of the time
   All of the time

19…. someone to love you and make you feel wanted?
   None of the time
   A little of the time
   Some of the time
   Most of the time
   All of the time