

Post-Secondary Students with Symptoms of Psychosis:

A Mixed-Methods Systematic Review

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A Thesis Submitted in Partial Fulfillment of the Requirements

for the Master's Degree of Science in Nursing

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“You never really understand a person until you consider things from [their] point of view.”

Harper Lee

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Thesis Abstract

The purpose of this thesis was to synthesize evidence on symptoms of psychosis in post-secondary students, including participant characteristics, prevalence, risk factors, interventions, and reported experiences. The design was a mixed-methods systematic review, modeled on the Joanna Briggs Institute and PRISMA guidelines, with all standard systematic review procedures followed. A search in nine databases yielded 26 (published between 2006 and 2018) articles for inclusion. Data were analyzed according to objectives and reported using synthesis tables and narrative summaries. Average age of participants was 21 years and most identified as female and Caucasian. Prevalence of psychosis across the included studies was inconclusive. Risk factors associated with symptoms of psychosis included substance use, depression, and younger age. There were five interventions with mixed results and three studies about experiences. While five promising interventions exist, inadequate testing and replication limits confidence in their effectiveness. There is a notable deficit in qualitative evidence exploring the experiences of students with symptoms of psychosis.

Acknowledgements

I would like to dedicate my thesis to post-secondary students who have, or who are experiencing mental illness. I admire each and every one of you for your courage and bravery while attending school and pursuing your career and life goals. I hope to work alongside current and future generations of students and the general public to eliminate the stigma associated with mental illness, and to ensure students are receiving the necessary care to manage symptoms and foster recovery, while successfully completing academic pursuits.

I would like to thank the various knowledge users involved in my thesis: A. MacInnes (Senior Mental Health Advisor, uOttawa), Carmen Hust (RN, PhD, Nursing Professor), Crystal Morris (OT Reg. Ont., Occupational Therapist, OnTrack, The Ottawa Hospital), Danielle Vigneault, Fabien Provost (Student), and Meriem Benlamri (Knowledge Mobilization Coordinator, Frayme). Your expertise, first-hand experiences, and valuable input and guidance at various stages of this study was integral to make meaning out of my project, and to highlight implications for clinical practice, policy, education, and research in this field.

I would also like to express gratitude to my parents, Heidi and George, and my siblings Jaclyn, Michael, and Ian, as well as my devout circle of friends, who have always provided unwavering love and support throughout my schooling and nursing career. Without you, I would not have been able to achieve what I have. You are my light, strength, and comedic relief during the best and worst of times. For this, I cannot thank you enough.

Finally, I would like to thank my thesis supervisor Amanda and committee members Ian and Jean Daniel, for their guidance, patience, and encouragement throughout my thesis. I would also like to thank Lindsey Sikora for assisting me with the literature search, and Sophie Lightfoot and Mackenzie Murawsky for assisting me throughout the citation screening and data extraction

process. Thank you all for your dedication and support, I would not have been able to achieve this without you.

Declaration of Thesis Committee Members

Amanda Vandyk, PhD, RN. Dr. Amanda Vandyk was the primary thesis supervisor of my graduate research. She helped determine my thesis topic and helped coordinate and plan the completion of my thesis. Dr. Vandyk is knowledgeable and experienced in planning and conducting systematic reviews and assisted in guiding me throughout the systematic review process. Dr. Vandyk participated in editing thesis drafts, making recommendations, and facilitation of advisory panel meetings. Dr. Vandyk has also provided guidance and assistance with the thesis publication process.

Jean Daniel Jacob, PhD, RN. Dr. Jean Daniel Jacob was a member of my thesis committee. He played an integral part in reviewing and making recommendations concerning the thesis's theoretical underpinnings, rationale, and content. He also contributed to the editing process of the entire thesis.

Ian Graham, PhD, FCAHS. Dr. Ian Graham was a thesis committee member who played an integral role in reviewing and making recommendations to the methodology and overall structure and design of the systematic review – including the integrated knowledge translation portion. He also contributed to editing of the entire thesis.

Chapter One: Introduction

This chapter provides an introduction to my thesis, including a summary of relevant literature related to post-secondary (PS) students with symptoms of psychosis, previous systematic reviews about PS students with symptoms of psychosis and mental illness in general, the aim of the thesis and research objectives, and the layout of the thesis.

Introduction

There has been a recent surge in mental health issues among PS students (Storrie, Ahern, & Tuckett, 2010), accompanied by international research efforts to address these concerns (Eisenberg, Hunt, & Speer, 2013). Cross-national research carried out by the World Health Organization through the World Mental Health Survey Initiative revealed that 20% of PS students had a mental health disorder (Auerbach et al., 2016). High prevalence rates of mental health problems are found among university students, for example, McLafferty and colleagues (2017) reported that the lifetime prevalence rate for major depressive episode and generalized anxiety disorder among 739 university students was approximately 24% and 23% respectively.

With media attention, experts have highlighted the mental health crisis facing Canada's PS institutions and called for investments in prevention and early intervention (Liptrap, 2018). According to a survey of 43,780 students from 41 Canadian PS institutions, approximately 20% of students are diagnosed and/or treated by a health care professional for anxiety and 15% for depression (American College Health Association, [ACHA], 2016). In addition, 15% of students report 'tremendous stress' and experience difficulties with respect to academic expectations (58%), financial obligations (40%), and sleep (37%) (ACHA, 2016). In one study, 2,279 graduate students from 26 countries and 234 institutions had rates of depression and anxiety six times higher than the general population, with 41% of graduate students having moderate to

severe anxiety, and 39% of graduate students having moderate to severe depression, compared to six percent of the general population (Evans, Bira, Gastelum, Weiss, & Vanderford, 2018).

Furthermore, approximately 2% of Canadian PS students are diagnosed with and/or receive treatment for psychotic disorders such as bipolar disorder and schizophrenia (ACHA, 2016). Psychosis can be broadly defined as loss of contact with reality (American Psychiatric Association [APA], 2000), and manifests as experiencing hallucinations, delusions, and disorganization of thoughts, behaviours, and/or speech (National Institute of Mental Health, 2016). Beyond the Canadian context, researchers have investigated PS students who experience symptoms of psychosis. One study in Italy assessed the prevalence of hallucination-like experiences in 649 undergraduate college students and found that approximately 19% of students experienced multisensory hallucination-like experiences, including auditory and visual hallucination-like experiences (Preti et al., 2014). In another study, researchers assessed psychotic-like experiences in 2,963 Kenyan students and determined that 23% reported having at least one psychotic-like experience (Ndeti et al., 2012).

Mental health services within PS institutions should be equipped for all student mental health needs; yet deficits are consistently reported. For example, in Alberta, a survey of PS institutions revealed that many do not have initiatives aimed at helping students with mental health issues and few have promotion or outreach programs for students diagnosed with mental disorders (Heck et al., 2014). Services that are available are shown to have inadequately trained staff, inconsistent practices regarding the use of diagnostic and assessment tools, poor referral procedures, and substandard treatment planning (Mowbray et al., 2006). There is little doubt that these issues have contributed to poorer educational outcomes, such as higher dropout rates (Hunt, Eisenberg, & Kilbourne, 2010), poorer participation in education, and less satisfaction

with academic pursuits (Roy, Rousseau, Fortier, & Mottard, 2016). Furthermore, mental health services vary among PS institutions. Using the University of Ottawa as an exemplar, services may include counselling, psycho-educational groups, individual, couple, or family therapy, and provision of links to community resources (e.g. referral to a community mental health program, hospital program, etc.) (University of Ottawa, n.d.a). As the demand for these services continues to grow, developing an integrated, community-based system with partnerships between PS institutions, student associations, health care providers, and community organizations is paramount.

Existing Systematic Reviews

As part of this thesis, I conducted a preliminary search of the literature with the intent to examine the range and nature of research activity about PS students who experience symptoms of psychosis. I used keywords post-secondary, student, and psychosis in the online databases PsycINFO, CINAHL, and Pubmed; I also searched Google Scholar using the same keywords. To date, there appears to be two systematic reviews on PS student mental health. Both systematic reviews synthesized literature on mental illness in adolescents and/or young adults. Below is a summary of the findings.

The first review was a Joanna Briggs Institute (JBI) qualitative systematic review by Woodgate and colleagues (2017). Fifty-four research papers were included between the dates of 1993 and 2015, with the majority originating from the United States, United Kingdom, Australia, and Canada. Although this review used rigorous methods, one limitation I identified was that authors did not assess publication bias. The authors investigated the meanings young people assign to living with mental illness and how they manage their health. The following questions were addressed: “What meanings do young people with mental illness assign to living with

mental illness?” “What are young peoples’ experiences of living with mental illness, and what is the impact of mental illness on their lives?” and “What helps and what hinders young people with mental illness to manage their health and lives?” (Woodgate et al., 2017, p. 278). The synthesized experiences of adolescents aged 13-24 diagnosed with any mental disorder revealed that participants felt uncomfortable in their body and the world, commonly feared rejection by family or peers, used a variety of strategies to cope with mental illness, and encountered challenges when seeking mental health services. Although this review explored the experiences of young people experiencing mental disorders, it was not specific to PS students, nor was it specific to symptoms of psychosis.

The second systematic review was conducted by Storrie and colleagues (2010) and aimed to critically appraise the peer-reviewed literature regarding overall emotional and mental health problems experienced by university students and outlined recommendations for improving mental health services on campus. This review included 11 research papers between the dates of 2000-2009, with the majority of papers originating from the United States, United Kingdom, and one from Australia. The authors included four databases in the systematic search, but did not use additional sources such as grey literature to search for studies. Furthermore, they did not identify inclusion or exclusion criteria, nor did they describe data extraction or synthesis methods, and the likelihood of publication bias was not assessed. Despite these limitations, the authors concluded that anxiety, depression, and psychotic disorders were major problems experienced by PS students, and common barriers for seeking help included stigma from having a mental illness and individual characteristics, such as low emotion management skills and high psychological distress. The authors also reported that although the prevalence of emotional problems in this

population has increased steadily since 1994, available help within PS institutions is decreasing, partly due to less funding and lack of available resources.

When considering these reviews together, we see that while a synthesis of experiences of mental illness in adolescents and adults exists, as does a synthesis of these experiences in PS students, there is no systematic exploration of the experiences of PS students with specific mental disorders. It is well known that mental health symptoms vary depending on the type of mental disorder, and that these symptoms present inconsistently among affected individuals. Some symptoms of mental illness can alter thinking, perceptions, and consciousness about the self and others (Malla, Joober, & Garcia, 2015). Psychotic disorders, for example, are known to present during adolescence and early adulthood (Pedrelli, Nyer, Yeung, Zulauf, & Wilens, 2015) and can severely impact social and psychological development, relationship skills, attainment of education goals, and overall quality of life (Shi et al., 2017a).

Aim of Thesis and Research Objectives

The aim of this study was to conduct a mixed-methods systematic review to synthesize research to date on risk factors and interventions for PS students with symptoms of psychosis, and to explore the experiences of these individuals.

The specific objectives were:

- 1) To describe the socio-demographic, clinical, and service-use characteristics of PS students across all included studies.
- 2) To identify the prevalence of PS students with symptoms of psychosis across all included studies.

- 3) To identify and describe factors associated with the development of symptoms of psychosis in PS students.
- 4) To assess the effectiveness of interventions for PS students with symptoms of psychosis.
- 5) To explore the experiences of PS students with symptoms of psychosis.

A rigorous synthesis of prevalence, risk factors, interventions, and the experiences of PS students with symptoms of psychosis is needed to underpin delivery of healthcare and services for this population. A synthesis of risk factors will provide a comprehensive picture of what may contribute to the development of symptoms of psychosis in PS students and equip individuals involved in the students' lives (e.g. relatives, clinicians, administrators, educators, and others) with information needed to recognize risk factors early. Knowledge of risk factors may also help tailor interventions for students as they experience symptoms of psychosis. It is well known that it is crucial to initiate interventions early in the illness trajectory, to prevent or delay the onset of more severe symptoms and to reduce the social and economic burden of living with chronic psychosis (Kidd, Kaur, Virdee, George, McKenzie, & Herman, 2014; Shi et al., 2017a). A synthesis of interventions studied to date will provide a picture of what is tested in this population, and what gaps need to be addressed in this area. Finally, it is important to characterize and understand the unique perspectives and life experiences of PS students who have symptoms of psychosis, in order to achieve an in-depth understanding of factors influencing their experiences. This knowledge will shed light on their perspectives, experiences, and journey throughout the course of illness.

Thesis Layout

This thesis is composed of five chapters:

- 1) Chapter One is an introduction to the thesis topic, including the aim of the study and research objectives, as well as the layout of the thesis;
- 2) Chapter Two describes the theoretical underpinnings of the study, including paradigmatic stance, concepts, and conceptual frameworks used to guide and inform the study;
- 3) Chapter Three describes the methods used in the study, including the thesis design, data collection procedures, search strategy, selection criteria, screening process, methodological quality assessment, data extraction, and data analysis procedures. The integrated knowledge translation portion of the systematic review will be woven throughout the chapters;
- 4) Chapter Four describes the results of the systematic review according to each objective;
- 5) Chapter Five presents a summary of the findings and the integrative discussion. This includes identifying key findings, discussing the strengths, limitations and implications of the study, and providing concluding thoughts. Chapter Five is followed by a bibliography and appendices including additional results tables, figures, and documents.

Chapter Two: Theoretical Underpinnings, Concepts, and Conceptual Frameworks

Paradigm

Paradigms are sets of philosophical underpinnings that provide a lens or framework to guide research inquiries and approaches (Weaver & Olsen, 2006). They can further be defined as “the basic belief system or worldview that guides the investigator, not only in choices of method, but in ontologically and epistemologically fundamental ways” (Guba & Lincoln, 1994, p. 105).

Ontology refers to the nature of reality and what can be known about it, whereas epistemology refers to the nature of the relationship between the knower and what can be known (Guba & Lincoln, 1984). Historically, scientists prioritized the quantification of data, as demonstrated by the prolific use of the positivist paradigm during the 19th century (Guba & Lincoln, 1994).

Scholars in the 20th century including Hempel, Popper, Kuhn, Lakatos, and Laudan challenged the assumptions of this paradigm, recognizing that it is impossible to discover ultimate truths and separate fact from theory (Gortner, 1993; Letourneau & Allen, 1999). Consequently, a “paradigm shift” occurred, a term coined by Thomas Kuhn (1970), in which the postpositivist paradigm was born. Since then, four major paradigms that have been used for nursing research include: postpositivism, constructivism, critical theory, and pragmatism (Weaver & Olsen, 2006).

This study is designed as a mixed-methods systematic review, to synthesize scientific literature relevant to the outlined objectives, therefore it is best aligned with the pragmatic paradigm. According to Onwuegbuzie and colleagues (2007), the primary philosophy of mixed-methods research is pragmatism. It is pertinent to note that I am not doing a systematic review of mixed-methods studies, but rather, I will be including qualitative, quantitative, and mixed-methods studies in my review and will analyze data separately. Mixed-methods research is an

approach to theory and practice that considers multiple viewpoints, perspectives, positions, and standpoints of qualitative and quantitative research (Onwuegbuzie, Johnson, & Turner, 2007, p. 113). This approach allows the researcher to use both quantitative and qualitative data from a variety of sources to address the outlined objectives. The pragmatic stance provides the flexibility to use the most appropriate methodology and procedures based on the objectives of the research inquiry. Ormerod (2006) described pragmatism as a paradigm that “emphasizes the uncertainty and changing nature of findings” (p. 905). Pragmatism offers an alternative lens to guide research, rather than prescribing to a singular paradigm such as post-positivism, constructivism, critical theory, or others; yet it does not present an entirely encompassing worldview (Biesta, 2010). Instead, pragmatism breaks down the opposing worldviews of post-positivism and constructivism in order to look at what is meaningful from both (Biesta, 2010). Mixed-methods systematic reviews may have to integrate research studies that have differing paradigmatic stances, which is a consideration to acknowledge within my own mixed-methods systematic review.

The pragmatic paradigm posits that quantitative and qualitative research are compatible and may be combined within a single study, that phenomena should be assessed in terms of their empirical and practical outcomes (Johnson & Onwuegbuzie, 2004), and that the research questions and objectives should drive the methodology (Pansiri, 2005). Pragmatism is outcome-oriented (Johnson & Onwuegbuzie, 2004) and focused on creating practical solutions to real problems (Shannon-Baker, 2016). This paradigm is also characterized by communication, shared meaning-making, transferability to similar contexts or situations (Shannon-Baker, 2016), and joint action (Morgan, 2007). This is aligned with integrated knowledge translation, which seeks to address practice gaps by using the best evidence, as well as collaborating with relevant

knowledge users to make research findings more applicable and transferable to their contexts (Canadian Institute of Health Research [CIHR], 2014).

The pragmatic researcher maintains both subjectivity in their own reflections about the research and objectivity in data collection and analysis (Shannon-Baker, 2016), which is compatible with the creation of a systematic review protocol prior to gathering and synthesizing research evidence. Pragmatism emphasizes complementarity, meaning qualitative and quantitative approaches can be combined to balance both the advantages and disadvantages of each (Shannon-Baker 2016). Data synthesis will occur using a pragmatic lens with the aim of creating results and recommendations to inform policy and practice (Hannes & Lockwood, 2011). While the results will help individuals understand risk factors, interventions, and the experiences of PS students with symptoms of psychosis, they will not dictate what clinicians or administrators do in their practice (Hannes & Lockwood, 2011).

Furthermore, the practice of using multiple research methods within a pragmatic lens involves triangulation, which was described by Denzin (1970) as combining two or more theories, data sources, or methods in the study of a single phenomenon. Data triangulation (the use of a variety of sources in a study), as well as between-method triangulation (use of both quantitative and qualitative approaches) (Denzin, 1978) was employed in this research study. According to Denzin (1978), who first outlined how to triangulate methods, using multiple forms of data and mixed study designs when exploring a phenomenon limits potential biases pertaining to data source, investigator, or methodological approaches. Advantages of triangulation include improving confidence in research results, the development of creative ways to collect data, the production of ‘thicker and richer’ data, and the ability to uncover contradictions (Jick, 1979) – all of which are relevant to the proposed research inquiry. Although quantitative and qualitative data

were synthesized separately, the results of each synthesis procedure will complement each other and will be integrated in the discussion to provide a more comprehensive understanding of the topic.

Concepts and Theoretical Considerations

Post-Secondary Institution

Post-secondary institutions include universities, colleges, or institutes that can grant degrees, diplomas, certificates, or other qualifications through formal education (Government of Canada, 2017). In Canada, PS education is defined as the “highest level of educational attainment, [which] is an apprenticeship or trades certificate or diploma (including 'centres de formation professionnelle'); college, CEGEP or other non-university certificate or diploma; university certificate or diploma below bachelor level; or a university degree (bachelor's degree; university certificate or diploma above bachelor level; degree in medicine, dentistry, veterinary medicine or optometry; master's degree; earned doctorate)” (Statistics Canada, 2010, para. 1). People attend PS institutions after completing high school, with the aim of attaining degrees, diplomas, certificates, or other qualifications in pursuit of careers or other goals. The term “post-secondary institution” is a common term used within the Canadian context, but other synonymous terms exist, including universities, colleges, vocational schools, trade schools, as well as the umbrella term of higher education.

It is important to think about PS students who experience symptoms of psychosis within the context of PS institutions, as mental health can be viewed not only at the individual level, but also at systemic, contextual, and political levels. PS institutions are communities or settings with established infrastructures to facilitate academic achievement (Versaevel, 2014). They are complex organizations with objectives and standards related to teaching, research, and service

(Sporn, 1996). PS institutions are also vulnerable to their political, economic, social, and technological environments, and governmental regulations can greatly affect the primary functions of PS institutions (Sporn, 1996). Anecdotally, as shared by knowledge users apart of this study, the infrastructure and culture within a particular PS institution may have an impact on academic achievement, physical health, mental well-being, and students' overall experiences.

Furthermore, there are many forms of culture within PS institutions. In the context of a PS institution, culture may include ideas, customs, and social behaviour of people within a society, as well as the attitudes and behaviour characteristics of social groups (English Oxford Dictionary, 2018). Academic culture is the “external manifest of the common values, spirits, behaviour norms of people on campus who are pursuing and developing their study and research” (Shen & Tian, 2012, p. 61). Culture is evident through the rules and regulations in place, people's views about academic activities, supports, attitudes, and evaluation mechanisms within PS institutions (Shen & Tian, 2012). Activities on campus that focus on teaching and scientific research in pursuit of specialized knowledge and promotion of learning are the main features of PS education, which distinguish PS institutions from other subcultures in society (Shen & Tian, 2012). During their PS studies, students are able to develop their imagination, creativity, and wisdom by producing and reproducing the culture of their PS institution (Shen & Tian, 2012). These experiences are integral to the shaping of students' academic pursuits, lifestyles, and values, thus having an influence on overall student well-being.

PS institutions also house a variety of support services for students, such as peer support programs, recreation facilities, sports, social groups and societies, and health promotion activities. For example, as discussed by knowledge users apart of this study, the University of Ottawa offers a range of services for all students, including recreational activities, health

promotion programs, counselling and coaching, pet therapy, student academic success services, and sexual violence support and prevention programs, among others. Health services are also available, which encompass prevention and early identification of illness, treatment, care, and support for acute and chronic management of illness. Although specific health services vary between PS institutions, examples of services include walk-in clinics, sports medicine clinics, physiotherapy and massage, addiction medicine, immunizations, sexually transmitted infection prevention and management, and mental health services (University of Ottawa, n.d.b). Mental health services aim to provide specialty care for students experiencing a range of mental health problems, from acute situational issues, to more chronic conditions such as anxiety and depression. Often, students can access psychiatric and psychological services, counselling, and referrals for other community resources and interdisciplinary clinicians (University of Ottawa, n.d.a).

Post-Secondary Student

In Canada, 2,034,957 students were enrolled in a university or college program during the 2015-2016 academic year (Statistics Canada, 2017), constituting approximately 17% of the overall population in 2016 (Statistics Canada, 2017). In the United States, enrollment in degree-granting PS institutions is about 20 million students (United States Department of Education, 2018). The transitional period from high school to PS education is a critical time when individuals gain independence (Brooks & Dubois, 1995), and face the challenges accompanying this independence. Young people entering adulthood often live an unsettled and unstable life as they test various possibilities for their future work and relationships before making long-term commitments (Berk, 2009; Tanner, 2006). PS students engage in exploration and forming of an adult identity, which is closely related to their interaction with significant others and the social

contexts within which they are embedded (Erikson, 1968; Stryker & Serpe, 1994) – such as a PS institution.

PS students have many competing demands that can take a toll on their mental health, including academic workload, financial strain, transient living accommodations, new social networks and social isolation, and other sources of conflict (Storrie et al., 2010). Academic demands of PS education require students to adapt to a new level of academic requirements (Campos, Oliveira, de Mello, & Dantas, 2017). Student entering PS education most often come from high school, where educational culture is different in many ways. For example, in a university setting, students need to be self-directed and independent, there is generally less individual attention given to students by educators, more hours devoted to homework, studying for exams, and completing assignments individually, grades may be based on a small number of essays, projects, and/or exams, students are responsible for time management and planning to meet academic deadlines and requirements, and failing to meet these requirements may result in withdrawal from a program (Western University, 2018).

From a financial perspective, PS students pay tuition for their education, but have limited time to work. Student debt in Canada totals approximately 28 billion dollars, and in the United States, this total is about 1.5 trillion dollars (Canadian Broadcast Corporation [CBC], 2017). For the 2017-2018 academic year, Statistics Canada reported an average increase of 3% in university tuition fees (CBC, 2017). Students report concerns about student debt, student loans, and how they will be able to manage life after school with lingering debt (Financial Post, 2018). A recent systematic review highlighted how financial strain, such as accumulating student debt, is associated with poorer student mental health (Fitch, Hamilton, Bassett, and Davey, 2011).

Finally, PS students are also faced with many social expectations, including forming new friendships and building relationships. Students without proper social supports and resources may experience loneliness, which affects self-identify and physical and mental development (Lin & Huang, 2012). A significant correlation exists between loneliness and learning burnout for students, indicating that a poor social network may lead to academic difficulties (Lin & Huang, 2012). Feelings of loneliness and learning burnout also negatively influence overall academic experiences (including engagement and performance) (Stoliker & Lafreniere, 2015), and peer social support is shown to have an effect on psychological responses to stressors (Chao, 2011). In a study comparing social support in students with subthreshold symptoms of psychosis, poor social support was associated with distress and self-stigma (Denenny, Thompson, Pitts, Dixon, & Schiffman, 2015).

The Continuum Model of Psychosis

The continuum model of psychosis posits that nonclinical populations (i.e. persons without a diagnosis) experience varying degrees of psychosis that do not reach full criteria for clinical psychosis (Johns & van Os, 2001). The continuum of psychosis is similar to a continuum of risk, with some individuals never experiencing psychosis and others experiencing sporadic episodes of varying frequency and severity of clinical psychosis (Escher, Romme, Buiks, Delespaul, & van Os, 2002; Johns & van Os, 2001; Smeets, Lataster, van Winkel, deFraaf, Ten Have, & van Os, 2012). Various terms are used in the literature that refer to elements of the psychosis continuum, including schizotypal personality disorder, schizotypy, psychoticism, aberrant salience, mild or non-specific symptoms (specifically subclinical psychosis, subclinical psychotic experiences, and psychotic-like experiences), prodromal symptoms (specifically attenuated psychosis syndrome, clinical high-risk, and ultra-high risk), first episode psychosis,

and clinical diagnosis of a psychotic disorder. Below is a description of all terms, although PS students with schizotypal personality disorder, schizotypy, psychoticism, and aberrant salience were not included in this systematic review.

Schizotypal personality disorder.

As per the DSM-5, schizotypal personality disorder (SPD) is characterized by a pervasive pattern of social and interpersonal deficits, cognitive or perceptual distortions, and eccentricities in behaviour (APA, 2013). Personality traits may include suspiciousness, interpersonal aloofness, paranoid ideation, magical thinking, unusual perceptual experiences, and odd thinking and speech (APA, 2013). SPD is noted in the DSM-5 to be part of the schizophrenia spectrum and may be related to psychotic disorders or may be present in individuals with psychotic disorders (APA, 2013), however the diagnostic criteria for SPD differs from psychosis or psychotic disorders.

Schizotypy.

Schizotypy is a personality measure of psychosis proneness (Andorko et al., 2017) and is described as a “multidimensional construct that represents the underlying vulnerability to schizophrenia-spectrum psychopathology that is expressed across a broad range of personality, subclinical, and clinical phenomenology” (Kwapil & Barrantes-Vidal, 2014, p. 368). Schizotypy as a construct is broad in nature because it encompasses a spectrum of conditions – including schizophrenia, personality disorders, psychotic disorders, and subclinical expressions of psychopathology (Mason & Claridge, 2015). Schizotypy is used in research with non-clinical samples to investigate the etiological and developmental risk factors correlated with schizophrenia-spectrum psychopathology. Schizotypy is not synonymous with the prodromal phase of psychosis, which is a common misunderstanding. Instead, the present operationalization

of schizotypy implies that most individuals labeled as “schizotypes” do not develop schizophrenia-spectrum disorders (Kwapil & Barrantes-Vidal, 2014). Measuring schizotypy in non-clinical samples may provide an understanding of the mechanisms underlying the development of schizophrenia-spectrum disorders but does not necessarily indicate that an individual is experiencing symptoms of psychosis or has a psychotic illness.

Psychoticism.

Psychoticism was first proposed by Eysenck in 1952 as a personality dimension ranging from high empathy, cooperativeness and sociability, to psychopathology and psychosis (Eysenck, 1952). Psychoticism is a general construct that has been measured in clinical and non-clinical samples and may be a potential risk factor for psychosis-proneness (Rishnadas, Palaniyappan, Lang, McLean, & Cavanagh, 2014) and other types of psychopathologies. Psychoticism is a general construct that may be used to identify individuals at risk for developing a broad range of psychopathologies and does not necessarily indicate an individual is experiencing symptoms of psychosis.

Aberrant salience.

The aberrant salience hypothesis of schizophrenia is beyond the scope of this review; however, it is important to differentiate this concept from the concepts previously mentioned. Aberrant Salience is the “unusual or incorrect assignment of salience, (or significance) or importance to otherwise innocuous stimuli” (Cicero, Kerns, & McCarthy, 2010, p. 1), and has been hypothesized to be a mechanism, or risk factor, for the development of psychosis, (Bernardini et al., 2018; Cicero et al., 2010; Kapur, 2003). Aberrant salience is frequently reported during the prodromal phase of first-episode psychosis (Lelli et al., 2015; Moller & Husby, 2000; Yung & McGorry, 1996), when individuals experience periods where stimuli that would not usually

interest them become more significant (Cicero et al., 2010). These individuals also have heightened senses, an increased sense of meaning, heightened cognitive abilities, and an intensified sense of emotionality (Cicero et al., 2010). Aberrant salience is thought to explain the development and maintenance of delusions (a symptom of psychosis) (Cicero et al., 2010). The theory posits that as individuals attempt to rationally explain the aberrant feelings of salience, they may come to delusional conclusions and develop psychotic-like experiences or psychosis (Cicero, Docherty, Becker, & Kerns, 2015). Aberrant Salience has been studied as a risk factor but does not necessarily indicate that an individual is experiencing symptoms of psychosis.

Mild or non-specific symptoms.

Psychotic-like experiences, subclinical psychotic experiences, subclinical psychosis.

These terms are used in the literature to describe parts of the general population who experience varying degrees of psychotic-like experiences (PLEs) that do not necessarily reach the clinical criteria for psychosis (Johns & van Os, 2001). The continuum model of psychological disorders purports that individuals who experience psychotic experiences, such as hallucination or delusions, experience psychosis on a continuum, meaning that nonclinical individuals may have milder forms of psychosis with less frequency than clinical forms of psychosis (Johns & van Os, 2001; van Os & Kapur, 2009; Verdoux & van Os, 2002). For example, in one study, 30 to 70 percent of college students reported that they have heard voices at least one in their lives (Stip & Letourneau, 2009), revealing that non-clinical populations experience PLEs, including hallucinations and delusions. Those who have higher levels of PLEs may be at increased risk for developing clinical psychosis, or a psychotic disorder (Barnes, 2011). While PLEs in the general population are mostly transient, a proportion do evolve into psychotic disorders, as evidenced by

a meta-analysis which found that PLEs in healthy people predict future onset of psychotic disorders (Kaymaz et al., 2012).

Signs of psychosis are often present before a psychotic illness fully develops (Walker et al., 2004), and most signs are subtle and do not reach the clinical threshold of being a clinical disorder (Barnes, 2012). Individuals who experience this may be considered prone to psychotic features, experiencing sub-clinical psychotic experiences or psychosis, or have prodrome symptoms and are the earliest manifestations of psychosis (Barnes, 2011). Approximately one-third of individuals who meet the clinical high risk for psychosis will transition to full psychosis within two years (Cadenhead & Mirzakhani, 2016). Subclinical psychosis is part of the psychosis continuum (Murphy, Shevlin, Houston, & Adamson, 2012), common in the general population, and phenotypically and dimensionally similar to severe psychotic experiences (Nuevo et al., 2012; Stefanis et al., 2002). Authors of a meta-analysis reported that across all included studies, subclinical psychotic experiences strongly predicted transition into clinical psychosis (Kaymaz et al., 2012).

Prodromal symptoms.

Attenuated psychosis syndrome.

Psychosis risk syndrome was re-labelled as attenuated psychosis syndrome (APS) in the DSM-5, and this indicates that a person is experiencing psychotic-like symptoms that are below a threshold for meeting a clinical diagnosis of a psychotic disorder (APA, 2013). It is not a clinical diagnosis (Xu, Zhang, & Wang, 2015), but is a symptomatic transition state leading to clinical psychosis (Cheng & Schepp, 2016). APS is not necessarily a subtype of schizophrenia spectrum disorder, but this label exists to allow for early identification of people at risk for psychosis, with the aim of implementing early intervention and treatment (Xu, Zhang, & Wang, 2015). A

common element for meeting criteria for APS is that an individual seeks treatment to relieve distress associated with psychotic-like experiences (Xu, Zhang, & Wang, 2015). This is the “early phase” of psychosis, the time when it is important to identify individuals to ensure they engage with the health care system (Ma et al., 2010). Individuals labelled with APS will not necessarily develop a psychotic disorder but are at increased risk for developing a psychotic disorder (Xu, Zhang, & Wang, 2015). Studies of psychosis risk syndrome have focused primarily on young people (Addington et al., 2015). In a study by Addington and colleagues (2015), the average age of individuals presenting with clinical high risk for psychosis was approximately 19 – the age at which many first-year students enter into PS education.

Clinical high risk or ultra high risk for psychosis.

Identifying individuals as having clinical high risk (CHR), also referred to as ultra high risk (UHR), are used to detect persons at risk of developing psychosis in the short or medium term, and to try and provide early interventions and treatment in order to prevent transition to clinical psychosis (Tor et al., 2018). These individuals are at an elevated risk for developing psychosis or psychotic disorders (Yung, 2017). UHR describes individuals who are in the pre-psychotic phase, presenting with prodromal signs and symptoms. These signs and symptoms of psychosis are related to several outcomes, including the development (or no development) of a psychotic disorder (Fusar-Poli et al., 2013). UHR criteria are widely applied in the literature (Fusar-Poli et al., 2013); these criteria include “the presence of 1 or more of the following: attenuated psychotic symptoms (APS), brief limited intermittent psychotic episode (BLIP), and trait vulnerability plus a marked decline in psychosocial functioning (genetic risk and deterioration syndrome [GRD]) and unspecified prodromal symptoms (UPS)” (Fusar-Poli et al., 2013, p. 4). The ability to detect

individuals at UHR has important implications for early detection and intervention (Fusar-Poli et al., 2013).

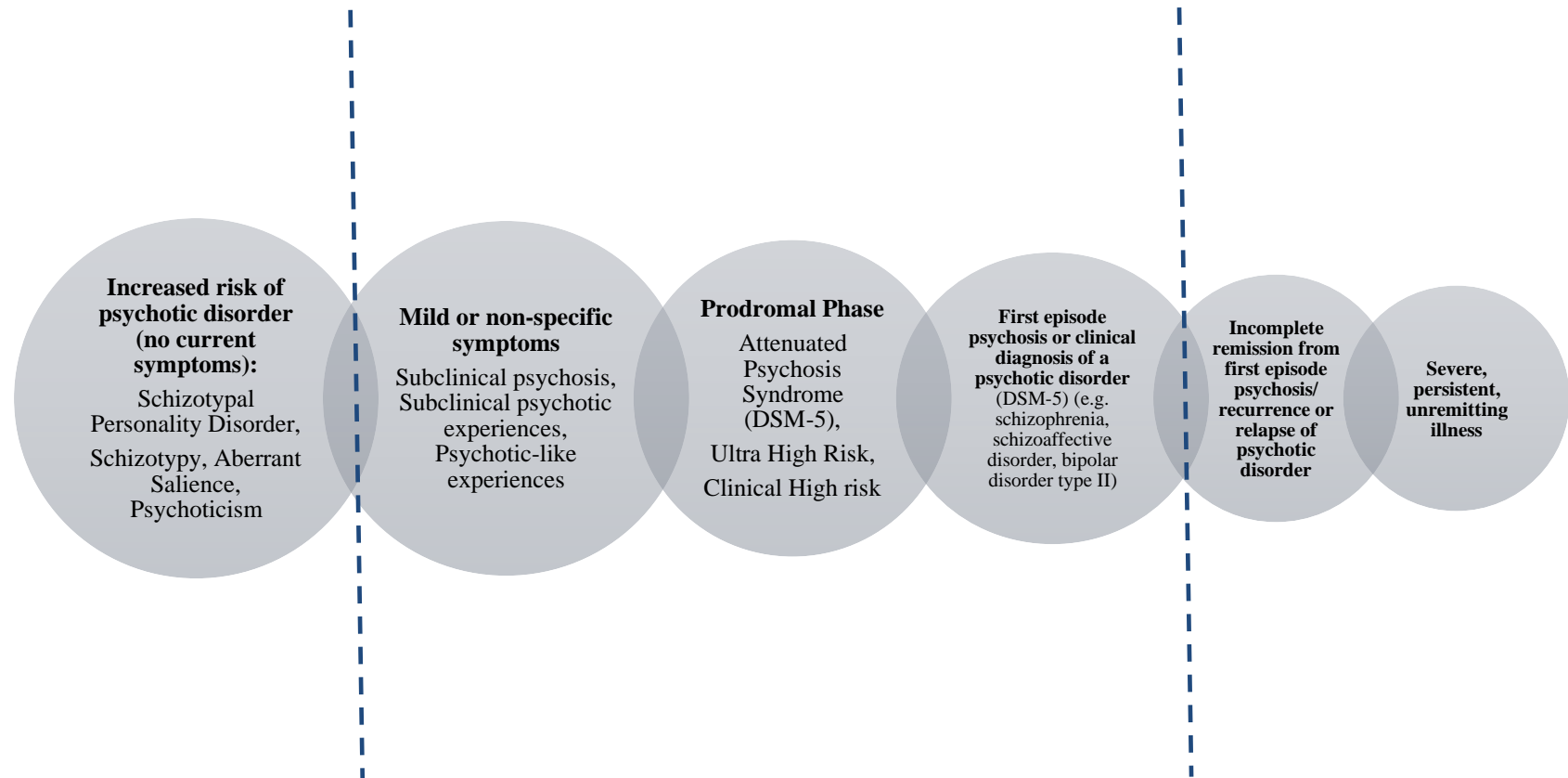
First episode psychosis and clinical diagnosis of psychotic disorder.

Psychosis is a thought disorder which can be broadly defined as loss of contact with reality (APA, 2000). Psychosis is characterized by delusions, hallucinations, and/or disordered thinking, behaviours, and/or speech (Halter, 2014). These symptoms are specific in nature and quality and occur along a spectrum (Bhati, 2013). Delusions are fixed, false beliefs a person holds that are incongruent with reality, and hallucinations refer to a sensory experience or perception for which no external stimulus exists (Halter, 2014). The term “psychotic” refers to the presence of certain symptoms, and varies according to the combination, duration, and severity of symptoms (APA, 2000). Therefore, symptoms of psychosis vary according to individual presentation and psychiatric diagnosis. Psychosis may present subtly, making it difficult to differentiate a psychotic state from a normal mental state in some individuals (Heckers et al., 2013).

First episode psychosis is marked by full threshold of psychosis with moderate to severe symptoms, neurocognitive deficits and functional decline (Jackson & McGorry, 2009). If symptoms do not resolve, a person may develop incomplete remission from first episode or recurrence or relapse of psychotic disorder, and beyond that, severe, persistent, and unremitting illness (Jackson & McGorry, 2009). Psychotic disorders are defined by the level, number, and duration of psychotic signs and symptoms. A diagnosis of severe psychotic disorder is formulated after mental status assessments and elimination of other etiological factors, such as substance use or medical illness (Heckers et al., 2013). As per the DSM-5, the five key symptoms of psychotic disorders include: delusions, hallucinations, disorganized speech, disorganized or catatonic behaviour, and/or negative symptoms (APA, 2013). In the DSM-5, two

of these five symptoms must be present and at least one symptom must be delusions, hallucinations, or disorganization to meet diagnostic criteria for a psychotic disorder (APA, 2013). As per the DSM-5, there are both chronic psychotic disorders (e.g. schizophrenia and schizoaffective disorder), and time-limited psychotic disorders (e.g. brief psychotic disorder and schizophreniform disorder) (APA, 2013). Other mental disorders may present with psychotic symptoms, such as delirium, Alzheimers, or major depressive disorder with psychotic features (APA, 2000). Refer to Figure 1.0 below for a conceptual diagram of the identified concepts related to psychosis.

Figure 2.0 - Conceptual Diagram of the Identified Concepts Related to Psychosis (Adapted from Jackson & McGorry, 2009)



Diathesis-Stress-Model of Schizophrenia

The Diathesis Stress Model of Schizophrenia, also referred to as the “neural diathesis-stress” model of psychosis was first proposed by Walker and Diforio in 1997, which was later updated by Walker and colleagues (2008) to incorporate subsequent empirical findings (Pruessner, Cullen, Aas, & Walker, 2017). Pruessner and colleagues (2017) further updated the model by incorporating research on stress neurobiology, including the role of stress and the hypothalamic-pituitary-adrenal (HPA) axis. The HPA axis is made up of the hypothalamus, pituitary gland, and the adrenal glands, which all interact through a complex set of positive and negative feedback systems to control regulation of body processes (including responses to stress, immunity, and fertility) (Demorrow, 2018). Commencing early in life (as early as conception), proponents of this model endorse that a range of genetic and environmental factors (in isolation or combined) increase vulnerability to developing psychosis (Pruessner et al., 2017). Psychiatric disorders, then, result from a combination of genetic predisposition and psychological or environmental stressors (i.e. risk factors) (Halter, 2014), which interact in complex ways in the development of mental illness – including psychotic disorders (Halter, 2010). Although there appears to be no concrete definition for each risk factor category within the Diathesis Stress Model of Schizophrenia, there are descriptions of each, and are broken down into the following categories and sub-categories:

- 1) Genetic predisposition: includes inherited risk alleles and genetic mutations, and genes that are relevant to HPA axis function (e.g., FKBP5 and BDNF) (Pruessner et al., 2017).
- 2) Brain structure abnormality: it is theorized that structural abnormalities in the brain may disrupt functioning, such as in schizophrenia. Factors may include enlarged lateral cerebral ventricles, a dilated third ventricle, ventricular asymmetry, or a combination of

these. Other structural abnormalities include: reduced cortical, frontal lobe, hippocampal, or cerebellar volumes, increased size of the sulci (fissures) on the surface of the brain, or a combination of one or more of these (Halter, 2014).

- 3) Neurobiological: this may include factors associated with the dopamine theory, serotonin theory, and glutamate theory (all are thought to play a role in the development of psychotic disorders such as schizophrenia), or a combination of one or more of these (Halter, 2014).
- 4) Early life adversity factors: includes, but are not limited to, pre-, peri-and post-natal stress and insults, childhood trauma, poor parental bonding (Pruessner et al., 2017). Pre-natal stressors may include a history of pregnancy or birth complications (viral infection, poor nutrition, hypoxia, and exposure to toxins, or psychological trauma to the mother during pregnancy).
- 5) Chronic or repeated stress: these can further be broken down into environmental or psychological stressors (Pruessner et al., 2017).
 - a) Psychological stressors: stressful life events, substance use (Pruessner et al., 2017), developmental stressors, family stressors, social stressors, physical stressors, and exposure to psychological trauma (Halter, 2014).
 - b) Environmental stressors: factors may include social adversity (living in chronic poverty and/or high-crime areas), migration to and/or growing up in a foreign culture (Halter, 2014), low socio-economic status, ethnic minority status, or city living (Pruessner et al., 2017).

Transitions

Students attending PS institutions who develop symptoms of psychosis may be experiencing one, or multiple transitions. Transitions, as a human phenomenon, is defined as “a passage from one life phase, condition, or status to another” (Chick & Meleis, 1986, p. 239), and is a process triggered by change (Meleis, 2010). Transition refers to both the process and outcome of complex person-environment interactions and is embedded in both context and situation (Chick & Meleis, 1986). Transitions occur when a person’s reality is disrupted, and this experience is linked to the changing of one’s self-identify (Kralik, Visentin, & Van Loon, 2006). There are four types of transitions, as outline by Meleis’s Transitions Theory, including developmental, situational, health-illness, and organizational transitions (Schumacher & Meleis, 1994). Human developmental transitions are complex and dynamic and involve biologically determined stages of growth throughout the lifecycle (including cognitive and physical) (Meleis, 2010). They may also involve unpredictable events, which induce changes that influence a person’s health and behaviour (Hattar-Pollara, found in Meleis, 2010). Situational transitions include changes in educational and professional roles, family situations, or relocation to a new environment (Meleis, 2010) – such as attending a PS institution in a new city. Health-illness transitions refer to the development of acute or chronic illness or a person’s journey through the recovery process (Meleis, 2010). Lastly, organizational transitions refer to changes in policies, practices, professions, or communities (Meleis, 2010). The first three types help to conceptualize the transitions experienced by PS students with symptoms of psychosis.

Transitions may produce profound changes in the lives of individuals and have important implications for health and well-being (Schumacher & Meleis, 1994). Changes in health and illness trigger the transition process, and individuals tend to be more vulnerable to risks that may

impact health during transitions (Bohner, 2017). It is assumed that transitions have interrelated biological, psychological, social, and cultural dimensions (Bohner, 2017). People may experience multiple transitions at once that are related or unrelated to each other, can occur in a parallel or overlapping manner, and be simultaneously or sequentially lived (Meleis, 2010). When relating this to my population of interest, we see that symptoms of psychosis usually manifests in adolescence or early adulthood (Halter, 2014), which illustrates how a developmental transition might trigger a health-illness transition. Similarly, a situational transition, such as attending a PS institution, may trigger a health-illness transition, such as the development of symptoms of psychosis. Transitions have been described as non-linear, meaning they are ongoing processes with movement in many directions (Meleis, 2010). This notion is congruent with the fluctuating course of psychotic disorders described by students who experience both deteriorating and recovering phases of illness (Sung & Puskar, 2006).

Summary and Integration of Concepts

One in five Canadians will experience a mental health or substance use problem in any given year (Smetanin et al., 2011), with people aged 15-24 most at risk (Pearson, Janz, & Ali, 2013). In fact, the prevalence of mental illness is up to 39% in persons aged 15-21, which corresponds to when many students begin PS education (Mowbray et al., 2006). Psychosis typically manifests in late adolescence or early adulthood and can disrupt social and psychological development, which impairs quality of life and attainment of educational goals (Shi et al., 2017a). Adolescents and young adults with psychosis risk syndrome show similar impairments in cognitive and social functioning and are at higher risk for developing a psychotic disorder such as schizophrenia (Xu et al., 2015). Early identification and intervention is needed to alter the course of illness and improve treatment outcomes (Ma et al., 2010).

Although heredity contributes to the development of psychosis, onset is often associated with environmental factors, which affect the developing brain during sensitive periods (van Os, Kenis, & Bart, 2010). Social environments are also linked to the development of psychosis (Kuipers et al., 2006). In one study, authors reported that family support and supportive social environments are associated with reduced positive symptoms of psychosis (Norman et al., 2005), while other authors conclude that psychosocial stress is associated with an increased risk for developing psychosis (van Winkel, Stefanis, & Myin-Germeys, 2008). The numerous environmental and psychological stressors associated with attending a PS institution, including financial issues, academic expectations, living away from home, and being in a new social environment, place vulnerable persons at risk for developing a psychiatric illness (Mowbray et al., 2006). As a result of experiencing psychiatric symptoms, including hallucinations and paranoia, students' may have difficulty with concentration, memory, motivation, decision-making, stress, and organizational skills, which affect their academic progress, including class attendance, class participation, note-taking, completing assignments, taking examinations, and engaging in group work (Markoulakis & Kirsh, 2013).

Various risk factors related to the development of mental illness in PS students have been cited in the literature – including lower socioeconomic status (Cuellar & Roberts, 1997; Eisenberg, Gollust, Golberstein, & Hefner, 2007; & Weitzman, 2004), relationship stressors (Blanco, Okuda, & Wright, 2008) and limited social supports (Blanco et al., 2008; Hefner & Eisenberg, 2009). Risk factors for development of mental illness may be understood in the context of how pre-existing individual vulnerabilities interact with environmental and cultural factors within the PS institution setting (Hunt & Eisenberg, 2010). The complex interaction of risk factors, including biological (e.g. genetic predisposition, growth and development)

psychological (e.g. academic and financial stress), and environmental stressors (e.g. relocation to a new city or attending a new PS institution) may trigger a health-illness transition (i.e. symptoms of psychosis) in a PS student.

The transitions students experience are akin to the description by Martin-McDonald and Biernoff (2002): "...rites of passage occur when there is a transition in cultural expectations, social roles, and status and/or condition or position, interpersonal relations, and developmental or situational changes to being in the world" (p. 347). Faced with new challenges such as academic demands, financial strain, social expectations, increased autonomy, construction of a new self-identity as one becomes an adult— all within a new environment and culture —PS students experience many transitions when integrating into a PS institution. For PS students with symptoms of psychosis, three forms of transition may occur: 1) the developmental transition from adolescence to adulthood; 2) a situational transition into PS education and moving away from one's family and social supports; and 3) a health-illness transition with the development of symptoms of psychosis. As mentioned previously, these transitions might occur simultaneously or sequentially, where one transition triggers another (Meleis, 2010).

In conclusion, multiple factors must be considered when conceptualizing PS students who experience symptoms of psychosis. The interplay of undergoing transitions (e.g. being in a new PS school environment), having pre-existing risk factors (e.g. genetic vulnerability) and potential exposure of additional risk factors in the PS school setting (e.g. substance use, financial stressors) may lead to the development of symptoms of psychosis in PS students. Understanding the complex interactions of these concepts guided my thinking throughout the research process, aided in understanding the results and conclusions derived from this study, and informed recommendations to best suit the needs of this unique population. Incorporation of conceptual or

theoretical models or frameworks within systematic reviews helps guide the systematic review process and clarifies outcomes (Godfrey, Harrison, Graham, & Ross-White, 2010), however systematic review guidelines (e.g. PRISMA) do not stipulate mandatory use of models or frameworks (Moher et al., 2009). I used various concepts and conceptual models to guide my thinking around PS students who experience symptoms of psychosis, but these concepts were not necessarily used to dictate my results or discussion points.

Chapter Three: Methodological Considerations

Chapter three denotes the methods I used in my thesis research to conduct a systematic review of literature examining symptoms of psychosis in PS students. It also describes the integrated knowledge translation (iKT) portion of the systematic review, including relevant concepts related to iKT.

Thesis Design

The design chosen for this thesis is a mixed-methods systematic review guided by iKT principles and the Joanna Briggs Institute (JBI) methodology for mixed-methods systematic reviews (JBI, 2015). iKT is “...an approach to doing research that applies the principles of knowledge translation to the entire research process” (CIHR, 2014, p. 2) and is a model of collaborative research, where researchers work with knowledge users (KUs) throughout the entire research process, including identification of the research problem (Graham, Kothari, & McCutcheon, 2018), and involves KUs as equal partners alongside researchers with the premise of making research more relevant for KUs (CIHR, 2014, p. 2). I discussed my focus on risk factors, interventions, and experiences with relevant KUs, who emphasized the importance and need for this information to help guide clinical and administrative decisions about providing care and support to PS students experiencing symptoms of psychosis. The KUs also stressed how this project will raise awareness about psychosis for PS students themselves and clinicians working with this population. Qualitative, quantitative and mixed-methods studies were included in my review, and quantitative and qualitative data were analyzed separately. As stated previously, the specific research objectives included:

- 1) To describe the socio-demographic, clinical, and service-use characteristics of PS students across all included studies.

- 2) To identify the prevalence of PS students with symptoms of psychosis across all included studies.
- 3) To identify and describe factors associated with the development of symptoms of psychosis in PS students.
- 4) To assess the effectiveness of interventions for PS students with symptoms of psychosis.
- 5) To explore the experiences of PS students with symptoms of psychosis.

Methodological Concepts

Synthesis Research

Systematic reviews reveal what is known about a topic, as well as existing knowledge gaps.

They are useful for providing recommendations for practice and future research (Grant & Booth, 2009). Systematic reviews are considered the cornerstone of evidence-informed practice because they integrate and synthesize evidence about a topic using transparent and reproducible procedures (Polit & Beck, 2017). While there are several organizations with guiding principles for reviews (e.g. Cochrane Database of Systematic Reviews, Centre for Reviews and Dissemination, EPPI-Centre), the Joanna Briggs Institute (JBI) methodology is designed to address health issues of interest to health care professionals, to guide policy, and to inform practice (JBI, 2014).

Further to different guiding principles, there are also different types of synthesis studies. For example, a scoping review is a preliminary assessment that focuses on identifying the scope of research available on a topic (Grant & Booth, 2009). A state-of-the-art review is a type of literature review that focuses on the most recent research but has no formal quality assessment procedure (Grant & Booth, 2009). There are also reviews that include only quantitative or qualitative evidence (e.g. review of effectiveness or qualitative evidence synthesis) (Grant &

Booth, 2009). Literature reviews provide an examination of recent literature and can cover a wide range of subjects at varying levels of comprehensiveness (Grant & Booth, 2009). Mapping reviews (or systematic maps) categorize existing literature to identify research gaps and focus on specific types of evidence about a topic (Grant & Booth, 2009).

If one aims to explore a topic broadly, yet adhere to strict methodological rigor criteria, a mixed-methods systematic review is best. The mixed methods approach to conducting a systematic review is described by the JBI as "...a process whereby (1) comprehensive syntheses of two or more types of data (e.g. quantitative and qualitative) are conducted and then aggregated into a final, combined synthesis, or (2) qualitative and quantitative data are combined and synthesized in a single primary synthesis" (JBI, 2014, p. 6).

There are three general approaches used in mixed-methods systematic reviews, as articulated by Sandelowski and colleagues (2006) including segregated, integrated and contingent methodologies. Segregated methodologies require individual syntheses of quantitative data and qualitative data to be conducted prior to the final "mixed-method" synthesis, in which quantitative and qualitative findings will either support or refute one another (JBI, 2014, p. 9). The resulting synthesis is presented in the form of a theoretical framework, or discussion, recommendations and/or conclusions (JBI, 2014, p. 9). Integrated methodologies do not involve separate synthesis of quantitative or qualitative data, rather, both forms of data are combined into a single mixed-method synthesis, in which data must be similar enough to be combined (JBI, 2014). Finally, contingent methodologies involve two or more separate syntheses, in which the first synthesis generates a second question, which will prompt a second synthesis, and so forth (JBI, 2014).

The segregated methodologies framework is best suited to answer multiple questions within one review and allows for the application of multiple kinds of data analysis and synthesis procedures (JBI, 2014). This design allows for the inclusion of multiple kinds of evidence to address diverse objectives and synthesizes evidence that will be more appropriate and usable by a wider range of people (JBI, 2014). This framework enabled me to extract qualitative and quantitative data separately in congruence with each outlined objective and resulted in a final synthesis.

Currently, there are no universally adopted methods for conducting mixed-methods reviews, and no consensus exists on the point at which quantitative and qualitative components should be integrated – which are identified limitations of this design (Grant & Booth, 2009). Another identified weakness is the difficulties associated with bringing together studies guided by different theoretical underpinnings, methodologies, structures, and paradigms (Grant & Booth, 2009). While I am aware of these limitations, this approach was best suited to my study.

Knowledge Translation and Integrated Knowledge Translation

Knowledge translation (KT) is “a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the health care system. This process takes place within a complex system of interactions between researchers and knowledge users which may vary in intensity, complexity and level of engagement depending on the nature of the research and findings as well as the needs of the particular knowledge user” (CIHR, 2014, p. 1). Integrated knowledge translation (iKT) is “...a model of collaborative research, where researchers work with KUs who identify a problem and have the authority to implement the research recommendations” (Korthari, McCutcheon, & Graham,

2017, p. 299), and involves KUs as equal partners alongside researchers with the premise of making research more relevant for KUs (CIHR, 2014, p. 2). IKT is an approach to minimize the ‘know-do gap’ which occurs when scientific knowledge is not used in practice (Graham, Kothari, & McCutcheon, 2018, p. 2). IKT facilitates the integration of KUs throughout the research process (Graham et al., 2018).

The CIHR outlines the following principles related to iKT research, which I will link with my research. First, knowledge synthesis is the integration of all available evidence on a topic (CIHR, 2014) – my objective is to gather and synthesize all available evidence on my topic to answer the outlined objectives. Dissemination involves tailoring a research message to reach an appropriate audience for research findings (CIHR, 2014) – I will work alongside KUs to disseminate research findings and recommendations to reach relevant audiences in appropriate ways. Knowledge exchange refers to the interaction between researchers and KUs as findings emerge from the research process (CIHR, 2014) - I will maintain open communication with KUs throughout the research process, as findings emerge. The ethically sound application of knowledge refers to driving research findings into practice, which can be used to improve health and the health care system (CIHR, 2014) – my aim is for my research findings to inform clinicians caring for PS students, as well as to guide PS mental health services and policies (CIHR, 2014).

iKT is an approach to conducting research that informs investigators’ thinking about how to translate scientific knowledge into policy and practice (Graham & Tetroe, 2014). To appropriately meet the needs of PS students who experience symptoms of psychosis, PS institutions and researchers investigating student mental health need to form collaborations with an iKT-driven approach. This collaborative approach to research is ideal when the aim is to

improve the quality of care and health outcomes. Given the increased awareness of mental illness in PS students, synthesizing the evidence to date on PS students who have symptoms of psychosis is timely.

Knowledge User

Knowledge users (KU) “represent all those who would be able to use research results to inform their decisions (clinicians, managers, policy makers, patients/families and others) (Graham et al., 2018, p. 2), about health policies, programs, or practices (CIHR, 2014). KUs are typically identified by the researcher(s), but once engaged, KUs are considered equal partners who bring knowledge and skills to collaboratively inform the research process (CIHR, 2014; Graham et al., 2018). A KU’s level of engagement in the research process may vary in intensity and complexity depending on the nature of the research and on his/her information needs (CIHR, 2012).

KU engagement opportunities for systematic reviews were identified in an article by Keown and colleagues (2008). According to these authors, some engagement opportunities may include consultation regarding the review topic, participation in input and reaction meetings, and involvement in dissemination activities. KU engagement steps for this research project are mapped to specific stages of the mixed-methods systematic review process, and involvement of KUs has been tracked chronologically. These are discussed below and will be weaved throughout the thesis.

Protocol and Registration

I created the protocol for this study using The Preferred Reporting Items for Systematic review and Meta-Analysis Protocol (PRISMA-P) Statement (Shamseer et al., 2015) and used PRISMA to guide the conduct and reporting of the study (Moher et al., 2009). I registered the review with the International Prospective Register of Systematic Reviews (PROSPERO), and the record was

published on the PROSPERO website on August 13, 2018 (registration number CRD42018104338).

Methods

The ways in which I engaged with the KUs throughout the systematic review process are described below and included four steps. Refer to Additional Table 1.0 in the Appendix for details on KU involvement throughout the systematic review process.

Knowledge User Engagement Step One: Identification of Knowledge Users for Proposal Development

According to Keown and colleagues (2008), the first step to stakeholder engagement includes incorporating stakeholder input into the development of the research question, objectives, and proposal. To identify my KUs, I found contact information on PS institution websites, organizational websites, and through personal contacts. Next, I informally connected with clinicians working at PS health services, outpatient psychiatric services, inpatient psychiatric services, psychiatric community organizations, and PS students with a history of psychosis. I introduced myself as a Master's of Science in Nursing student at the University of Ottawa and provided a brief overview of what I was hoping to accomplish with my thesis research. I also clearly explained that the research proposal was not yet formalized and that this was a preliminary step to identify a feasible and relevant research project. Based on the feedback received at this point, I finalized my research objectives.

I initially connected with five individuals who met the profile of KUs appropriate for this study. While not formally engaged in the study at this point, I consulted with them to ensure that the development of the research aim, objectives, and anticipated findings are compatible with their needs and priorities (CIHR, 2012). I also wanted to assess the appropriateness and

feasibility of my study (CIHR, 2012). This early engagement step also ensures potential KUs are engaged prior to initiation of the study (Guise et al., 2013), facilitates relationship building, and helps to maintain credibility and trust (Guise et al., 2013). Through this consultation process, I came to understand how my research could be designed to best respond to their needs.

Knowledge User Engagement Step Two: Development of research question and approach

I conducted a preliminary search of the available literature on psychosis in PS students to determine the types of studies and information available and create draft objectives for the review. This preliminary search was similar to a scoping review, which is defined as “...a form of knowledge synthesis that addresses an exploratory research question aimed at mapping key concepts, types of evidence, and gaps in research related to a defined area or field by systematically searching, selecting and synthesizing existing knowledge” (Colquhoun et al., 2014, p. 1292-1293). My search was similar to a scoping review in the following ways: (1) my research question was broadly defined (“What literature exists related to psychosis in PS students?”) (2) all study types were included for review (3) my search approach is similar to the search approach used in scoping reviews, and (4) data was informally extracted related to themes (which were identified as risk factors, interventions, and experiences of PS students with symptoms of psychosis) (University of Toronto, 2018). However, my preliminary search did not adhere to all scoping review guidelines in the following areas. First, I did not conduct a formal database search of all relevant databases, or a comprehensive search of reference lists, hand searching of key journals, organization, or conferences (Colquihoun et al., 2014). I only searched CINAHL, psycINFO, and Medline databases, as well as conducting an informal Google Scholar search on the topic. Secondly, I did not select studies following post-hoc inclusion and exclusion criteria, nor did I formally extract data using a data charting form (Colquihoun et al., 2014).

Lastly, I did not use an analytic framework or thematic construction to provide an overview of the literature (Colquihoun et al., 2014).

Subsequently, I connected with the five initially identified KUs individually via e-mail and telephone communication and thought-stormed about how a synthesis of the available evidence would best meet their needs. Together, we came to a general consensus about the direction of the study and the objectives to be addressed. This occurred from the months of February (2018) to April (2018). This steered the development of the systematic review aims and objectives.

Knowledge User Engagement Step Three: Development of the Advisory Panel

Once I formulated my results, I formed an advisory panel of KUs who participated throughout the conduct of the systematic review. As a first step, I re-connected with the initial KUs. I sent an invitation via e-mail to these individuals, as well as additional KUs identified once the systematic review was in progress, to invite them to be part of the advisory panel (as suggested by Guise et al., 2013). This e-mail invitation is presented in Additional Document 1.0 in the Appendix. The invitation was reviewed by a KU prior to sending out the invitation to all KUs, who provided feedback regarding appropriateness, and from this, I made small changes. The invitation included a description of the scope of the project and the expectations for inclusion in the advisory panel (CIHR, 2012). KUs are not research participants; they are experts who were to advise me throughout the research project; therefore, no written consent form was required; however, I did elicit verbal agreement regarding being part of the advisory panel from each KU.

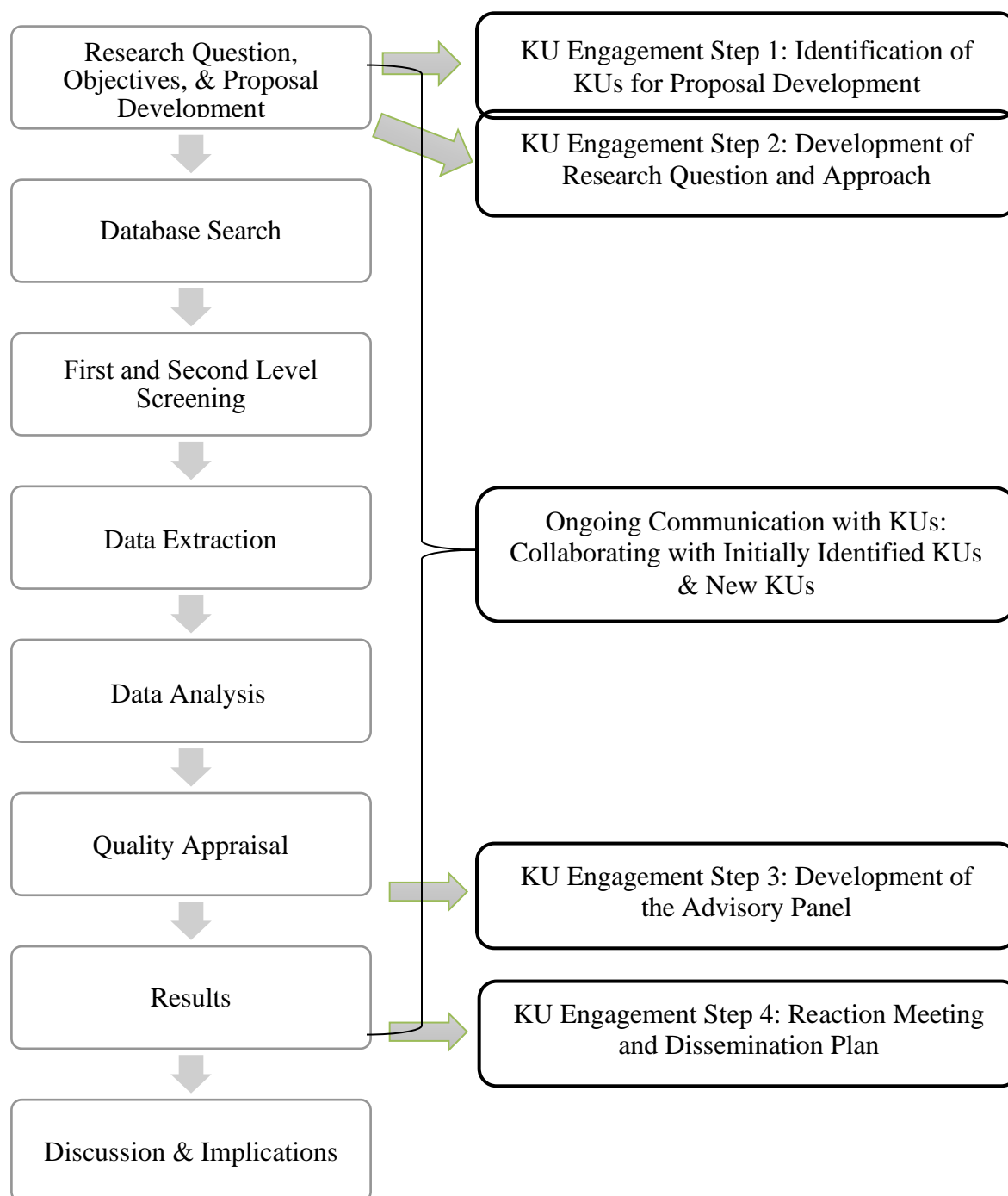
The final advisory panel included one initially identified KU, as well as additional five KUs who joined the panel while the systematic review was in progress. After sending e-mail invitations to all identified KUs, I scheduled individual meetings to either speak over the phone,

meet in person, or a combination of both with each KU, depending on their preference. In these meetings, I provided more detail on my study and the role of being a KU on the advisory panel. I also emphasized that advisory panel members were not research participants, and that acknowledgement of their role will be dependent on their preference (e.g. remaining anonymous, putting their name and credentials into the research study, etc.). The final advisory panel consisted of six KUs, which is consistent with the “small group” proposed by Keown and colleagues (2008, p. 68). These KUs included an occupational therapist, an educator at a PS institution, a policy advisor at a PS institution, a PS student who has experienced symptoms of psychosis, a research scientist, and a nursing student interested in mental health.

Knowledge User Engagement Step Four: Reaction Meeting and Dissemination Plan

The final KU engagement activity occurred when results and summary of findings were formulated. In-person methods are advantageous as they allow for interaction between KUs and the researcher, and elicit deeper understanding of viewpoints (Guise et al., 2013). This meeting allowed for jointly formed implications for practice, research, academic policy and education. Objectives of this meeting were to: 1) obtain feedback related to summary of findings, discussion points, implications to clinical practice, academic policy, education, and future research; and 2) to discuss possible end-of-study KT activities, including dissemination of findings. A summary of this meeting is provided in chapter four, under summary of findings, discussion, limitations, strengths, and implications. Figure 3.0 provides a visual representation of KU engagement steps mapped to stages of the systematic review process.

Figure 3.0 – Knowledge User Engagement Steps throughout the Systematic Review Process



Data Collection Procedures

Selection criteria.

Eligibility criteria were created using the PICO statement, as specified in the JBI methodology (2014). This statement was favoured over others, because the research inquiry involves a specific population, phenomenon of interest, and context. The PICO statement (population, intervention comparison, outcome) (Stone, 2002) or SPICE statement (setting, perspective, intervention or exposure of interest, comparison, evaluation) (Booth, 2004) were less appropriate because they involve interventions and comparisons not aligned with the research objectives. Eligibility criteria and limits are shown in Table 3.0.

Table 3.0 – Eligibility Criteria and Limits

PICo	Inclusion	Exclusion
Population	Experience of symptoms of psychosis (diagnosed by a clinician or self-reported), or who have a diagnosis of a psychotic disorder as per the DSM-5, or who have self-reported psychotic disorder	Non-PS individuals
Phenomenon of Interest	<ul style="list-style-type: none"> ● Experience of symptoms of psychosis, including: mild or non-specific symptoms (sub-clinical psychosis, subclinical psychotic experiences, psychotic-like experiences); or the prodromal phase (attenuated psychosis syndrome, ultra high risk, clinical high risk) ● First episode psychosis ● Diagnosis of a psychotic disorder as per the DSM-5 	<ul style="list-style-type: none"> ● Cognitive impairment (e.g. dementia, down-syndrome) (rationale: risk factors may differ for these populations, and healthcare and services for these populations are delivered differently) ● Co-occurring autism spectrum disorder (rationale: risk factors may differ for these populations, and healthcare and services for these populations are delivered differently) ● Schizotypal personality disorder (rationale: diagnostic criteria differs from psychosis)

		<ul style="list-style-type: none"> ● Psychoticism (unless identified as a risk factor) ● Schizotypy (unless identified as a risk factor) ● Aberrant salience (unless identified as a risk factor) ● Medication-only interventions
Context	PS institutions of any kind	High school or elementary school, work settings
Limits	Inclusion	Exclusion
Types of literature	All published peer-reviewed literature	Non-peer reviewed sources: <ul style="list-style-type: none"> ● Conference proceedings ● Thesis ● Dissertation ● Books ● Letters to the editor ● Editorials Non-full text (abstracts)
Language	English (language of the researcher)	Studies written in a language other than English
Location	No limits will be placed on the studies' country of origin	
Date range	2006-2018 Rationale: This date range will capture generation Y (oldest age in 2018 is 38) and generation Z (oldest age in 2018 is 23) – which will capture the most recent generations of PS students, as well as the most recently studied risk factors, interventions, and personal strategies/supports. With input from the KUs, we agreed this date range was appropriate based on the aforementioned rationale, in addition to identifying the most recently studied risk factors, interventions, and experiences of PS students with symptoms of psychosis. This will help to ensure that findings are feasible and	

	applicable to the KUs current contexts.	
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Grey literature.

Grey literature refers to literature (scientific or technical) that is not available through traditional bibliographic sources (California State University Long Beach University Library, 2016). There is still disagreement as to whether grey literature sources should be included in systematic reviews; some believe only published reports provide findings with more robust evidence, others believe excluding non-published literature results in publication bias (Polit & Beck, 2017). Grey literature was excluded from this review in consultation with the thesis advisory committee.

Online database search strategy.

The search strategy combined systematic searches of multiple electronic databases combined with secondary searches. In June (2018) in consultation with a library scientist (L.S.) at the University of Ottawa, a pilot search was conducted of the PsycINFO database using appropriate MeSH headings and keywords based on the aforementioned PICO. Concepts included “psychosis”, “post-secondary student”, and “post-secondary institution.” These three concepts were combined using “AND,” and within each group the concepts were combined using “OR.” Limits imposed on the search included date range from 2006-2018. The first 300 citations were reviewed for relevance to the PICO question. The citations were deemed relevant, and I translated this search strategy to the Medline database. Once I translated this search strategy, it was sent to L.S. and my thesis supervisor (A.V.) for peer review, which meets the PRESS standard. Modifications were made to the search strategy as per suggestions from L.S. and A.V. Once the final search strategy was approved by L.S., I translated this search strategy to the remaining databases, including Pubmed, Embase, Cochrane Library, CINAHL, PsycINFO, Education Source, ERIC (Proquest), and the Joanna Briggs Library. All search strategies were sent to L.S.

for peer review. Further modifications were made to the search strategies per database as per suggestions from L.S. I incorporated these modifications into the search strategies, and the search strategies and results were sent back to L.S. for final peer review. Once approved, on July 10th, 2018, I uploaded search results from each database into Endnote Desktop, and then uploaded these into the Covidence© software. A total of 2,734 citations were uploaded. At this stage, Covidence© automatically removed a total of 590 duplicate citations, leaving a total of 2,144 citations to screen.

Screening process.

Two reviewers (myself and a peer in the Master of Science in Nursing program, M.M.) independently engaged in the study selection process, to reduce the possibility of rejecting relevant reports (Shamseer et al., 2015). Covidence©, an online citation screening tool, was used to facilitate and monitor study selection. This software program allowed for complete screening of citations, clearly displayed differences in reviewers' ratings, and helped to mitigate any issues pertaining to inter-rater reliability.

We selected studies for inclusion based on a two-level screening process. First, we independently screened titles and abstracts for congruence with eligibility criteria (first-level screening). I provided a quick reference sheet for the second screener to aid with the first and second-level screening process, which is presented in Additional Document 2.0 in the Appendix. Once all citations were screened by myself and my peer, we met to review results using Covidence© and to discuss and resolve all instances of discrepancy. At this time, we retained all potentially relevant citations and those with insufficient information to determine eligibility. A total of 267 discrepancies were resolved on September 6, 2018. We also noted an additional 252

duplicate citations missed by Covidence. We manually removed these while screening. The first-level screening process spanned from July 10, 2018 to August 3, 2018.

Next, we independently screened the full-texts of the retained articles for congruence with eligibility criteria (second-level screening). I searched for full-text articles using the following methods: University of Ottawa library website using the Search+ function, I searched databases and journals indicated in each citation, Google Scholar, and requested articles on forms through the University of Ottawa RACER interlibrary loan system. Using Covidence©, I documented the justification for excluding citations in an Excel spreadsheet. A final consensus meeting was held on October 22, 2018 to agree upon the final set of included citations. A total of 102 conflicts were reviewed, and a total of 11 remaining conflicts that we could not resolve were reviewed by my thesis supervisor (A.V.). A total of 24 articles were included for data extraction.

Hand search and consultation process.

I conducted a hand-search using reference lists of all included articles with referenced citations. Two additional articles were included as a result of the hand-search. One was initially screened out as “abstract only”, but I later found the full article (Anglin et al., 2014). The second article was published after the initial database search, which is why it was not included in the initial first or second-level screening process (Anglin et al., 2018). This resulted in a total of 26 articles representing 22 studies included for data extraction.

Audit trail.

I maintained a detailed record of all search strategy procedures to ensure a transparent and replicable process. This included: databases searched, subject headings and keywords used for each database, hand-search sources, and all KU communication and feedback. I reported the screening and selection process using the PRISMA-P flow chart (Moher et al., 2009).

Data extraction.

I created a data extraction template in accordance with each objective in Microsoft Word. This was reviewed by my thesis supervisor and modifications were made based on feedback. Next, each template was pilot-tested by myself and my thesis supervisor for inter-rater reliability using three citations (Andorko et al., 2017; Freeman et al., 2017; Knis-Matthews, Bokara, DeMeo, Lepore, & Mavus, 2007). The latter citation was later removed for not meeting full eligibility criteria. My thesis supervisor and I met to discuss discrepancies in data extraction templates and modified the templates accordingly. Once the templates were finalized, I extracted data from each included study using these templates. A peer in the Master of Science in Nursing program (S.L.) also engaged in independent data extraction to ensure inter-rater reliability. I also provided a data extraction guide for the second data extractor, which is presented in Additional Document 3.0 in the Appendix. Additional Figure 1.0 in the Appendix provides a visual representation of data extraction and synthesis procedures. A meeting was held on June 12, 2019, to resolve conflicts related to data extraction between myself and my peer (S.L.), and my supervisor (A.V.) was also present. Conflicts that we could not resolve were reviewed by my thesis supervisor. A total of 25 conflicts were resolved, with seven identified in the study characteristics data extraction table, specifically the “theory used” in each study.

Methodological quality assessment.

I conducted quality appraisal of all included citations using the Joanna Briggs Critical Appraisal Tools online (JBI, 2017), and organized them in supplemental tables. I also conducted separate quality appraisal of studies that included prevalence data using the Joanna Briggs Critical Appraisal Tool online for Prevalence Studies (JBI, 2017). I used these quality appraisal results to comment on how rigorously prevalence data were measured across studies, and to illustrate the

confidence of prevalence results. These critical appraisal tools are available for all study designs, as well as discussion articles (JBI, 2017). The purpose of this quality appraisal was to comment on the state of science on this topic; therefore, I have reported on the complete critical appraisal results in the findings section of this thesis. A peer in the Master of Science Nursing program (S.L.) also conducted quality appraisals of all included citations (including prevalence studies), and I consulted with my peer and thesis supervisor to settle discrepancies in ratings. Due to the heterogeneity of studies, I reported narratively on quality appraisal findings.

Data Analysis Procedures

Study characteristics.

The included studies and their information (title, author(s), year of publication, journal of publication, study type, study design, sample size, setting, country of study, type of post-secondary institution, type of students, theory used, objective(s)/aim(s)/goals(s), hypothesis/hypotheses, data collection method(s), data analysis method(s), ethics obtained) were organized in a table. The table offers an overview and brief summary of each study's characteristics and all relevant results to answer the research questions and is presented in the results section of the thesis. When multiple articles reported on one study, I aggregated these for data extraction and analysis. The study characteristics blank data extraction table is presented in Additional Table 2.0 in the Appendix.

Objective one: To describe the socio-demographic, clinical, and service-use characteristics of post-secondary students across all included studies.

Socio-demographic characteristics, clinical characteristics, service use characteristics of participants and corresponding sample sizes in each included citation were recorded in a Microsoft Word data extraction document to facilitate viewing of trends, comparisons, and

calculations of frequencies, percentages, and averages where applicable, for each variable. In the results, I only reported on characteristics included in 50% or more of the studies. When multiple articles reported on one study, I aggregated these for data extraction and analysis. The socio-demographic characteristics blank data extraction table is presented in Additional Table 3.0 in the Appendix, the clinical characteristics blank data extraction table is presented in Additional Table 4.0 in the Appendix, and the service-use characteristics blank data extraction table is presented in Additional Table 5.0 in the Appendix.

- Socio-demographic characteristics: “of, relating to, or involving a combination of social and demographic factors” (Merriam-Webster Dictionary, 2018, para. 1). Examples of socio-demographic characteristics may include (but are not limited to): age, sex, gender education, finances, or current employment. Sex is usually categorized as “female” or “male”, and is a set of biological attributes associated with physical and physiological features, including chromosomes, gene expression, reproductive and sexual anatomy, and hormone function (CIHR, 2014, para. 1). Gender is usually conceptualized as “girl/woman” or “boy/man,” however there is diversity in how individuals perceive themselves, understand, experience, and express gender (CIHR, 2014, para. 2). Gender is socially constructed, and influences how individuals perceive themselves (CIHR, 2014).
- Clinical characteristics: symptoms of a psychiatric illness or a diagnosed psychiatric illness as per the DSM-5 (APA, 2013). Examples of clinical characteristics may include (but are not limited to): reported psychotic disorder, co-morbid psychiatric disorder, co-morbid medical disorder, taking anti-psychotic medications, taking other medications, illicit drug use, or alcohol use.

- Service use characteristics: utilization of any health care service. Examples of service-use characteristics may include (but are not limited to): care from PS institution mental health services, care from PS institution medical services, care from a general practitioner, care from a mental health care practitioner, or care from community mental health services.

Objective Two: To identify the prevalence of post-secondary students with symptoms of psychosis across all included studies.

Data relevant to prevalence rates of symptoms of psychosis among PS students, as well as sex/gender variables were recorded in Microsoft Word data extraction template to facilitate viewing of trends, comparisons, and calculations of frequencies, percentages, and averages where applicable. In the results, I only reported on studies that included percentages and/or frequencies, as this is representative of prevalence. If authors reported on means of average scores this was included in a separate table. I also provided a description of all measurement tools used to measure symptoms of psychosis, how each author reported symptoms of psychosis, and whether measurement tools were used as intended, or modified. When multiple articles reported on one study, I aggregated these for data extraction and analysis. The prevalence of symptoms of psychosis blank data extraction table is presented in Additional Table 6.0 in the Appendix.

Objective three: To identify and describe factors associated with the development of symptoms of psychosis in post-secondary students.

I used the World Health Organization's definition of a risk factor: "any attribute, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury" (World Health Organization, 2004, para. 1). Data relevant to risk factors associated with the development of symptoms of psychosis in PS students were recorded in a Microsoft Word data

extraction document. For each risk factor, the following data were collected: name of the risk factor, statistical test used, result, direction of the relationship, and statistical significance value (e.g. p-value), corresponding sample, sex, and gender variables correlated with risk factors. Risk factors were categorized using the Diathesis Stress Model of Schizophrenia, as mentioned previously. Categories will include:

- 1) Genetic predisposition
- 2) Brain structure abnormality
- 3) Neurobiological
- 4) Early life adversity
- 5) Chronic or repeated stress
 - a) Psychological stressors
 - b) Environmental stressors
- 6) Other

When multiple articles reported on one study, I aggregated these for data extraction and analysis.

When reporting results of risk factors, I used a vote-counting approach to synthesize the quantitative data regarding the relationship between a risk factor examined by four or more studies and symptoms of psychosis. Vote counting is based on the percentage of studies demonstrating, or failing to demonstrate, a statistically significant relationship. I supplemented vote-counting with recommendations made by Grimshaw and colleagues (2003) to extract the direction and magnitude of effect for all factors demonstrating a statistically significant effect ($p \leq 0.05$). If both bivariate and multivariate statistical analyses were performed for one factor, the results from the higher model (multivariate test result) were relied on. The only exception was if majority of statistical analyses (50% or more) were bivariate for one risk factor, these

results were relied on. If a risk factor was assessed once, there was insufficient data to assess. If a factor was assessed between two to three times, it was coded as a trend, meaning there was insufficient evidence to reach a conclusion. A risk factor was assessed four or more times to draw conclusions regarding its relationship with symptoms of psychosis. Risk factors assessed four or more times were coded as:

- 1) Significant relationship between the risk factor and symptoms of psychosis if more than 60% of the statistical or quantitative tests show a significant relationship between the factor and symptoms of psychosis;
- 2) Not significant to symptoms of psychosis if more than 60% of the statistical or quantitative test show an insignificant relationship;
- 3) Equivocal meaning inconsistent significance to symptoms of psychosis if fewer than 60% of the statistical or quantitative tests show a significant or no significant relationship.

Factors assessed in fewer than four studies were identified and examined for trends only. The risk factors blank data extraction table is presented in Additional Table 7.0 in the Appendix.

Objective four: To assess the effectiveness of interventions for post-secondary students with symptoms of psychosis.

An intervention was defined as a program or initiative “designed to improve the health of [an individual] or change the conditions which have a negative impact on the well-being of the [individual]” (Mosby’s Medical Dictionary, 2009, para. 1). The Template for Intervention Description and Replication (TIDierR) checklist was used to guide data extraction (Hoffman et al., 2014). This checklist provides a complete description of each intervention, which enables discussion about feasibility of the interventions within the KU contexts, as well as information about how to replicate each intervention (Hoffman et al., 2014). Data relevant to interventions

for PS with symptoms of psychosis were recorded in a Microsoft Word data extraction template. When multiple articles reported on one study, I aggregated these for data extraction and analysis. The interventions (TIDieR) blank data extraction table is presented in Additional table 8.0 in the Appendix.

Data extracted included:

- 1) A name or phrase that describes the intervention (name/description);
- 2) Rationale, theory, or goal of the elements essential to the intervention (design of intervention based on theory);
- 3) Goals of the intervention;
- 4) Materials/resources used in the intervention (those provided to participants, used in intervention delivery, or training of intervention providers, and where the materials can be accessed);
- 5) Procedures, activities, and/or processes used in the intervention, including enabling or support activities;
- 6) Description of the procedures of the intervention;
- 7) Who provided the intervention (describe their expertise, background, or specific training);
- 8) Mode of delivery of intervention and whether it was individual or group;
- 9) Where the intervention occurred (location, any necessary infrastructure or relevant features);
- 10) Number of times the intervention was delivered and over what period of time (including number of sessions, schedule, duration, intensity or dose);

- 11) What, why, when, and how the intervention was tailored/personalized, titrated, or adapted (if applicable);
- 12) Tailoring/personalization of the intervention;
- 13) Any modifications made during the course of the study (what, why, when, and how);
- 14) Intervention adherence or fidelity;
- 15) How well the intervention was delivered as planned.

To meet objective four, I also extracted the following information on measures and outcomes: outcomes (related to symptoms psychosis), tool(s) used to measure outcomes, validation of the tool in the identified study, statistical test(s) used, bivariate/multivariate statistics used, outcomes, results (reported by author and test values/statistical significance values), and corresponding sample sizes were extracted. The interventions (outcomes) blank data extraction table is presented in Additional Table 9.0 in the Appendix.

Objective five: To explore the experiences of post-secondary students with symptoms of psychosis.

I synthesized qualitative data according to the JBI meta-aggregation approach (JBI, 2014). Qualitative findings were extracted from each included study and we included the verbatim extract of the author's analytic interpretation accompanied by a participant voice (i.e. quote), fieldwork observations, or other supporting data. To be considered credible or unequivocal (and included into synthesis), the findings must be accompanied by an illustration from the text that informs the finding (JBI, 2014). Qualitative data related to the experiences of PS students who have symptoms of psychosis (category names, definition of each category, supporting exemplars and quotes) were recorded in a Microsoft Word data extraction template. A level of credibility for each finding was established as per the JBI (JBI, 2019). Categories include: 1) unequivocal,

“relates to evidence beyond reasonable doubt which may include findings that are matter of fact, directly reported/observed and not open to challenge;” 2) credible, “those that are, albeit interpretations, plausible in light of data and theoretical framework. They can be logically inferred from the data. Because the findings are interpretive they can be challenged;” and 3) not supported, “when 1 nor 2 apply and when most notably findings are not supported by the data” (JBI, 2019, para. 3). Only unequivocal and credible findings were included. The experiences of students with symptoms of psychosis blank data extraction table is presented in Additional Table 10.0 in the Appendix.

Ethics

I connected with a protocol officer for Ethics at the University of Ottawa to inquire about whether I had to submit an ethics application to the University of Ottawa Research Ethics Board for the iKT portion of the systematic review (i.e. formation of an advisory panel). We connected over email and a phone conversation, where I provided a synopsis of my systematic review, and highlighted formation of the advisory panel, the role of KUs, and emphasized that data would not be collected from any KU. The research protocol officer reviewed the case with the director for Ethics, and they sent an email stating that the research project I outlined was exempt from ethics review based on Article 2.1a of the TCPS-2. She did, however, suggest that I retrieve written agreement from each KU on the advisory panel acknowledging their role, and establishing how they will be acknowledged for their involvement in the review and thus I followed these recommendations

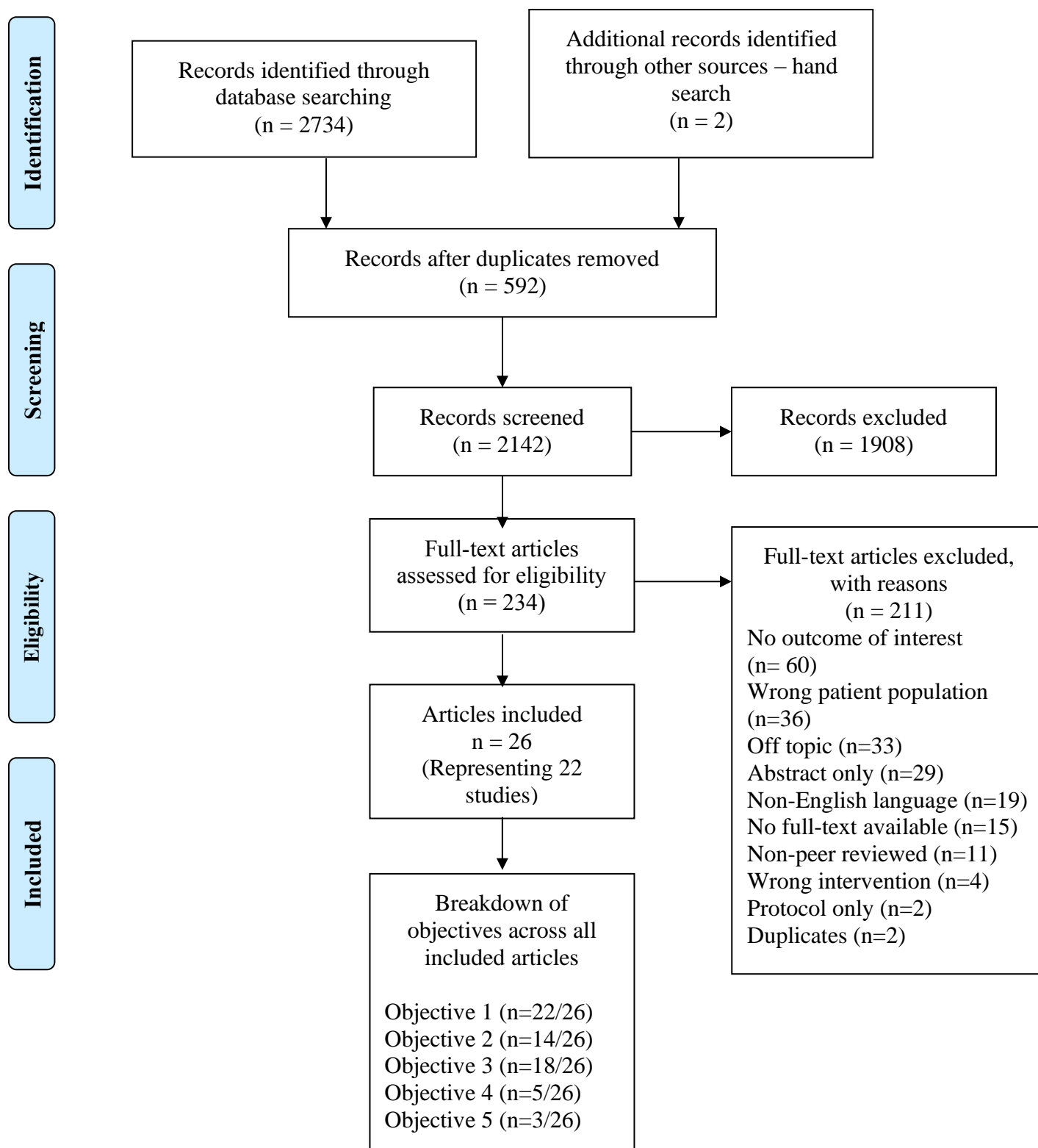
Chapter Four: Results

This chapter presents the results from the systematic review. First, results of the systematic database search are described. Second, the study characteristics of the included studies are reported, followed by a description of participants across included studies. Third, the methodological quality assessment results are reported. Fourth, the prevalence of symptoms of psychosis in PS students across studies is reported. Lastly, results according to objectives three, four, and five are reported (risk factors, interventions, and experiences of PS students with symptoms of psychosis).

Systematic Search

From the search strategy, 2,734 potentially relevant citations were retrieved from the database search. Of these, 592 were duplicates, and 1,908 were off-topic after first-level screening. Two hundred and thirty-six articles were retained for second-level screening. Of these, 211 were excluded for the following reasons: No outcome of interest (n= 60), Wrong patient population (n=36), Off topic (n=33), Abstract only (n=29), Non-English language (n=19), No full-text available (n=15), Non-peer reviewed (n=11), Wrong intervention (n=4), Protocol only (n=2), Duplicates (n=2). In total, 24 articles met inclusion criteria. An additional two articles were retrieved and met inclusion criteria following a hand search of all included articles, leaving a total of 26 articles for inclusion. Across the 26 articles, 22 addressed objective one, 14 addressed objective two, 18 addressed objective three, five addressed objective four, and three addressed objective five. (See Additional Table 11.0 in the Appendix for the search strategy of nine electronic databases and the PRISMA flow chart presented in figure 4.0. Additional Figure 2.0 in the Appendix provides a visual representation of the breakdown of objectives across articles).

Figure 4.0 – PRISMA Flowchart



Study Characteristics

The 26 included articles reported on 22 unique studies. When performing certain data analysis calculations, four articles were excluded. The rationale for this is because four articles originated from one study (Shi et al., 2017a; Shi et al., 2017b; Shi et al., 2016; Wang et al., 2015), which was confirmed by the authors via e-mail correspondence. Two additional articles originated from one study (Anglin et al., 2018; Anglin et al., 2014). Therefore, the included articles (n=26) reported on 22 unique studies, which were published from 2006 to 2018. The studies were conducted in 11 countries: United States (n=7), United Kingdom (n=4), China (n=2), South Korea (n=2), Ireland (n=1), Canada (n=1), Iran (n=1), Belgium (n=1), Australia (n=1), Turkey (n=1), and Spain (n=1). All studies included PS students in their samples, with nine authors specifically reporting on undergraduate PS student participants.

Of the included studies, 14 were cross-sectional survey designs, one was a longitudinal pre-post survey design (which originated from a randomized controlled trial), two were randomized controlled trials, three were case studies, one was a general qualitative approach, and one was a mixed-methods approach. Of the included studies, 20 included self-report questionnaires to collect data and three included in-depth interviews. Details on study characteristics are presented in Additional Table 12.0 in the Appendix.

Methodological Quality Assessments

The critical appraisal tools used to assess the methodological quality of the articles included the Checklist for Randomized Controlled Trials (n=3), Checklist for Case Control Studies (n=1), Checklist for Analytical Cross Sectional Studies (n=16), Checklist for Case Series (n=1), Checklist for Case Reports (n=2), and Checklist for Qualitative Research (n=3) (JBI, 2017). There were three randomized controlled trials (RCTs), with scores of 5/13, 7/13, and 11/12. In

two of the RCTs, it was unclear if: 1) allocation to treatment groups was concealed, 2) treatment groups were treated identically other than the intervention of interest, and 3) whether participants were analyzed in the groups to which they were randomized. In all studies, treatment groups were similar at baseline, and authors measured outcomes in the same way for treatment groups.

The analytical cross-sectional studies had a variety of scores (range: 4/7 to 7/7 and 4/8 to 7/8). Majority of authors measured the exposure in a valid and reliable way (14/16), identified confounding factors (12/16), and used strategies to deal with confounding factors (14/16), and all authors used appropriate statistical analysis (16/16). Only four out of 16 authors described the study subjects and the setting in detail, with majority not specifying the time period.

Additional quantitative designs included one case control study that scored 6/9, one case series study that scored 7/10, and two case reports with scores of 8/8 and 4/8. For the case reports, both studies described the patient's history clearly and presented it in a timeline, described the intervention and post-intervention clinical condition clearly, and reported on takeaway lessons.

The three qualitative studies scored 3/10, 5/10, and 7/10. None of the authors reported on the congruity between a philosophical perspective and research methodology, nor did any mention a statement locating the researcher(s) culturally or theoretically. The influence of the researcher(s) on the research (and vice-versa) was not addressed in any of the studies. However, there was congruity between the research methodology and the methods used to collect data, and all studies were approved by an appropriate ethical body. Quality assessment results are presented in Table 4.0. This table also highlights whether each study addressed objective three (risk factors), four (interventions), or five (experiences). For further details on the complete critical appraisal results, refer to additional Table 13.0 in the Appendix.

Table 4.0 – Summary of Critical Appraisal Completed using the Joanna Briggs Institute Critical Appraisal Tools (n=26)

JBICritical Appraisal Tool	Authorship (date)	Total score	Objective
Checklist for Case Control Studies (n=1)	Wang et al. (2015)	6/9 ¹	3
Checklist for Case Series (n=1)	Shi et al. (2017a)	7/10	3
Checklist for Analytical Cross Sectional Studies (n=16)	Pickering et al. (2008)	6/7 ²	3
	Alavi et al. (2010)	6/7 ³	3
	Skinner et al. (2011)	7/7 ⁴	3
	Anglin et al. (2014)	7/8	3
	Bruenig et al. (2014)	5/8	3
	Gibson et al. (2014)	3/7 ⁵	3
	Wickham et al. (2014)	4/7 ⁶	3
	Cicero et al. (2015)	4/8	3
	Nam et al. (2016)	5/7 ⁷	3
	Fonseca-Pedrero et al. (2016)	5/7 ⁸	3
	Shi et al. (2016)	5/8	3
	Andorko et al. (2017)	6/7 ⁹	3
	Anglin et al. (2018)	6/8	3
	Bernardini et al. (2018)	6/7 ¹⁰	3
Checklist for Case Reports (n=2)	Baruch et al. (2009)	8/8	4
	Ertem & Duman (2016)	4/8	4
Checklist for Randomized Controlled Trials (n=3)	Freeman et al. (2017)	11/12 ¹³	4
	Shi et al. (2017b)	7/13	4
	Xu & Liu (2017)	5/13	4
Checklist for Qualitative Research (n=3)	Sung et al. (2006)	7/10	5
	Sung & Puskar (2006)	3/10	5
	Roy et al. (2016)	5/10	5

¹Question 9 was excluded (N/A).

²Question 4 was excluded (N/A).

³Question 4 was excluded (N/A).

⁴Question 4 was excluded (N/A).

⁵Question 4 was excluded (N/A).

⁶Question 4 was excluded (N/A).

⁷Question 4 was excluded (N/A).

⁸Question 4 was excluded (N/A).

⁹Question 4 was excluded (N/A).

¹⁰Question 4 was excluded (N/A).

¹¹Question 4 was excluded (N/A).

¹²Question 4 was excluded (N/A).

¹³Question 5 was excluded (N/A).

Methodological Quality Assessments for Studies Reporting Prevalence of Symptoms of Psychosis

Authors reported on prevalence data in 14 studies, and thus I further assessed the methodological quality of these studies using the Joanna Briggs Checklist for Studies Reporting Prevalence Data (JBI, 2017). All authors measured the condition in a standard, reliable way for all participants (14/14), and majority of authors used appropriate statistical analysis (12/14), and in most studies, the response rate was adequate (13/14). However, only 1/14 authors sampled study participants in an appropriate way, less than half of the authors used a sample frame appropriate to address the target population (6/14), and half used an adequate sample size (7/14). Quality assessment results on prevalence studies are presented in Table 4.1. For further details on the complete critical appraisal results for studies with prevalence of symptoms of psychosis, refer to Additional Table 14.0 in the Appendix.

Table 4.1 – Summary of Prevalence Study critical appraisal completed using the Joanna Briggs Institute Critical Appraisal Tools (n=14)

JBI Critical Appraisal Tool	Authorship (date)	Total score
Checklist for Studies Reporting Prevalence Data (n=14)	Alavi et al. (2011)	5/9
	Andorko et al. (2017)	6/9
	Anglin et al. (2018)	7/9
	Bernardini et al. (2018)	7/9
	Cicero et al. (2015)	5/9
	Fonseca-Pedrero et al. (2016)	6/9
	Freeman et al. (2017)	9/9
	Gibson et al. (2014)	7/9
	McIntyre et al. (2018)	6/9
	Nam et al. (2016)	5/8 ¹
	Skinner et al. (2011)	6/9
	Wang et al. (2015)	5/9
	Wickham et al. (2014)	4/9
	Xu et al. (2017)	5/9

¹Question 5 was excluded (N/A).

Objective One: Participants Included in the Reviewed Studies

Although there were 34 participant characteristics reported in total, only age, sex/gender, and ethnicity were reported in 50% or more of the included studies. Age was reported in 22 studies, with participants being on average 21 years old (range 17 to 63 years). Sex, reported in 22 studies, identified 69% (n=8,292) of the participants as female, 30% (n=3,613) as male, less than one percent reported as missing (n=74), and less than one percent as other (n=36). Ethnicity was reported in 13 studies, with 68% (n=6,490) of participants described as white/Caucasian, 9% (n=884) Asian, 8% (n=691) other, 5% (n=516) multi-ethnic/mixed, 5% African (n=485), 3% (n=307) reported as missing, and 2% (n=199) Hispanic/Latino. Other sociodemographic characteristics, such as the participants' civil/relationship status, level of study/education, program of study, and employment status were not consistently collected, and many were reported in one study only.

Clinical and service use characteristics were inconsistently reported or omitted from the studies. While clinical characteristics were described in 14 studies, the majority of authors did not report on the same clinical characteristics, and service use characteristics were included in four studies, with two authors reporting on participants' contact with mental health services and three authors reporting on different service use characteristics. Participant characteristics are presented in Table 4.2. For complete details on participant characteristics, refer to Additional Table 15.0 in the Appendix.

Table 4.2 – Summary of Participant Characteristics

Socio-demographic Characteristics			
Socio-demographic Characteristic	Number of Studies	Total sample size	Mean weighted Frequency (%)
Age (years)	$\eta=22$	N=12,015	Mean: 21.1 Range: 17-63
Sex	$\eta=22$	N=12,015	Female: 8,292 (69) Male: 3,613 (30) Missing: 74 (<1) Other: 36 (<1)
Ethnicity	$\eta=13$	N=9,572	White/Caucasian: 6,490 (68) Asian: 884 (9) Other: 691 (8) Multi-ethnic/mixed: 516 (5) African 485 (5) Missing: 307 (3) Hispanic/Latino: 199 (2)

Objective Two: Prevalence of Symptoms of Psychosis in Sample Studies ($\eta=14$)

Of the included studies ($n=22$), having symptoms of psychosis were stipulated as part of the inclusion criteria for participant recruitment in five studies. To avoid skewing the prevalence results, these studies were excluded from this analysis. Furthermore, in three studies, information on prevalence was not provided. Thus, a total of 14 studies were used to report on the prevalence of symptoms of psychosis across the study participants.

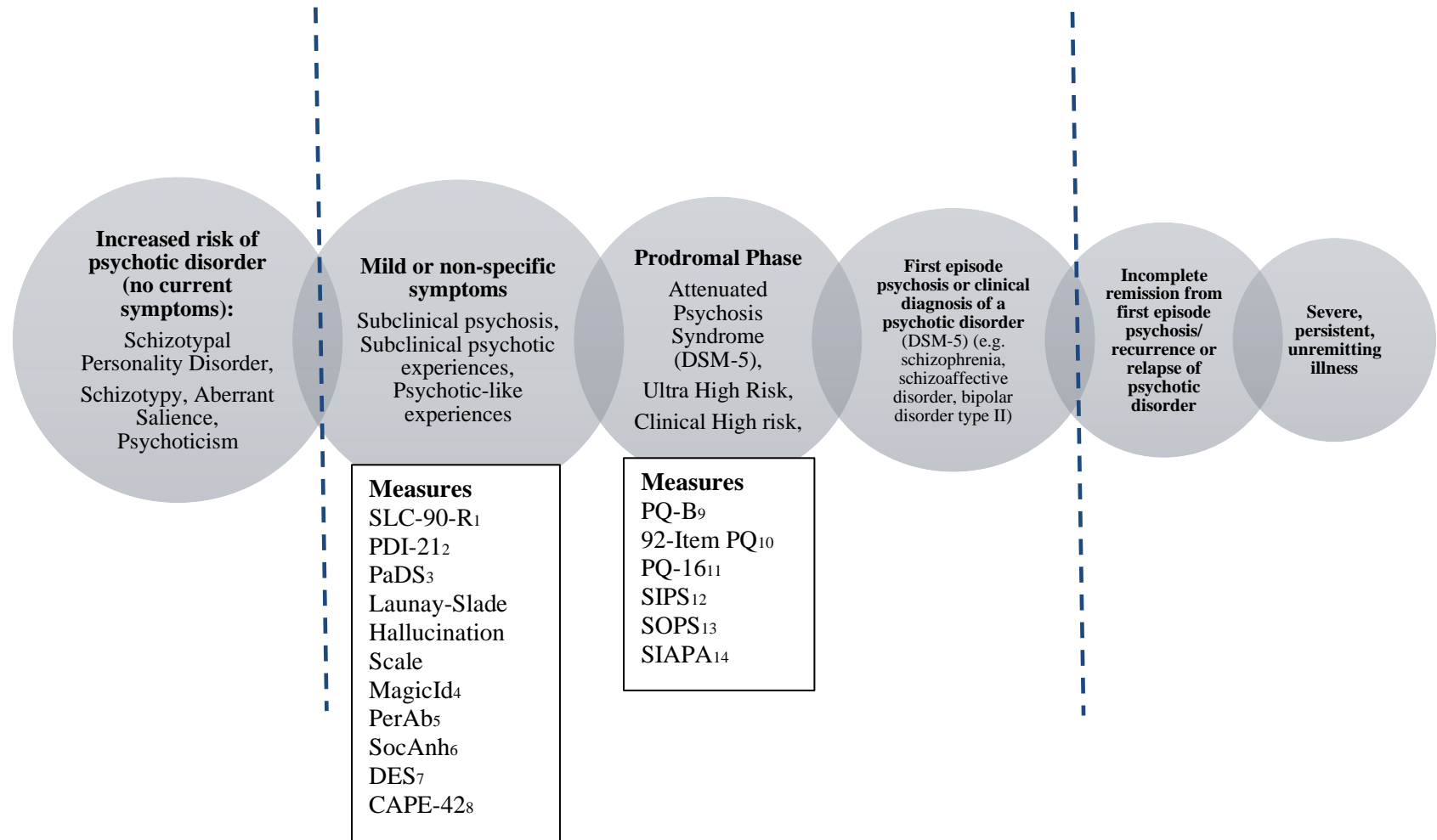
Overall Findings of Prevalence across Studies

The psychosis spectrum represented in this systematic review includes mild or non-specific symptoms, the prodromal phase of psychosis, and first episode psychosis or clinical diagnosis of a psychotic disorder. Based on this representation, eight authors measured mild or non-specific symptoms within their study samples (also referred to as subclinical psychosis, subclinical psychotic experiences, or psychotic-like experiences), and six authors assessed for symptoms

associated with the prodromal phase (including attenuated psychosis syndrome, clinical high risk, and ultra-high risk). There were no measures used that assessed for evidence of first episode psychosis or a clinical diagnosis of psychotic disorder. Across the 14 studies, authors used 11 different measurement tools, with six used in more than one study.

Eight authors reported prevalence of symptoms of psychosis as frequencies using six different measurement tools. Of these, three authors used two measurement tools as intended and six authors used four measurement tools in a modified way (e.g. reported on one item of the measurement tool, or part of the measurement tool). Six authors reported on symptoms of psychosis using mean scores using six different measurement tools. Of these, six authors used five measurement tools as intended, and one author used two measurement tools in a modified way (i.e. used a single item on one measurement tool and used half the items on another measurement tool). Each measurement tool used is mapped on the psychosis spectrum conceptual model in Figure 4.1. A complete description of measurement tools is presented in Additional Table 16.0 in the Appendix.

Figure 4.1 – Conceptual Diagram of the Identified Concepts Related to Psychosis (Adapted from Jackson & McGorry, 2009) with Related Measurement Tools



- 1SLC-90-R: Symptom Level Checklist-90-Revised
- 2PDI-21: Peters Delusion Inventory-21
- 3PaDS: Persecution and Deservedness Scale
- 4MagicId: Magical Ideation Scale
- 5PerAb: Perceptual Aberration Scale
- 6SocAnh: Social Anhedonia Scale
- 7DES: Dissociative Experiences Scale
- 8CAPE-42: Community Assessment of Psychotic Experiences-42
- 9PQ-B: Prodromal Questionnaire-Brief
- 10Item PQ: 92 Item Prodromal Questionnaire
- 11PQ-16: Prodromal Questionnaire-16
- 12SIPS: Structured Interview for Prodromal Symptoms
- 13SOPS: Scale of Prodromal Symptoms
- 14SIAPA: Structured Interview for Assessing Perceptual Anomalies

Prevalence Expressed as Frequencies across Studies ($\eta=8$)

Only prevalence of symptoms of psychosis expressed as frequencies is described in the following section because it is not possible to calculate a prevalence from a mean. Of the eight authors that reported prevalence of symptoms of psychosis as frequencies, six measurement tools were used. Measurement tools to assess for this outcome were used appropriately in three studies and modified in six studies.

Mild or non-specific symptoms ($\eta=3$).

Mild or non-specific symptoms of psychosis were measured in three studies with five different measurement tools. These tools included: the Peters Delusion Inventory-21 (PDI-21), Magical Ideation Scale (MagicId), Perceptual Aberration Scale (PerAb), Revised Social Anhedonia Scale (SocAnh), and the Community Assessment of Psychotic Experiences-42 (CAPE-42).

One author used a measurement tool appropriately. Cicero and colleagues (2015) reported that 8% ($n=162$) of participants met the threshold for high risk on the PerAb, MagicId, and/or SocAnh. The remainder of authors reported symptoms of psychosis in a modified way. Fonseca-Pedrero and colleagues (2016) reported that 96% ($n=317$) of participants endorsed at least one item on the PDI-21, but authors did not report the average number of items reported across participants. Two authors used the CAPE-42 measurement tool: Bernardini and colleagues (2017) reported that 54% ($n=139$) participants experienced at least one type of “positive psychotic symptom,” 64% ($n=165$) endorsed at least one type of “negative psychotic symptom,” and 74% ($n=189$) endorsed at least one type of “depressive psychotic symptom.” In contrast, Fonseca-Pedrero and colleagues (2016) reported that out of 660 participants, less than one percent endorsed “positive psychotic symptoms” on item 24 (“Do you ever feel as if the thoughts in your head are being taken away from you?”) and 20% endorsed “positive psychotic

symptoms” on item 6 (“Do you ever feel as if some people are not what they seem to be?”). In both cases, authors only reported participants’ endorsing at least one item on the CAPE-42, as opposed to the average of total items endorsed per positive, negative, depressive dimension, or as a total score across all three dimensions.

Prodromal symptoms ($\eta=5$).

The prodromal phase of psychosis was measured in five studies using three different measurement tools, including the Prodromal Questionnaire – Brief (PQ-B), 45 item positive subscale of the 92-item Prodromal Questionnaire, and the Prodromal Questionnaire – 16 (PQ-16). All instruments are self-report measurement tools. In the studies that measured the prevalence of prodromal symptoms, instruments to assess for this outcome were used appropriately in two studies and modified in three studies.

The PQ-16 was used in two studies, and was used appropriately, with 33% ($n=2,028$) of participants deemed clinical high risk for psychosis (a cut-off score of six) (Freeman et al., 2017; Wang et al., 2015). In other studies, the number of participants with prodromal symptoms was measured in a way that did not respect the original structure or format of the tool used. Most commonly, authors would use only one item of a multi-item scale without first determining whether the item was a valid and reliable indicator for the outcome. For example, Andorko and colleagues (2017) used the PQ-B and reported that among 409 participants, 83% ($n=337$) endorsed at least one symptom of psychosis, but authors did not report the average number of items endorsed across participants. The 45-item positive subscale of the 92-item prodromal questionnaire was used in two studies, with 88% ($n=1,159$) of participants endorsing at least one symptom of psychosis (Anglin et al., 2018; Gibson et al., 2014). Authors did not report the

average number of items endorsed across participants. Prevalence results are presented in Table 4.3.

Table 4.3 – Prevalence of Symptoms of Psychosis ($\eta=8$)

Author(s) (year)	Clinician- diagnosed or self-report	Used as Intended or Modified	N studies reporting	Total population	Frequency (%)	Measurement tool/ Interpretation of Result	*Quality Appraisal Score
	Mild or Non-Specific Symptoms						
Fonseca-Pedrero et al. (2016)	Self-report	Modified	N=1	N=330	317 (96%)	Peters Delusion Inventory (PDI-21) ₁ 96% of participants positively reported endorsing at least one item on the PDI-21, thus endorsed experiencing delusions at least once in their lifetime.	6/9
Cicero et al. (2015)	Self-report	Used as intended	N=1	N=2,100	162 (8%)	PerAb, MagicId, SocAnh ₂ 8% of the sample met the threshold for high risk on PerAb, MagicId, and/or SocAnh.	5/9
Bernardini et al. (2017)	Self-report	Modified	N=1	N=257	Positive psychotic symptom score (often, almost always): 139 (54%)	Community Assessment of Psychotic Experiences (CAPE-42) ₃ Over half the sample endorses at least 1 item on the positive, negative,	7/9

					Negative psychotic symptom score (often, almost always): 165 (64%)	or depressed dimension of the CAPE-42.	
					Depressive psychotic symptom score (often, almost always): 189 (74%)		
Fonseca-Pedrero et al. (2016)	Self-report	Modified	N=1	N=660	Item 24: Positive psychotic symptom score (often, almost always): 0.6%	Community Assessment of Psychotic Experiences (CAPE-42) ₃ Item 24: “Do you ever feel as if the thoughts in your head are being taken away from you?”	6/9
					Item 6 20.3%	Item 6: “Do you ever feel as if some people are not what they seem to be?”	

	Prodromal Phase						
Andorko et al. (2017)	Self-report	Modified	N=1	409	337 (83%)	Prodromal Questionnaire – Brief ⁴ 83% of the population in this study endorsed at least one psychotic-like experience.	6/9
Anglin et al. (2018)	Self-report	Modified	N=2	1,315	1,159 (88%)	45 item positive subscale of the 92-item Prodromal Questionnaires ⁵	7/9
Gibson et al. (2014)						88% of students endorsed at least one of the 45 positive psychotic items on the scale.	7/9
Freeman et al. (2017)	Self-report	Used as intended	N=2	6,091	2,028 (33%)	Prodromal Questionnaire – 16 ⁶ 33% of students reached the cut off score of greater than 6 for being deemed clinical high risk for psychosis.	9/9
Wang et al. (2015)							5/9

*Quality appraisal score was obtained using the JBI Appraisal Checklist for Studies Reporting Prevalence Data (2017).

1. Peters, E., Joseph, S., & Garety, P. (1999). Measurement of Delusional Ideation in the Normal Population: Introducing the PDI (Peters et al. Delusions Inventory). *Schizophrenia Bulletin*, 25(3), 553-576.
2. Eckblad, M., Chapman, L., & Garfield, Sol, L. (1983). Magical ideation as an indicator of schizotypy. *Journal of Consulting and Clinical Psychology*, 51(2), 215-225.
Chapman, L. J., Chapman, J. P., & Raulin, M. L. (1978). Body-image aberration in Schizophrenia. *Journal of Abnormal Psychology*, 87(4), 399-407.
Chapman, L. J., Chapman, J. P., Raulin, M. L., & Eron, L. (1976). Scales for physical and social anhedonia. *Journal of Abnormal Psychology*, 85(4), 374-382.
3. Stefanis, N. C., Hanssen, M., Smirnis, N. K., Avramopoulos, D. A., Evdokimidis, I. K., Stefanis, C. N., . . . Van Os, J. (2002). Evidence that three dimensions of psychosis have a distribution in the general population. *Psychological Medicine*, 32(2), 347-358.
<http://dx.doi.org/10.1017/S0033291701005141>
4. Loewy, R. L., Pearson, R., Vinogradov, S., Bearden, C. E., & Cannon, T. D. (2011). Psychosis risk screening with the Prodromal Questionnaire--brief version (PQ-B). *Schizophrenia research*, 129(1), 42-6.
5. Loewy, R., Bearden, C., Johnson, J., Raine, A., & Cannon, T. (2005). The prodromal questionnaire (PQ): Preliminary validation of a self-report screening measure for prodromal and psychotic syndromes. *Schizophrenia Research*, 77(2-3), 141-149.
6. Ising, H. K., Veling, W., Loewy, R. L., Rietveld, M. W., Rietdijk, J., Dragt, S., Klaassen, R. M., Nieman, D. H., Wunderink, L., Linszen, D. H., . . . van der Gaag, M. (2012). The validity of the 16-item version of the Prodromal Questionnaire (PQ-16) to screen for ultra high risk of developing psychosis in the general help-seeking population. *Schizophrenia bulletin*, 38(6), 1288-96. <https://doi-org.proxy.bib.uottawa.ca/10.1093/schbul/sbs0>

In summary, none of the included studies were designed as prevalence studies but reported on the prevalence of symptoms of psychosis using a variety of measurement tools. Prevalence scores were mostly reported as individuals' endorsing at least one item on the tool as opposed to a report of total scores, and some authors reported means instead of percentages, therefore it was not possible to calculate a total prevalence score of psychosis across study participants. A detailed description of prevalence of psychosis results reported across studies, including those which did not use frequencies or percentages, is presented in Additional Table 17.0 in the Appendix.

Objective Three: Risk Factors ($\eta=18$)

I categorized risk factors according to the Diathesis Stress Model of Schizophrenia. A rationale for categorizing each risk factor is presented in Additional Table 18.0 in the Appendix. Seven authors reported on psychological risk factors, three reported on environmental risk factors, two authors reported on early life adversity risk factors, one neurobiological risk factor was investigated, and 12 authors reported on 20 risk factors that did not fit into the theoretical confines of the model, therefore were classified as “other.” No authors reported on risk factors related to genetic predisposition or brain structure abnormality. Below is a detailed description of results according to each Diathesis Stress Model of Schizophrenia category.

Chronic or Repeated Stress: Psychological Stressors ($\eta=7$)

In seven studies, authors measured the effect of chronic or repeated psychological stress on symptoms of psychosis, including substance use ($n=4$ studies), social factors ($n=2$ studies), traumatic life experiences across the lifespan ($n=1$ study), and family functioning ($n=1$ study). Substance use was positively related to symptoms of psychosis ($p \leq 0.05$) (Andorko et al., 2017; Bernardini et al., 2017; Fonseca-Pedrero et al., 2016; Skinner et al., 2010). Specifically, cannabis use, alcohol use, designer drug use, and ‘any drug use’ were statistically significantly associated with symptoms of psychosis. There were not enough data to reach a conclusion regarding the relationship between social factors, traumatic life experiences across the lifespan, family functioning, and symptoms of psychosis.

Chronic or Repeated Stress: Environmental Stressors ($\eta=3$)

In three studies, authors measured the effect of chronic or repeated environmental stress on symptoms of psychosis, including ethnic identity, perceived relative deprivation, general belief in a just world, personal belief in a just world, trust in society, social rank, index of multiple

deprivation (all n=1 study), and racial discrimination (n=2 studies). There were not enough data to reach a conclusion regarding any of the environmental risk factors, with the exception of racial discrimination. A positive trend was found between experiencing racial discrimination and symptoms of psychosis ($p \leq 0.05$) (Anglin et al., 2018; Anglin et al., 2014).

Early Life Adversity ($\eta=2$)

In two studies, risk factors related to early life adversity were investigated, including childhood attachment styles (Pickering et al., 2017), childhood bullying, and childhood sexual trauma (Nam et al., 2016). There were not enough data to reach a conclusion regarding these risk factors.

Neurobiological ($\eta=1$)

Bruenig and colleagues (2014) investigated whether genes involved in the dopamine system are related to stress and symptoms of psychosis. DNA samples were taken from participants in the form of saliva samples to look at single nucleotide polymorphisms (SNPs) (a variation in a single base pair on a DNA sequence, which typically have three genotypes CC, CT, and TT) on different genes and their association with symptoms of psychosis. There were not enough data to reach a conclusion regarding this neurobiological risk factor.

Other ($\eta=12$)

A total of 12 studies included 20 different risk factors categorized as “other.” Six studies included co-morbid mental health problems, specifically depression (n=4 studies), anxiety (n=2 studies), internet addiction (n=1 study), co-morbid psychopathology in general (n=1 study), personal history of mental health problems (n=1 study), and sleep dysfunction (n=1 study). In addition to co-morbid mental health problems, other risk factors investigated included age (n=5 studies), sex/gender (n=4 studies), self-esteem (n=2 studies), aberrant salience (n=2 studies), self-concept clarity (n=2 studies), family income (n=2), poor well-being, resilience, family

history of mental health problems, race, ethnicity, immigrant status, stress sensitivity, and identification with ones' country of birth (all $n=1$ study).

Depression was positively related to experiencing symptoms of psychosis ($p \leq 0.05$) (Andorko et al., 2017; Anglin et al., 2018; Anglin et al., 2014; Nam et al., 2016). Further, there was a positive trend between anxiety and symptoms of psychosis ($p \leq 0.05$) (Anglin et al., 2018; Anglin et al., 2014). There were not enough data to reach a conclusion regarding the risk factors internet addiction, co-morbid psychopathology in general, personal history of mental health problems, poor well-being, or sleep dysfunction.

A significant inverse relationship was found between age and symptoms of psychosis, meaning younger PS students were more prone to experiencing symptoms of psychosis ($p \leq 0.05$) (Anglin et al., 2018; Anglin et al., 2014; Gibson et al., 2014; McIntyre et al., 2018; Skinner et al., 2010). Sex/gender was not statistically significantly related to symptoms of psychosis (Anglin et al., 2014; Gibson et al., 2014; Nam et al., 2016). Four trends were found, including: 1) an inverse relationship between self-esteem and symptoms of psychosis ($p \leq 0.05$) (Cicero et al., 2015; Shi et al., 2016); 2) a positive relationship between aberrant salience and symptoms of psychosis ($p \leq 0.05$) (Cicero et al., 2018; Cicero et al., 2015); 3) an inverse relationship between self-concept clarity and symptoms of psychosis ($p \leq 0.05$) (Cicero et al., 2018; Cicero et al., 2015); and 4) there was no relationship between family income and symptoms of psychosis (Anglin et al., 2018; Anglin et al., 2014). Aberrant salience is the incorrect assignment of salience, or significance/importance to innocuous stimuli (Kapur, 2003). Self-concept clarity refers to how clear, consistent, stable, and confident one's self concepts are (Stinson, Wood & Doxey, 2008).

There were not enough data to reach a conclusion regarding the risk factors resilience, family history of mental health problems, race, ethnicity, immigrant status, stress sensitivity, or identification with ones' country of birth. Risk factor results are presented in Table 4.4.

Table 4.4 – Summary of Risk Factor Results Organized by the Diathesis Stress Model of Schizophrenia ($\eta=18$)

	Factor	Authorship (date)	Relationship	Significance $p \leq 0.05$		Conclusion/Trend
				BV	MV	
Chronic and Repeated Stress: Psychological Stressors	Substance Use	Bernardini et al. (2017)	+	S	.	2/2 MV (+) 3/3 BV (+) Substance use is positively related to experiencing symptoms of psychosis.
		Skinner et al. (2010)	+	S	.	
		Andorko et al. (2017)	+	.	S	
		Fonseca- Pedrero et al. (2016)	+	S	S	
	Social support	Shi et al. (2016)	-	S	S	1/1 MV (-) 1/1 BV (-) Not enough data to assess.
	Traumatic life experiences (TLE)	Gibson et al. (2014)	+	S	S	1/1 MV (+) 1/1 BV (+) Not enough data to assess.
	Family functioning	Wang et al. (2015)	-	S	.	1/1 BV (-) Not enough data to assess.
	Social identification	McIntyre et al. (2018)	-	S	S	1/1 MV (-) 1/1 BV (-) Not enough data to assess.
Chronic and Repeated Stress: Environmental Stressors	Friendship group variables	McIntyre et al. (2018)	-	S	S	1/1 MV (-) 1/1 BV (-) Not enough data to assess.
	Perceived Relative Deprivation	Wickham et al. (2014)	x	S	NS	1/1 MV (x) 1/1 BV (-) Not enough data to assess.

	General belief in a just world	Wickham et al. (2014)	-	S	NS	1/1MV (x) 1/1 BV (+) Not enough data to assess.
	Personal belief in a just world	Wickham et al. (2014)	-	S	NS	1/1MV (x) 1/1 BV (+) Not enough data to assess.
	Trust	Wickham et al. (2014)	-	S	NS	1/1MV (x) 1/1 BV (+) Not enough data to assess.
	Social rank	Wickham et al. (2014)	-	S	NS	1/1MV (x) 1/1 BV (+) Not enough data to assess.
	Index of multiple deprivation	Wickham et al. (2014)	+	S	NS	1/1MV (x) 1/1 BV (+) Not enough data to assess.
	Immigrant status	Anglin et al. (2014)	x	NS	.	1/1 BV (x) Not enough data to assess.
	Racial discrimination	Anglin et al. (2018)	+	S	S	2/2 MV (+) 1/1 BV (+)
		Anglin et al. (2014)	+	.	S	Trend: There is a positive relationship between experiencing racial discrimination and symptoms of psychosis.
Early Life Adversity	Attachment style: anxiety	Pickering et al. (2017)	+	S	S	1/1 MV (+) 1/1 BV (+) Not enough data to assess.
	Attachment style: avoidance	Pickering et al. (2017)	+	S	S	1/1 MV (+) 1/1 BV (+) Not enough data to assess.
	Childhood bullying	Nam et al. (2016)	+	S	S	1/1 MV (+) 1/1 BV (+) Not enough data to assess.

	Childhood sexual trauma	Nam et al. (2016)	+	S	S	1/1 MV (+) 1/1 BV (+) Not enough data to assess.
Neurobiological	SNP rs17601612 on the DRD2 gene, rs2494732 on the AKTI gene, and rs6589386 on the DRD2 gene	Bruenig et al. (2014)	+	.	S	1/1 MV (+) Not enough data to assess.
	Genotype CC on SNP rs 17601612, rs 2494732, and rs6589386	Bruenig et al. (2014)	+	.	S	1/1 MV (+) Not enough data to assess.
Other	Age	Gibson et al. (2014)	x	NS	.	2/2 MV (-) 3/3 BV (-) There is a significant relationship between younger age and symptoms of psychosis.
		McIntyre et al. (2018)	-	.	S	
		Skinner et al. (2010)	-	S	.	
		Anglin et al. (2014)	-	S	.	
		Anglin et al. (2018)	-	S	S	
	Depression	Nam et al. (2016)	+	.	S	3/3 MV (+) 3/3 BV (+) Depression is positively related to experiencing symptoms of psychosis.
		Andorko et al. (2017)	+	S	S	
		Anglin et al. (2018)	+	S	S	
		Anglin et al. (2014)	+	S	.	

	Male sex	Nam et al. (2016)	x	NS	.	3/3 BV (x) 1/4 MV (+) There is no relationship between sex and symptoms of psychosis.
		Gibson et al. (2014)	x	NS	.	
		Anglin et al. (2014)	x	NS	.	
		Skinner et al. (2010)	+	.	S	
	Self-esteem	Shi et al. (2016)	-	S	S	1/1 MV (+) 2/2 BV (+) Trend: Self-esteem is negatively associated with symptoms of psychosis.
		Cicero et al. (2015)	-	S	.	
	Anxiety	Anglin et al. (2014)	+	S	.	1/1 MV (+) 2/2 BV (+) Trend: Anxiety is related to symptoms of psychosis.
		Anglin et al. (2018)	+	S	S	
	Ethnicity	Anglin et al. (2014)	x	NS	.	1/1 MV (+) 1/1 BV (x) Not enough data to assess.
		Cicero et al. (2018)	+	.	S	
	Ethnic identity	Anglin et al. (2018)	x	NS	.	1/1 BV (x) Not enough data to assess.
	Family income	Anglin et al. (2018)	x	NS	.	2/2 BV (x) Trend: Family income is not related to symptoms of psychosis.
		Anglin et al. (2014)	x	NS	.	
	Aberrant Salience	Cicero et al. (2015)	+	S	.	2/2 BV (+) Trend: Aberrant salience is related to symptoms of psychosis.
		Cicero et al. (2018)	+	S	.	
	Self-Concept Clarity	Cicero et al. (2015)	-	S	.	2/2 BV (-) Trend: Self-concept clarity is negatively associated with symptoms of psychosis.
		Cicero et al. (2018)	-	S	.	
	Family history of mental health problem	Skinner et al. (2010)	+	.	S	1/1 MV (+) Not enough data to assess.

	Resilience	Shi et al. (2016)	-	S	.	1/1 BV (-) Not enough data to assess.
	Poor well-being	Wickham et al. (2014)	+	S	NS	1/1MV (x) 1/1 BV (+) Not enough data to assess.
	Stress sensitivity	Gibson et al. (2014)	+	S	.	1/1 BV (+) Not enough data to assess.
	Country of birth identification	McIntyre et al. (2018)	+	.	S	1/1 MV (+) Not enough data to assess.
	Race	Nam et al. (2016)	x	NS	.	1/1 BV (x) Not enough data to assess.
	Internet addiction	Alavi et al. (2010)	+	S	S	1/1 MV (+) 1/1 BV (+) Not enough data to assess.
	Co-morbid psychopathology	Shi et al. (2017)	+	S	.	1/1 BV (+) Not enough data to assess.
	Personal history of mental health problem	Skinner et al. (2010)	+	.	S	1/1 MV (+) Not enough data to assess.
	Sleep dysfunction	et al. Andorko (2017)	+	S	S	1/1 MV (+) 1/1 BV (+) Not enough data to assess.

BV: bivariate data

MV: multivariate data

(+): positive association

(-): negative, or inverse association

x: no relationship

S: significant

NS: not significant

.: not tested

Objective Four: Interventions ($\eta=5$)

Five studies reported on an intervention for PS students with symptoms of psychosis. Each intervention was different, therefore a narrative description of the interventions using the Template for Intervention Description and Replication (TIDieR) (Hoffman et al., 2014), as well as outcomes, is provided below. Three intervention studies were included, and two case reports. A complete description of each intervention is presented in Additional Table 19.0 in the Appendix.

Intervention Studies: Randomized Controlled Trials ($\eta=3$)

The effects of improving sleep on mental health (OASIS): A randomised controlled trial with mediation analysis (Freeman et al., 2017).

A total sample size of 3,755 PS students were randomized to a treatment group ($n=1,891$) and a control group ($n=1,864$). Participants engaged in an individual web-based virtual intervention called “Sleepio.” Sleepio is based on cognitive behavioral therapy (CBT) and aims to improve sleep in individuals with insomnia and ultimately decrease symptoms of psychosis (Freeman et al., 2017, p. 749). The intervention was delivered once and included six sessions over ten weeks, each lasting an average of 20 minutes. Participants completed an initial online assessment, which was then processed through an algorithm that personalized the program to best suit the needs of the participant. Completion of daily sleep diaries also allowed for individualized advice as part of the intervention. The treatment included behavioural techniques (e.g. sleep restriction, stimulus control, relaxation), cognitive techniques (e.g. paradoxical intention, belief restructuring, mindfulness, imagery), and educational components (e.g. information about sleep hygiene, sleep processes). This content was presented by an online therapist and participants had

access to an online community and library of information about sleep. Outcomes included the intervention effects on paranoia, hallucinations, mania, and psychotic experiences.

Results.

Over the three time points (week three, ten, and 22), the sleep treatment resulted in significant reductions in paranoia and hallucinations in the treatment group ($p < 0.0001$) and small reductions in psychotic experiences. At weeks ten and 22, there was a significant reduction in the treatment group on mania scores ($p < 0.0001$). Adjusting for sex and year of PS schooling, sleep treatment also led to improvements in prodromal symptoms at weeks ten and 22 ($p < 0.0001$). Lastly, participants randomized to the sleep treatment were less likely to meet criteria for ultra-high risk of psychosis at weeks ten ($p < 0.0001$) and 22 ($p = 0.00026$).

Effects of rational emotive behaviour therapy (REBT) intervention program on mental health in female college students (Lu & Xiu, 2017).

A total of 60 female PS students randomized to a treatment group ($n = 25$) and control group ($n = 35$) participated in a rational emotive behaviour therapy (REBT) intervention program on perceived mental health symptoms (including paranoid thoughts and psychosis) (Lu & Xiu, 2017, p. 157). The intervention occurred once. Participants attended REBT group therapy sessions one day a week for 35 to 40 minutes, and this spanned over eight weeks. The adherence rate was 100%. REBT is CBT-based and explores ten irrational beliefs (e.g. every human being should be efficient, responsible, and successful in any situation, the origins of all events are outside the individual, etc.). Students participated in group discussions at a university with a REBT therapist, who facilitated group discussions and challenged participants views about accepting or rejecting the educational materials. Participants were also given homework assignments, which were reviewed at subsequent sessions.

Results.

The Symptom Checklist-90-Revised was used to measure mental health symptoms and was validated in the study. The authors provided a table with mean scores of paranoia and psychosis before and after the intervention; no ANOVA result scores or significance values were reported in the table or text, therefore it is difficult to determine the effects of the intervention on symptoms of psychosis.

Systemic therapy for youth at clinical high risk for psychosis: A pilot study (Shi et al., 2017b).

This study was a single-blind randomized control trial that employed systemic therapy (ST) as an intervention to a total sample of 26 students experiencing symptoms of psychosis. Students were randomized to a treatment group (n=13) and a control group (n=13). The goal of the intervention was to help participants contextualize symptoms of psychosis by addressing the individuals' social systems (Shi et al., 2017b, p. 2). ST is based on a solution-focused model that is solution and resource oriented; it helps reframe an individual's problem(s) by using a variety of questioning techniques, to explore and strengthen available resources, and to open up possibilities to solve problem(s) (Shi et al., 2017b, p. 2-3). In the study, a trained systemic therapist with ten years of experience provided in-person group therapy sessions. The intervention spanned over ten weeks, with one 50 minute session per week. Participants were also given homework assignments. The intervention was broken up into four phases: (1) introduction and clarification of therapeutic goals; (2) understanding the context of identified problems and exploring resources and solutions and putting solutions into action; (3) reinforcement of changes; and (4) relapse prevention (Shi et al., 2017b, p. 4). Therapeutic goals

and solutions to identified problem(s) were individual-focused. The adherence rate was not reported.

Results.

The Scale of prodromal symptoms was utilized to evaluate outcomes; however validation of the tool for this study population was not reported. Participants in the treatment group demonstrated significant decreases in severity of “positive psychotic symptoms” compared to baseline ($p=0.005$), whereas the control group did not. There were no statistically significant improvements in “negative psychotic symptoms” in either group.

Post-intervention, eight participants (62%) in the treatment group and six participants (46%) in the control group were reported to be in remission from initial clinical high risk status (measured using the Structured Interview for Prodromal Symptoms), but the reduction was not significant. The conversion rate to psychosis was approximately 4% (1/26), meaning one student developed bipolar disorder during the follow-up period.

Case Reports ($\eta=2$)

Enhancing the therapy relationship in acceptance and commitment therapy for psychotic symptoms (Baruch et al., 2009).

Acceptance and commitment therapy (ACT) and functional analytic therapy (FAP) was used as an intervention for symptoms of psychosis in a case study ($n=1$). The individual was a 21-year-old male PS student. The primary treatment goals outlined were to increase the participants capacity to respond mindfully to paranoid thoughts, move toward personal values, increase mindful reactions to internal experiences, and to pursue individual goals (Baruch et al., 2009, p. 247). ACT focuses on altering individual responses to symptoms of psychosis and increasing psychological flexibility by targeting six core processes (acceptance, diffusion, self-as context,

contact with the present moment, values and committed action) (Baruch et al., 2009, p. 242).

FAP aims to improve interpersonal functioning by applying basic behavioural principles, and focuses on clinically relevant behaviours conceptualized as problematic and also highlights instances of client improvement.

The student attended 37 weekly and biweekly therapy sessions with a therapist over approximately one year. The sessions were tailored to meet personal goals, and a therapeutic relationship between the participant and therapist was developed over the span of treatment sessions. The author outlined a few complicating factors that interfered with therapy: (1) levels of abdominal pain experienced by the participant due to a chronic intestinal disorder, and (2) incompatibility between ACT and FAP principles (combining interpersonal as well as intrapersonal variables).

Results.

Outcomes were measured in two ways: assessment of psychotic disorder after treatment using a structured clinical interview based on the DSM-IV, and the participant self-monitoring the frequency of psychotic symptoms. After the intervention, the participant no longer met criteria for any mental health disorder, although he reported occasional psychotic symptoms, which only mildly interfered with every day functioning (Baruch et al., 2009, p. 253).

Motivational interviewing in a patient with schizophrenia to achieve treatment collaboration: A case study (Ertem & Duman, 2016).

Motivational interviewing (MI) was used as an intervention in this case study (n=1). The individual was a 22-year-old male, treatment resistant PS student with a psychotic disorder. MI is intended to evoke behavioural changes and is a common therapeutic intervention used in nursing practice, counselling, etc., and is employed during therapy sessions with homework assignments.

Clinicians assess individual barriers to change, explore ambivalent feelings, and tailor each interview to meet the person's needs. The goals of the intervention in this case study were to improve treatment collaboration and medication adherence. The individual met with a PhD student in the psychiatric nursing department certified in MI techniques, over the span of six weeks (one session per week for 45 minutes). Over the course of the six interviews, barriers to changing attitudes and ambivalence about medication adherence were explored, in addition to improving understanding of side effects and benefits of medication. Reflective listening, summarizing, and open-ended questions were used to facilitate therapy sessions, and the therapist focused on helping the individual change and supported continuation of treatment.

Results.

As a result of MI, there was a change in responses in the Morisky Medication Adherence Scale (a change from low adherence to moderate adherence), and the Drug Attitude Inventory scale (improvements in difficulty taking medications and reducing the possibility of a new exacerbation by continuing to use [medications]) before and after the intervention. Improvements were also captured through the client's description of his progress.

Objective Five: Experiences of Symptoms of Psychosis ($\eta=3$)

In three studies, the experiences of PS students with symptoms of psychosis were explored. Sung and Puskar (2006) did not include any quotes or exemplars and I attempted unsuccessfully to connect with the authors. Roy and colleagues (2016) did not provide definitions of categories or subcategories, and only provided four credible exemplars or quotes from PS students with first episode psychosis. After reaching consensus with committee members, meta-aggregation was not possible. Therefore, a narrative description of each article is provided below. A complete description of each study is presented Additional Table 20.0 in the Appendix.

Postsecondary Academic Achievement and First-Episode Psychosis: A Mixed-Methods Study (Roy et al., 2016)

The first study was a mixed-methods (cross-sectional survey and grounded theory) study exploring the academic experience of 11 PS students with first episode psychosis (FEP). The qualitative, grounded theory portion of the study had the following aim: “to explore the processes, personal, and environmental factors associated with positive and negative outcomes in this endeavor as well as the strategies used by students who live with FEP” (Roy et al., 2016, p. 43-44). The authors hypothesized that “individuals with FEP who are enrolled in educational programs would be younger, have more friends, and be more likely to be involved in romantic relationship than those who are not” (Roy et al., 2016, p. 43). Authors highlighted that students with FEP rely more on motivation and personal goals to succeed academically than students without FEP because they have difficulties with cognitive skills and social skills. The authors concluded that these cognitive and social difficulties experienced by PS students with FEP highlight the need to integrate interventions or strategies to help improve these aspects of their daily lives while attending school.

Schizophrenia in College Students in Korea: A Qualitative Perspective (Sung & Puskar, 2006)

The objective of this qualitative study was to “identify the salient themes that characterize the life experiences of college students with schizophrenia over the period spanning the academic years leading up to and just after entering college” (Sung & Puskar, 2006, p. 22). Students (n=21) with schizophrenia were recruited for in-depth interviews. Findings were grouped into 25 themes and six sub-categories that reflected the life experiences of the college students (Sung & Puskar, 2006, p. 25). These categories were: 1) experiences involving family interactions (broken

down into four sub-categories), 2) experiences involving interactions with friends (five sub-categories), 3) experiences of school life (broken down into five sub-categories), 4) experiences of everyday life (broken down into three sub-categories), 5) experiences of social role performance (broken down into three sub-categories), and 6) experiences of a mental illness (broken down into five sub-categories).

The article counted the frequency of each sub-category, but no quotes or exemplars were provided. Overall, most participants had little to no contact their family, encountered loneliness, and had difficulty making (or withdrew from) friends, (Sung & Puskar, 2006, p. 29).

Participants often stayed away from school due to psychiatric relapse, which interfered with academic progress (Sung & Puskar, 2006, p. 30). Although more negative experiences were reported than positive, some participants described positive feelings about school and a desire to continue to pursue academic goals (Sung & Puskar, 2006, p. 30). Without quotes or exemplars, it was not possible to aggregate data from this study with the others or make any inferences or conclusions.

Comparing Life Experiences of College Students with Differing Courses of Schizophrenia in Korea: Case Studies (Sung et al., 2006)

The third study explored the experiences of eight college students with schizophrenia. The aim of this study was “to identify the students’ subjective experiences according to their disease progression” (Sung et al., 2006, p. 83). This study was an extension of the study by Sung and Puskar (2006), and questions during in-depth interviews were based on the themes identified from the study by Sung and Puskar (2006). The authors identified three disease courses (recovering course, deteriorating course, and fluctuating course of schizophrenia) accompanied by sub-categories. The recovering course of illness was defined as “...maintaining their school

life and social activities, and they were interacting with friends...complying with their treatment and were being in symptom remissions” (Sung et al., 2006, p. 84). Participants highlighted academic success as being key to a normal life, school and career prospects gave their lives meaning, and family and other social supports helped them engage in school life and provided them with emotional support.

The deteriorating course of illness was defined as “...getting worse positive and negative schizophrenic symptoms than before... [and showing] diminished participation in social activities, more absences from school, and fewer peer relationships” (Sung et al., 2006, p. 86). The fluctuating course of illness was defined as “repeatedly getting worse and better during college life” (Sung et al., 2006, p. 87). Loneliness and social withdrawal were illustrated during the deteriorating and fluctuating course of illness, which had a negative effect on the wellbeing of students. Symptoms also interfered with academic success due to cognitive difficulties. Overall, students expressed individual and unique issues and difficulties, but all students experienced despair and stigma due to having a mental illness.

Chapter Five: Integrated Discussion, Limitations, Strengths, and Conclusion

In this chapter, I present a summary of my findings, the limitations and strengths of the study, three key discussion points, implications for clinical practice, policy, research, and education, and a conclusion.

Summary of Findings

The aims of this systematic review were to: 1) synthesize the available evidence on the socio-demographic, clinical, and service-use characteristics of PS students; 2) identify the prevalence of PS students with symptoms of psychosis based on samples included in studies on the topic; 3) describe the factors associated with the development of symptoms of psychosis in PS students; 4) assess the effectiveness of interventions for PS students with symptoms of psychosis; and 5) explore the experiences of PS students who have symptoms of psychosis. Twenty-six articles representing twenty-two studies were included in the review: 14 reported on prevalence, 18 reported risk factors, five were interventions, and three explored the experiences of PS students with symptoms of psychosis. Participants were on average 21 years old, 69% identified as female, and 68% identified as white or Caucasian.

Across the 14 studies that included prevalence data, authors used 11 different measurement tools to assess the prevalence of symptoms of psychosis. In addition to the heterogeneity of instruments used, some authors reported prevalence data using mean psychosis scores. This is problematic because presenting prevalence as a mean does not allow the reader to know how many of the study participants experienced or reported the outcome (in this case, symptoms of psychosis). Instead, mean scores represent the average number of symptoms endorsed on the measurement tool by the participants (as an aggregate), and thus these studies

were excluded when assessing overall prevalence of symptoms of psychosis. Of the studies reporting a true prevalence of the outcome within their sample (expressed as a percentage or number of participants with symptoms of psychosis), in only three studies, was the outcome measured and reported appropriately: 1) Cicero and colleagues (2015) reported 8% of participants (n=2,100) had mild or non-specific symptoms; 2) 33% of participants were experiencing the prodromal phase of psychosis across two studies (Freeman et al., 2017; Wang et al., 2015). In summary, it was not possible to calculate the total prevalence of symptoms of psychosis across study participants.

I categorized risk factors according to the Diathesis Stress Model of Schizophrenia, which includes five broad categories of risk factors. In the studies, neurobiological risk factors (n=1 study), early life adversity risk factors (n=2 studies), psychological risk factors (n=7 studies), and environmental risk factors (n=3 studies) were represented. There were also 20 risk factors that did not fit within the confines of the model, which I classified as “other”. Based on the vote-counting approach used, I was able to make conclusions for four risk factors. Specifically, substance use, depression, and younger age were positively associated with symptoms of psychosis, and sex/gender (i.e. being male versus female) was not related to having symptoms of psychosis. I also identified six risk factors that demonstrated trends (i.e. potentially related to symptoms of psychosis); however, they were explored in less than four studies. These included a potential positive relationship between experiencing racial discrimination, aberrant salience, or having anxiety and symptoms of psychosis, no relationship between a family’s income and symptoms of psychosis, and a negative (inverse) relationship between self-esteem and self-concept clarity and symptoms of psychosis.

Interventions for PS students with symptoms of psychosis were reported in five studies, including an online CBT-based intervention, Rational Emotive Behaviour Therapy, Systemic Therapy, the combination of Acceptance and Commitment therapy and Functional Analytic therapy, and Motivational Interviewing. Authors evaluated interventions using different methods and designs, and outcomes were mixed. Therefore, I was unable to reach conclusions regarding the effectiveness of interventions for PS students with symptoms of psychosis. Similarly, the experiences of PS students with symptoms of psychosis were explored in three studies with differing aims and only one study included sufficient quotes and exemplars, making meta-aggregation of the findings inappropriate. More research is clearly needed to test the effectiveness of interventions and to explore the experiences of students who experience symptoms of psychosis.

Limitations of the Thesis

While I followed rigorous methods in the conduct and reporting of this systematic review, there are some limitations to be mentioned. First, although the search was systematic and co-created and conducted with a health sciences librarian, grey literature was not searched. It is possible that I missed relevant grey literature reporting on prevalence, risk factors, interventions, and experiences of symptoms of psychosis in PS students. Second, only studies published in English were included, therefore papers written in other languages were excluded. This might have resulted in the exclusion of relevant studies published in other languages. Third, because of the inconsistency in reporting of the association between risk factors and symptoms of psychosis in the included studies, a vote-counting approach was used to make meaning out of the data. Several disadvantages can be associated with using a vote-counting approach, because it does not take into account effect sizes, does not give magnitudes to associations, nor precision of the

reported scores (Dilig-Ruiz, 2017). Finally, performing meta-analysis to determine the effectiveness of interventions was not possible because of the heterogeneity of interventions and I was unable to report on the total prevalence score of psychosis across the studies.

Strengths of the Thesis

While there are limitations, a few strengths are worth mentioning. First, results from this study were heterogeneous; despite this, we were able to synthesize and make meaning of data using creative techniques. Second, embedding an iKT approach within the study and working alongside KUs fostered dynamic relationships between researchers and KUs, and also highlighted meaningful and tangible implications for clinical practice, future research, education, and academic policy. Lastly, the broad nature of the systematic review highlighted the state of science on PS students with symptoms of psychosis, including sociodemographic, clinical, service-use characteristics, prevalence data, risk and protective factors, interventions, and the experiences of these students. Although results were largely inconclusive, this study will hopefully serve as a base for researchers embarking on future research areas related to this topic.

Discussion

Discussion Point One: State of Science

Prevalence of symptoms of psychosis.

The prevalence of symptoms of psychosis was measured across studies using a variety of measurement tools. Measurement tools were often modified, as evidenced by some authors reporting prevalence as individuals' endorsing at least one item on the tool as opposed to a report of total scores. Additionally, some authors reported means instead of percentages. For these reasons, it was not possible to calculate a total prevalence score of symptoms of psychosis across study participants. Lastly, quality appraisal scores of prevalence data varied, between 4/9 to 9/9,

with the majority of studies (n=8) scoring between 5/9 and 6/9. In summary, I recommend consistent use of validated measurement tools, and reporting total scores on measurement tools. This would enable future research studies to gather comprehensive and accurate data on the prevalence of symptoms of psychosis among PS students.

Sex and gender.

All authors reported participants as “female” or “male,” and only one author included the category of “other” (Freeman et al., 2017) without specifying what “other” meant. It is possible that the terms sex and gender were used interchangeably, which is problematic because these two terms have different meanings. There is evidence indicating that differences exist in health status, development of certain diseases, responses to medical treatments, and health care seeking behaviours between the sexes (biological attributes) and genders (socio-cultural factors) (CIHR, 2018; Regitz-Zagrosek, 2012). Accurately distinguishing between sex and gender, accounting for both of these variables in research, and moving towards a less binary representation is necessary to foster research that is representative of and transferable to diverse populations.

For psychosis, understanding sex and gender differences when identifying and treating the disorder is important because these attributes may be related to disease onset, symptomology, and treatment options (Li, Ma, Wang, Yang, & Wang, 2016). Unfortunately, even in the evidence supporting this claim, the authors (Li et al., 2016) do not clearly differentiate between sex and gender. Thus, using the term ‘men’ to represent ‘men and/or biologically male’ and ‘women’ to represent ‘women and/or biologically female’ is problematic. For the population as a whole, clinically, biologically male persons tend to have more negative and severe symptoms than biologically female persons, and females often present with more mood disturbance and affective symptoms (Li et al., 2016) than males. Among the entire population, the incidence of

psychosis is also higher in males than females, with onset typically earlier in males (between 18-25) than in females (between 25-35) (Ochoa, Usall, Cobo, Labad, & Kulkarni, 2012). According to the World Health Organization (2018), schizophrenia is more common among ‘men’ (12 million) compared to ‘women’ (nine million), and long-term outcomes of ‘men’ with schizophrenia are worse compared to ‘women’ (e.g. higher rates of mortality, suicide and homelessness, and poorer family and social support networks) (Ran, Mao, Chan, Chen, & Conwell, 2015).

Interestingly, 69% of participants in the included studies were identified as female, which is common in studies using PS student samples (e.g. Cusack et al., 2019; Gawlik, Mazurek, Tan, & Amaya, 2019; Vargas & Robles, 2019). It is likely that this distribution reflects the ratio of women/female to men/male students in PS education, which has steadily increased since the 1970s. In the United States, for example, more than 56% of PS students were women/female in 2016 (National Center for Education Statistics, 2016). According to Statistics Canada, women/females enrollment in PS programs has increased between 1992 and 2008 and now women/females comprise the majority of full-time PS students in undergraduate university programs (2015). There are also more women/females enrolled in graduate education in Canada (Association of Universities and Colleges Canada, 2011). Countries all over the world are also seeing an increase in women/females applying for PS education. These countries, which include the United Kingdom, Malaysia, Argentina, Cuba, Jamaica, and Panama, now have some of the highest women/female to men/male ratios enrolled in higher education (Martin, 2015). Finally, researchers who gather data on sex and/or gender, need to ensure that participants have the freedom to express their gender identity outside the binary terms of “female,” “male,” “woman,” or “man”, and are consistent with their use of the terms sex and gender.

Interventions and experiences of post-secondary students with symptoms of psychosis.

I was unable to determine the effectiveness of interventions for PS students experiencing symptoms of psychosis. A total of five studies were discovered in my study that explored five different interventions, and the quality of studies varied. All authors explored different variables and measured outcomes differently, utilized different measurement tools to measure symptoms of psychosis and used different data analysis procedures. In summary, the heterogeneity of the interventions, research designs, and measured outcomes did not allow for determination of effectiveness through meta-analysis (Higgins & Green, 2011). It appears that interventions for PS students with symptoms of psychosis are scarce and testing is minimal, which makes it difficult to determine what interventions should be used in PS institutions. Furthermore, not all interventions identified were described in complete detail, making replication difficult.

According to Hoffman and colleagues (2014), interventions are poorly described in publications generally, so this limitation is not restricted to the interventions included in this review. Use of existing models or guides to design, implement, and/or replicate interventions (such as the Template for Intervention Description and Replication checklist and guide) would improve the rigour and reliability of interventions studies (Hoffman et al., 2014). Furthermore, future intervention studies need to include samples of PS students that are large enough and diverse to allow for generalizability and implementation into clinical practice and healthcare services (Bonell, Oakley, Hargreaves, Strange, & Rees, 2006).

A notable research gap identified through this review was the paucity of research on the experiences of PS students with symptoms of psychosis. Qualitative data helps give meaning to human experiences, make sense of or interpret phenomena, provides an understanding of how people attribute meaning to their experiences, and allows for an exploration of experiences

considering the contexts, circumstances, or environments in which they take place (LoBiondo-Wood & Haber, 2013). Qualitative studies are needed to contextualize the lives of PS students with symptoms of psychosis, the various circumstances that influence them (e.g. financial circumstances, social circumstances), and their attitudes, beliefs, and values. Through their narratives, we may come to appreciate how PS students with symptoms of psychosis understand, act, and manage their day-to-day lives and situations. Finally, while the ways in which symptoms of psychosis is manifested are variable and often person-specific (National Institute for Health and Care Excellence, 2014), qualitative exploration also allows researchers to discover patterns within experience, which is useful when designing interventions, to ensure they are tailored and meaningful for the students they are intended to help. From a methodological perspective, qualitative research exploring the acceptability and feasibility of particular programs or interventions would inform and enhance their evaluation (Yardley, Ainsworth, Adren-Close, & Muller, 2015).

Discussion Point Two: Expansion of the Diathesis Stress Model of Schizophrenia

Theories, frameworks, and conceptual models offer structure and organization to knowledge, and may be used to guide research and practice (McEwen & Wills, 2014). They promote rational and systematic ways of thinking about a topic and offer conceptual understandings of complex concepts (McEwen & Wills, 2014). A conceptual model is “a set of interrelated concepts that symbolically represents and conveys a mental image of a phenomenon” (McEwen & Wills, 2014, p. 27). To ensure their continued relevance, conceptual models must be continuously revised and updated based on evidence (McEwen & Wills, 2014).

The Diathesis Stress Model of Schizophrenia is a conceptual model designed to portray and explain the risk factors associated with schizophrenia and other psychotic illnesses (Walker

& Diforio, 1997). There are five broad categories, with accompanying sub-categories, which include genetic predisposition, brain structure abnormality, neurobiological, early life adversity factors, and chronic or repeated stress (broken down into psychological and environmental stressors) (Halter, 2014; Pruessner et al., 2017). While these categories do not have any concrete definitions, a description of each category in the literature acted as a starting point for me to classify the risk factors explored in the included studies. Based on the existing use and understanding of this model, which appears to have a heavy biomedical influence, many of the identified risk factors in this study did not fit with the outlined categories in the literature. Below, I offer suggestions for how to expand the model to better represent the risk factors explored by researchers studying psychosis to date.

Genetic predisposition.

The “genetic predisposition” category is primarily about the how inherited factors, such as gene mutations, increase ones’ chance of developing psychosis (Pruessner et al., 2017). The narrowness of this category precludes the consideration of other genetic factors relevant to psychosis and mental illness more generally. For example, through this review, I identified risk factors such as race, family history of mental illness, and sex. These characteristics fall within a broader definition of genetic predisposition and are important to consider when articulating risk for psychosis in PS students.

The justification for expanding this Diathesis Stress Model category is apparent when we consider what is known about the genetic characteristics of psychotic disorders. Race, for example, can be described as a biological determination that groups humans into categories because of shared genetic features (Grandner, Williams, Knutson, Roberts, & Jean-Louis, 2016). Race may be linked with mental illness severity (Chiu, 2017), as well as the types of mental

disorders endured (Coleman et al., 2016). In fact, research has highlighted that these race-related differences may be most pronounced for depression and schizophrenia (Coleman et al., 2016). Furthermore, familial psychotic disorders are credited to inherited factors rather than environmental factors (Bigdeli et al., 2016), and a family history of a psychotic disorder is a known predisposing factor (International Schizophrenia Consortium, 2008; Stefansson et al., 2008; Walsh et al., 2008). Finally, some genetic studies suggest that there are sex-specific differences between males and females related to disease onset, symptoms, and treatment of schizophrenia (Li et al., 2016). Various hypotheses exist that highlight and explain the sex differences apparent in individuals with psychosis. The “hormone hypothesis”, for example, proposes that sex differences in schizophrenia are due to gonadal hormones, and the “sex chromosome hypothesis” proposes that chromosomes XX or XY play a role in the development of psychosis in individuals with excess sex chromosomes (Li et al., 2017). While race, family history of mental illness, and sex were identified through this review as risk factors related to the genetic makeup on an individual, it is possible that other genetic risk factors – not yet studied – also place a person at risk for psychosis. In order for the Diathesis Stress Model to be useable within current and future research, the description of this risk category should be broadened to include all risk factors inherent to the biologic composition of humans.

Chronic or repeated stress: Psychological stressors.

The “chronic or repeated stress: psychological stressors” category refers to stressful life events, as well as developmental, familial, social, and physical stressors (Halter, 2014; Pruessner et al., 2017). Interestingly, comorbid mental disorders are not explicitly included in this Diathesis Stress Model category. Through this review, I identified co-morbid psychopathologies, such as depression, anxiety, internet addiction, sleep dysfunction diagnosis, and personal history of

mental health problems as actual and potential risk factors for symptoms of psychosis in PS students.

Including co-morbid psychiatric illnesses into this category is important because of their known effects on symptoms of psychosis. Depression is shown to influence long-term outcomes related to recovery, relapse, and quality of life for persons with psychosis, and is a predictor for suicide completions in persons with schizophrenia (Upthegrove, Marwaha, & Birchwood, 2016), and increase one's risk of developing first episode psychosis (Velthorst et al., 2009). Similarly, anxiety, which we identified as having a positive relationship with symptoms of psychosis in PS students, has been linked to the development and severity of psychosis in youth (McAusland et al., 2017). It is likely that other co-morbid psychopathologies or forms of chronic or repeated stress also influence psychosis – the description of this category should be broadened to allow for these elements.

Proposed additional category: Personal factors.

Risk factors identified in this systematic review that cannot be conceptualized under the pre-existing categories of the Diathesis Stress Model of Schizophrenia include age, poor well-being, self-esteem, ethnicity, aberrant salience, self-concept clarity, stress sensitivity, resilience, and country of birth identification. These risk factors may be conceptualized under 'personal factors' which falls within the social determinants of health. The social determinants of health captures not only a range of social, economic, and environmental factors, but also personal factors, that determine individual and population health (Government of Canada, 2019). According to the World Health Organization (2019), personal factors refers to a person's individual characteristics and behaviours (e.g. gender, coping skills, eating habits, exercise habits, how an individual manages stressors, etc.). The current version of the Diathesis Stress Model does not fully capture

the broad range of risk factors that impact individual and population health – namely, personal factors.

When considering personal factors, they affect the development, progression, severity, and outcomes of individuals with psychosis. For example, authors investigating personal factors and their association with symptoms of psychosis, including ethnicity, age, immigrant status (Radua et al., 2018), aberrant salience (Reininghaus et al., 2016; Winton-Brown, 2013), and stress sensitivity (DeVylder, Ben-David, Schobel, Kimhy, Malaspina, & Corcoran, 2013; Reininghaus et al., 2016) found that all of these personal factors were associated with the development of psychosis. Further, there are personal factors that are protective against developing symptoms of psychosis, such as self-esteem (Benavides, Gary, & Kimhy, 2018), resilience (Georgiades, Farquharson, & Ellett, 2014; Mizuno et al., 2016), and self-concept clarity (Cicero, Martin, Becker, & Kerns, 2016). These findings are consistent with the results of this systematic review, however, did not include participants of PS students, and should have a home within the Diathesis Stress Model of Schizophrenia.

Lastly, although not included in this systematic review, education level, literacy, and employment are other social determinants of health (Government of Canada, 2019) worth mentioning. Education and employment are essential to help younger individuals transition into adulthood, improve self-esteem, and facilitate social inclusion (National Collaborating Centre for Mental Health, 2013). Furthermore, attaining less years of education may be associated with an increased prevalence of common psychiatric disorders such as depression and anxiety (Araya, Lewis, Rojas, & Fritsch, 2002). Conversely, early onset of psychosis has negatively affected educational attainment, and authors have reported highschool drop-out rates as high as 44% for students experiencing psychosis (Goulding, Chien, & Compton, 2010). Researchers in the field

should investigate the relationship between education level and literacy and symptoms of psychosis among PS students.

A summary of the diathesis stress model of schizophrenia and proposed future direction.

At present, the Diathesis Stress Model of Schizophrenia is the most accepted explanation of the development of psychotic disorders based on current evidence (Halter, 2014). It helps to explain how psychotic disorders occur when inherited genes interact with non-genetic factors, thus altering the structures of the brain, affecting the neurotransmitter system, or injuring the brain directly (Tandon, Keshavan, & Nasrallah, 2008). The model includes five risk categories but does not capture personal factors, or the complex interactions between risk factors over time.

The model provides a framework for explaining some key features of the developmental course and clinical presentation of schizophrenia and other psychotic illnesses (Walker & Diforio, 1997). Although the current model identifies biological factors (genetic predisposition, brain structure abnormality, neurobiological factors), and psychological factors (psychological stressors, environmental stressors, early life adversity factors), it fails to capture all factors conceptualized within the social determinants of health, and does not account for the dynamic interaction between biological, psychological, interpersonal, and contextual systems that shape health over the life span (Lehman, David, & Gruber, 2017). As knowledge is generated and professions evolve, conceptual frameworks and models are also continuously explored and refined (McEwen & Wills, 2014). I suggest expansion and refinement of the model as a future area of research, including investigating personal factors captured under the social determinants of health and associations with symptoms of psychosis. This would help expand the conceptualization of the assumptions related to symptoms of psychosis based on the latest

evidence (McEwen & Wills, 2014), and ultimately guide clinicians in understanding risk factors associated with symptoms of psychosis.

Discussion Point Three: Knowledge Users within Systematic Reviews

The importance of iKT within systematic reviews.

When using an iKT approach to research, Knowledge Users (KUs) play an integral role in many steps of the research process, from question identification to dissemination of findings.

Systematic reviews, a type of research study amenable to an iKT approach, are used to inform clinical practice guidelines (American Academy of Family Physicians, 2019), which serve as a framework for clinical decisions and evidence-informed practices, and are tools to help clinicians assess the benefits and harms of a given practice (American Academy of Family physicians, 2019). Given that high quality clinical practice guidelines are developed with KU input from multidisciplinary experts, professional societies, and members of the public (Parry, Salsber, & Macaulay, 2015), conducting systematic reviews within an iKT framework helps to ensure the evidence supporting guideline development is relevant and appropriate. Utilizing an iKT approach within systematic reviews can also lead to better uptake of research results, because KUs are engaged throughout the process, ensuring the research is targeted to their needs (Parry, Salsber, & Macaulay, 2015). Additionally, when developing an iKT project, Bayley and colleagues (2014) emphasized the importance of KUs and researchers discussing the strength of evidence for different topics, relevance of evidence to clinical practice, and feasibility of implementing knowledge translation strategies, in order to identify appropriate and high-uptake iKT projects – which can be applied to iKT-informed systematic reviews.

Gagliardi and colleagues (2016) performed a scoping review to characterize the nature of iKT research generally. These authors found that the ways in which iKT is operationalized in

research overall is varied and somewhat poorly reported. Using iKT specifically within systematic reviews is an emerging research approach, and is quickly gaining momentum. Two articles helped guide KU engagement throughout my thesis project (Guise et al., 2013; Keown et al., 2008). The first article outlined opportunities to engage KUs while conducting a systematic review, such as identifying and consulting with KUs while developing the research question, holding a KU input meeting once the research question and literature review is performed, presenting preliminary results at a KU reaction meeting, and engaging KUs in dissemination activities once the study is complete (Keown et al., 2008). The second article, written by Guise and colleagues (2013), included a literature review and interviews with leaders from research, policy, and evidence-based practice organizations about current KU engagement practices. In this article, the authors reported that across the 56 included articles, processes for KU engagement, terminology, and definitions lacked consistency (Guise et al., 2013). Several strategies for engaging KUs were planned as part of the study proposal, which included engaging KUs early in the research process, building and maintaining relationships throughout the research process, documenting all KU input, and providing brief, easy-to-read informational materials prior to meeting with KUs (Guise et al., 2013). While there is no clear formula to guide iKT systematic reviews, working alongside KUs throughout the research process is likely to increase the uptake of findings and serve as a basis for future research projects (CIHR, 2012).

Knowledge users and this systematic review.

As I have come to learn, systematic reviews using iKT are dynamic and KU involvement changes and evolves throughout the study. As outlined in the methods chapter, KUs were included in many steps of the study. Throughout the systematic review process, I identified enablers and challenges related to engaging with KUs that are similar to what is currently known

(Gagliardi et al., 2016). Enablers included outlining a specific strategic iKT plan prior to beginning the research process, communicating clear expectations and responsibilities with KUs, maintaining open lines of communication throughout the process between myself and the KUs, and having pre-existing relationships with some of the KUs. Overall, involving KUs in this systematic review helped generate what I believe to be a meaningful and creative research process, especially during the formation of research questions, crafting the implications, and dissemination of results. Specifically, KUs helped make meaning out of my results and create messages relevant for clinical practice, education, and academic policy. For example, KUs discussed the complex policy implications related to the health of students within PS institutions, and highlighted barriers for accessing healthcare, as well as suggested more appropriate and feasible ways to help PS students experiencing symptoms of psychosis gain access to supports and resources.

I also encountered some challenges during this thesis project related to the iKT component, which are worth discussing. First, when developing my research approach and objectives, I engaged with and met various KUs individually. This led to several possible directions and priorities for the study and attempting to address each led to a relatively large systematic review with five distinct objectives. As with all research, priority setting is important for systematic review studies to identify the most important research gaps and health evidence needs (Hoekstra, Mütsch, Kien, Gerhardus, & Lhachimi, 2017). The Cochrane Collaboration Review Groups use various frameworks, approaches, and methods for prioritization in systematic reviews, which may help to guide preliminary KU conversations and narrow the focus (Cochrane, 2019). Each KU I initially spoke with agreed that synthesizing risk factors, interventions, and the experiences of PS students with symptoms of psychosis would help

highlight the evidence to date, as well as gaps in the research worth exploring in future studies. As I learned, these early conversations should also consider timelines and resources to ensure that the project is feasible within these confines. Having a framework to guide the planning phase of iKT systematic review projects might help to mitigate challenges throughout the research process and provide a preliminary mechanism by which to evaluate the usefulness and success of this step.

The second challenge was maintaining a consistent network of KUs. After developing my research approach and objectives, the KUs apart of the project continued to introduce me to new KUs and this snowball effect occurred throughout the study. While some of the original KUs remained engaged throughout, others did not, and, as mentioned, new KUs were intermittently introduced. Although KUs joining partway through were interested and enthusiastic about the study and helped to ensure that I had a diverse pool of KUs to consult, they were not able to provide input into the research decisions and steps completed prior to their involvement. Additionally, maintaining contact and consistent communication with the KUs from onset to completion of the study was sometimes difficult because of busy and differing schedules that impeded regular meetings with all KUs. To ensure that I maintained as much contact as possible with my KUs, I purposefully re-connected with each KU a minimum of every two months via e-mail or telephone, to maintain on-going relationships (Guisse et al., 2013). Finally, KUs had varying levels of involvement throughout the research process, and it was important that I remain flexible and available. Meeting with them at their convenience helped to preserve positive partnerships for the duration of the study.

Furthermore, PS students experiencing symptoms of psychosis are considered a vulnerable population, which may make them reluctant to take part in formalized studies,

(Atkinson & Flint, 2001), either as a research participant or as a KU. For this reason, it was difficult to engage PS students with symptoms of psychosis to be KUs for this study. To overcome this, I applied the snowball sampling technique, which is usually used to find research participants, but I used this technique to engage PS students to become KUs. Snowball sampling occurs when one individual suggests to the researcher another individual, who in turn, may suggest another individual who may be interested in becoming involved in a research project (Atkinson & Flint, 2001). As a nursing student, I was able to connect with a fellow peer in the nursing program, who was able to connect me with a student who has experienced symptoms of psychosis. This individual became an integral KU within this study.

In summary, the benefits of using an iKT approach and engaging KUs in this systematic review far outweighed the challenges. Embedding diverse perspectives, backgrounds, and expertise from the KUs helped turn the synthesis findings into tangible and digestible messages. KUs also helped create purposeful and relevant implications for clinical practice, future research, education, and policy, which are discussed in the following section.

Implications

Knowledge User Engagement Step Four: Reaction Meeting and Dissemination Plan

The KU reaction meeting was held on May 16, 2019 from 1600-1740 at the University of Ottawa, and was facilitated by myself, my thesis supervisor and committee member, and a peer in the University of Ottawa Masters of Nursing program. Four KUs were present at the meeting, with one joining via teleconference. Prior to the meeting, I sent out an official e-mail invitation to each KU with a summary of my results and a letter outlining possible ways to acknowledge their contributions to the project (refer to additional document 4.0 in the Appendix), a meeting agenda (refer to additional document 5.0 in the Appendix). After introductions and an

explanation of the meeting objectives, I presented a summary of my thesis project and facilitated a discussion and feedback session related to the results, as well as the possible implications for clinical practice, academic policy, education, and future research. We also discussed strategies for dissemination of the findings through their networks and more broadly. Finally, we discussed possibly co-authoring a publication on their involvement as KUs in the project. The process by which we came to implications and recommendations presented below.

Feedback was recorded in a Microsoft Word document by my peer. A summary of the meeting was disseminated to KUs following the meeting, including those who were unable to attend (refer to additional document 7.0 in the Appendix). The four KUs who were present were encouraged to provide further feedback via in-person meeting, telephone, or e-mail and two of the KUs who were unable to attend the reaction meeting provided additional feedback in person afterwards. Feedback and discussion points from KUs is incorporated into the implications section of the thesis.

Implications for Academic Policy

This systematic review highlighted the paucity of qualitative research on the experiences of PS students with symptoms of psychosis. While this clearly has implications for research (discussed previously), it also brings into focus a more insidious issue for PS students with symptoms of psychosis: disclosure of their symptoms or illness. In the current PS landscape, there are multiple institutional barriers and considerations students must overcome (or weigh) when deciding to disclose their struggles. Similarly, certain professions mandate disclosure of mental health conditions. For example regulatory bodies such as the College of Nurses of Ontario mandate that nurses must report if they are experiencing a mental condition that is making them incapable of practicing (College of Nurses of Ontario [CNO], 2018). In certain circumstances, the nurse's

practice may be restricted, or the nurse may be removed from practice (CNO, 2018) – thus making it worrisome for nurses to disclose mental health issues. PS Students who are in these professional programs may be most hesitant to disclose given the possible ramifications on their future career.

The first barrier is related to students with symptoms of psychosis who require some form of academic leave or withdrawal from classes (Jones, Bower, & Furuzawa, n.d.) in order to undergo appropriate diagnostic testing and initiation of treatment. Re-enrollment in PS education is not a straightforward process, which is complicated for students who have switched to part-time studies or dropped out of academics completely. According to the University of Ottawa “students whose studies at the University of Ottawa are voluntarily interrupted for six or fewer consecutive terms may re-register in the same faculty without having to re-apply for admission” (2017, para. 5). Therefore, PS students who require academic leave for mental health reasons may only be able to re-register in the same faculty if their health improves within six terms because the University of Ottawa regulations also stipulate that “Students whose studies at the University of Ottawa are interrupted for more than six consecutive terms must re-apply for admission” (University of Ottawa, 2017, para. 5). Simply put, students who continue to be unwell for more than six consecutive terms have to re-apply for their program, which does not guarantee an admission. The university also mandates mandatory withdrawal if students obtain a cumulative grade point average (CGPA) below 3.0, or two failures in compulsory work terms (and other standards are applied within different faculties) (University of Ottawa, 2019b). Therefore, students experiencing mental health difficulties may not be able to attend lectures, complete course work, and may do poorly on assignments or tests (Goulding, Chien, & Compton, 2010), therefore may be at risk of obtaining a CGPA less than 3.0.

Second, when a student takes a leave from PS education, there is the potential of interruption of financial support, such as government funding, scholarships, and bursaries. For example, students who receive the Ontario Graduate Scholarship (OGS) must repay any amounts received prior to the change in registration status (i.e. withdrawal or leave of absence) if they do not get approval for the leave of absence (OGS, 2017). This approval requires an application to be submitted no later than 40 days before the end of the study period (Ministry of Training, Colleges and Universities Student Financial Assistance Branch, 2018) – which students may not be able to complete in time if they experience declining mental health closer to the end of term.

Third, for students who switch to part-time studies or leave school altogether, this change in academic standing is recorded on their transcript and permanent academic record and may interfere with acceptance into future programs, career opportunities, and funding received. In order to get into medical school, for example, academic requirements at the University of Ottawa include obtaining three years of full-time studies (five courses per semester each per year) in any undergraduate program leading to a bachelor's degree (2019b).

Lastly, based on the conversation with KUs, it appears as though most PS students with mental health problems receive care from their University or College's health services. If students are required to leave their studies as a result of their psychiatric symptoms, they may have even less supports and health care resources available to them (such as student academic success services, health care clinics, peer support groups, etc.). For international students, study visas may expire and residency in the country of study may also be affected if they take temporary leave from their studies due to mental health problems.

Each of these considerations must be carefully reflected upon by the student prior to disclosing their symptoms. People with psychotic illness such as schizophrenia may experience

difficulty with executive functioning tasks, including retaining contextually organized events, poor attention capacities, and in organizing sequential thinking (Semkovska, Bédard, Godbout, Limoge, & Stip, 2003). In the context of a PS student experiencing symptoms of psychosis, it may be difficult to engage in goal-directed activities, such as making appointments with health services, speaking with educators or academic advisors, and creating a plan for re-engaging in PS education once capable. Clearly, PS students with symptoms of psychosis need tremendous support during this time and institutional policies that foster their recovery rather than penalize them for seeking care.

Lastly, all of these discussion points have implications for attaining accurate prevalence rates of symptoms of psychosis within PS student populations. Studies within this systematic review included active students but did not include students who drop their studies or go on temporary leave because of their mental illness. Additionally, studies included in this systematic review used self-report data, which may be biased due to willingness (or lack thereof) of study participants disclosing symptoms of psychosis – all of which affect data related to prevalence. These points should be considered when collecting data related to prevalence of symptoms of psychosis among PS students.

Implications for Future Research

Study and participant characteristics.

The majority of the included studies originated from the United States (n=7) and the United Kingdom (n=4), and the participants included were predominantly white/Caucasian, limiting generalizability of results to populations in other countries or who represent other ethnic backgrounds. Furthermore, the majority of authors employed a cross-sectional survey design and used self-report questionnaires to collect data. Use self-report data may result in response bias,

when an individual “might offer biased estimates of self-assessed behaviour, ranging from a misunderstanding of what a proper measurement is to social-desirability bias, where the respondent wants to ‘look good’ in the survey, even if the survey is anonymous” (Rosenman, Tannekoon, & Hill, 2014, p. 2). Moreover, cross-sectional surveys limit trending of data over time and are insufficient when trying to establish a cause and effect relationship (Price & Murnan, 2004).

Just over half of the studies included clinical characteristics, but rarely did the authors report on the same characteristics and few authors reported on mental health services used by their participants. Therefore, it was not possible to develop a comprehensive picture of the clinical status or service use patterns of PS students with symptoms of psychosis. Consistently collecting socio-demographic, clinical, and service use characteristics would strengthen the knowledge base about the profile of PS students who experience symptoms of psychosis. Age, both sex and gender, ethnicity, and socioeconomic status, as risk or protective factors, demonstrated trends towards significance/non-significance and more research is required to truly understand their influence on the presence of symptoms of psychosis in PS students. Specific to research involving PS students, information on year of enrollment and type of education (e.g. nursing, commerce, engineering, etc.) is important to collect because it is possible that PS student enrollment in different levels of education or in different programs are at higher risk of developing symptoms of psychosis than others (e.g. undergraduate, graduate, post-graduate degrees or nursing compared to medical or arts programs).

From a clinical characteristic perspective, researchers should determine whether their participants have a personal history of psychiatric illness and/or family history of psychiatric illness. Not only is there a hereditary component to psychotic disorders (Pruessner et al., 2017),

this systematic review revealed that certain co-morbid psychopathologies, such as depression and anxiety, may be linked to symptoms of psychosis, and these risk factors are worthwhile accounting for in future research studies.

Service use characteristics need to be routinely (and consistently) collected. This information reveals the supports available to PS students, which may mitigate or improve their symptoms of psychosis. Identifying whether PS students receive care from PS institution mental health services, PS institution medical services, general practitioners, mental health practitioners, and/or community mental health services is vital when contextualizing this problem and creating possible solutions. This information will also help inform researchers about whether PS students are receiving appropriate mental health services when required and what services are available to them.

Overall, collecting a sufficient amount of data on participant characteristics (including socio-demographic, clinical, service-use, and psychological factors) is essential for a variety of reasons. It helps us account for confounding factors, evenly match control and comparison groups in intervention studies, and paint a more comprehensive and realistic profile of PS students who experience symptoms of psychosis. Researchers engaging in work on this topic are encouraged to consistently collect information on the socio-demographic characteristics, clinical characteristics, and service-use patterns of their study samples so that we can better synthesize and compare results across studies and further our understanding of these vulnerable students.

Qualitative and interventional research.

In this systematic review, only three studies were identified that explored the experiences of PS students with symptoms of psychosis, and only one of these studies had quotes and exemplars, which are generally expected in the publication of qualitative studies to show the basis of authors

conclusions (JBI, 2017). This is a very clear gap in knowledge and more qualitative work is needed to explore this phenomenon from the PS student perspective.

In terms of interventions, none of the ones identified in this review were designed to help PS students navigate the many challenges they face while completing PS education, yet it is clear that no simple pathways exists to navigate institutional regulations and policies (see Implications for Academic Policy section above). KUs emphasized how challenging it is for PS students to navigate the number of issues that present while dealing with symptoms of psychosis, such as receiving the right care at the right time, and figuring out academic issues, financial concerns, and housing. Two potential interventions highlighted by the KUs, feasible within the PS context, were system navigators and student mentors. Ideally, these interventions are designed to help PS students successfully complete complex tasks, such as requesting leaves of absence, re-enrolling into their programs, and managing finances (e.g. student loans, student scholarships), however more work is needed to explore their efficacy in PS students with symptoms of psychosis.

Local examples of peer mentoring and student navigator interventions exist. First, peer mentoring within the University of Ottawa, is a peer-based program where students in upper years help new students adjust to university life and reach their personal, academic, and professional goals, especially while undergoing various stressors and academic difficulties (University of Ottawa, 2019a). Unfortunately, one of the KUs informing this review, who was also a peer mentor, explained that the program is often over-capacity with students requesting assistance, and mental health needs are particularly challenging for peer-mentors. Second, there is a Student Navigators program at Algonquin College, where student navigators are matched with new students to help with general inquiries about the college, finding services, resources, and supports (including mental health and academic supports) (Algonquin College, 2019). While

available, these promising interventions have yet to be systematically evaluated. Further, a recent review of 20 studies on undergraduate mentoring programs revealed the variability in the delivery of these types of interventions (Gershenfeld, 2014) and more rigorous research is needed to determine whether these programs are truly beneficial for PS students with symptoms of psychosis.

Implications for Clinical Practice

In Ontario, mental illness accounts for ten percent of the burden of disease, yet it is allocated only seven percent of healthcare dollars (Centre for Addictions and Mental Health, 2019). Furthermore, the Ontario government recently announced plans to cut grants available through the Ontario Student Assistance Program (while reducing tuition fees by ten percent), which will lead to a loss of millions of operating dollars at colleges and universities. This change in funding will invariably affect student services, such as mental health supports (Andrey, 2019). Not only are PS institutions losing healthcare dollars, mental healthcare generally will receive 330 million dollars less per year than what was legislated in 2018 (Ontario Health Coalition, 2019). These changes come despite recent evidence that increased access to mental health services and appropriately targeted clinical interventions leads to lower lifetime prevalence of hospitalizations, suicide attempts, fewer suicide completions, and an average societal cost savings of 2,590 dollars Canadian per person (Vasiliadis, Dezetter, Latimer, Drapeau, Lesage, & Phil, 2017). Unfortunately, in Ontario, researchers and clinicians do not have full decision making authority over the ways in which government healthcare dollars are allocated and spent. In light of this, as nurses, we need to have a powerful, consistent voice and advocate for what is best for the populations we serve and strive to improve the wellness of our patients despite resource constraints.

From an intervention standpoint, Systemic Therapy, identified through this review, was particularly relevant for the KUs. In fact, some local clinical settings have implemented the intervention; though testing and evaluation within the Ottawa context is not available. This form of therapy incorporates wider community and social support networks into the recovery process, which was both interesting from KUs' perspectives and effective according to literature on the topic. In a recent systematic review with meta-analysis of 37 randomized controlled trials of Systemic Therapy, authors reported that this intervention improves symptoms of mental disorders in adults with schizophrenia, mood disorders, and eating disorders (Pinquart, Oslejsek & Teubert, 2016). While this intervention shows promise, it has not been used for or tested in PS students with symptoms of psychosis and more research is needed to determine its effectiveness specifically within this population.

In terms of direct patient care, during the KU meeting, we discussed the risk and protective factors identified through this systematic review. Interestingly, the risk and protective factors found to be "inconclusive" (i.e. not studied enough to draw conclusions), were all deemed important and routinely observed in PS students with symptoms of psychosis by the KUs, especially a history of trauma in childhood or across the lifespan, sleep dysfunction, and family history of mental health problems. This suggests that while I could not draw definitive conclusions for these factors based on existing evidence, they could be clinically meaningful and important to explore when conducting health histories with PS students with symptoms of psychosis.

Regardless of practice setting, nurses will likely encounter and care for patients with psychosis and psychotic disorders, including PS students. It is paramount that nurses are able to recognize and assess risk factors that may lead to the development of psychosis, in order to

incorporate strategies to mitigate risk. Nurses may also be involved in planning, implementing, and evaluating evidence-based interventions for young adults with psychosis. Early intervention in persons with symptoms of psychosis has been associated with better outcomes, including improved global functioning and involvement in school or work, overall quality of life, and lower symptom severity (Correll et al. 2018).

Implications for Education

As evidenced by this systematic review, some students attending PS institutions experience symptoms of psychosis, and it is imperative that educators have the capacity to support these students. PS students are at the age of majority (18 in six provinces, 19 in four provinces), meaning they are legally adults and responsible for their own health. PS institutions do not receive government funding to provide health care to their students (Department of Justice, Canada, 2017), and PS educators are not trained (nor equipped) to care for students with symptoms of psychosis. Yet, according to the Ontario Human Rights Code, PS educators are legally obliged to report a student if they suspect, or know, they are experiencing mental health issues (Ontario Human Rights Commission [OHRC], 2014). The Ontario Human Rights Code protects people in Ontario with mental health disabilities, which applies to persons receiving goods, services, and using facilities, including PS schools (OHRC, 2014). According to the Code, institutions and educators have the duty to accommodate students experiencing mental health issues (e.g. the duty to inquire about accommodation needs, medical information to be provided, confidentiality, and treatment) (OHRC, 2014).

Ultimately, early intervention for persons with symptoms of psychosis is associated with better outcomes, including improved global functioning and involvement in school or work, overall quality of life, and lower symptom severity (Correll et al., 2018). Educators routinely

communicate with PS students and may be the first to observe and identify students at risk of, or who are exhibiting symptoms of psychosis. Without educators' help in identifying and assisting these students, students may be at higher risk of poor outcomes, such as worsening of symptoms, dropping out of school, and falling through the cracks of the health care system. In Norway, for example, various mental health literacy training programs aimed at teachers and students in high schools have been implemented, including the Early Treatment and Intervention in Psychosis project which is designed to detect first-episode psychosis (Langeveld, Joa, Larsen, Rennan, Cosmovici, & Johannessen, 2011). Langeveld and colleagues (2011) reported that this educational intervention boosts teachers' ability to detect psychosis and fosters positive outcomes.

Education about symptoms of psychosis would also benefit PS students themselves, people who live with students experiencing symptoms psychosis (e.g. roommates, residential dons), family members, friends, community members, student clubs and support programs, immigration offices, and protection services on campus (as they often are first responders to PS students who may be experiencing symptoms of psychosis). KUs thought-stormed forms of education that would be useful. Although there is mixed evidence related to outcomes of online learning, they suggested implementing mandatory online training modules, toolkits, or videos highlighting risk factors, protective factors, signs and symptoms of psychosis, and resources available for students. Online training platforms are used for education and awareness for a multitude of topics and can reach a large number of people (United States Department of Education, 2017). They are sustainable, reusable educational resources, afford significant flexibility, and allow for learning without the limitations of attending in-person education sessions at specific locations within a specified time window (Cobb, Watson, & Ellis, 2018). For

example, the online Concussion Awareness Training Toolkit was developed to standardize diagnosis, treatment, and management of concussions among clinicians (Babul, Turcotte, Luong, & Pike, 2015). This toolkit received 28,000 hits worldwide and resulted in physicians and nurses displaying significant positive change in concussion practices (Babul et al., 2015). This type of educational intervention is likely transferable to psychosis and presents a good opportunity to study their effectiveness, however, may not necessarily be the most effective method for learning (Moore, 2017), and should be supplemented with in-person modes of education.

Second, KUs suggested anti-stigma education via social media campaigns to eliminate fears, misconceptions, and misunderstandings about psychosis. Anti-stigma campaigns reduce self-stigma and empower persons who experience symptoms of psychosis (Li, 2017). They also reduce stigma among caregivers of individuals with symptoms of psychosis (Yang, Lai, Luo, Wonpat-Borja, Jackson, Fernández, & Dixon, 2014). Anti-stigma interventions related to mental health education for college students has been studied internationally (Thornicroft et al., 2016). Within PS student populations, anti-stigma interventions (specifically social-contact-based interventions) usually achieve short and medium-term benefits, including improvement in attitude, but not a significant gain in knowledge (Thornicroft et al., 2016). Thornicroft and colleagues (2016) highlighted that research testing anti-stigma-based interventions is a heterogeneous field of study with mixed-outcomes. With this in mind, anti-stigma campaigns on topics related to psychosis targeting PS populations may achieve short and medium-term benefits but may not achieve long-term benefits regarding attitudinal changes or knowledge gains.

Despite evidence to date, anecdotally, awareness campaigns have worked for topical issues related to mental health; for example at the University of Ottawa, the Student-Athlete Mental Health Initiative was created by student athletes to raise awareness about mental health

difficulties experienced by university students, and to provide information about available resources (University of Ottawa, n.d.c). In 2015, the University of Ottawa launched a 400 million dollar fundraising campaign to bring awareness about mental health difficulties experienced by university student athletes (University of Ottawa, n.d.c). Again, this type of messaging is relevant to psychosis in PS students and could be disseminated during welcome week activities, student-led mental health initiatives, word-of-mouth by clinicians and educators working with PS students with mental health issues, and integrated lecture series (e.g. Mental Health Matters at the University of Ottawa).

Finally, nurses who work closely with this population are also responsible for educating patients, caregivers, educators, and the greater community on the subject of psychosis and mental illness in general. Education should include the signs and symptoms of psychosis, risk factors associated with symptoms of psychosis, protective factors, and various resources and supports available within PS institutions and in the community. Nurses must first and foremost advocate on behalf of PS students with symptoms of psychosis to ensure they attain timely and appropriate healthcare when required.

Conclusion

Becoming a PS student is an exciting transition, but it is also challenging in terms of academic, financial, and personal demands that can potentially lead to increased stress and development of mental health issues. While not commonplace, there are students who develop first onset of symptoms of psychosis during PS education. Comprehensive and accurate data of the prevalence of symptoms of psychosis needs to be investigated. A better understanding of the risk and protective factors associated with symptoms of psychosis, and interventions most effective for helping PS students experiencing symptoms of psychosis need to be explored. Additionally,

qualitative research is needed to explore the experiences of PS students with symptoms of psychosis, which is a notable gap in knowledge on the topic. PS institutions are ecosystems with unique infrastructures, governing bodies and policies, but are also influenced by a larger environmental, political, and legal system within which they are embedded. While most PS institutions offer campus-based student health services, including counselling services, they generally do not have the resources or funding needed to meet the growing demand for mental health services (Max & Waters, 2018). Standards of care for the mental health of PS students must be developed and implemented to ensure students receive appropriate and timely care. To achieve this, more rigorous intervention development and testing is needed to explore the best ways to support and integrate programs for students with symptoms of psychosis into PS institutions. Additionally, system navigators (or clear pathways) to help students receive mental healthcare and maintain their academic standing are needed within PS institutions.

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Appendices: Additional Tables, Figures, and Documents

Additional Table 1.0 – Involvement of Knowledge Users in the Systematic Review Process

February 2018: Identification of Knowledge users	<p>Emailed contacts at the University of Ottawa, Carleton University, Algonquin College, the first episode psychosis team (The Ottawa Hospital), the shared care mental health team (The Ottawa Hospital), the director of wellness at Queens University</p> <p>February 21: Assistant director health & counselling services at Carleton connected me with an MD but they never replied. 2 others replied</p>
March 2018: Development of Research Question and Approach	<p>March 1: RN, First episode psychosis team – email and phone call correspondence</p> <p>March 5: social worker at Carleton; email correspondence</p> <p>March 7: MD at a university school of medicine; email and met in person at question phase (connected via an MD at another hospital) – email correspondence and met in person</p> <p>March 8: MD from another university; email correspondence; moved away and declined involvement in my study</p>
April -June 2018: Development of Research Question and Approach / Development of KU Panel	<p>April 2: director of health and wellness, at another university; question phase; formally agreed to be part of KU panel</p> <p>June 4: APN at a community mental health program; email/in-person correspondence; formally agreed to be part of KU panel</p>
July 2018: Development of KU Panel	<p>July 24: RN from first episode psychosis referred me to an occupational therapist on the team. Email + phone call correspondence then met in person at a conference in person September 25</p>

<p>September 2018-April 2019: Development of KU Panel (continued)</p>	<p>September 15: nursing student – I oriented a nursing student on placement at my place of work and she expressed interest in becoming involved in my research project and expressed interest in being a KU. She formally agreed to me a KU in April</p> <p>September 25: a professor at Algonquin school of nursing; met in person at CIMH forum, then met in person on Oct 12 to discuss KU panel involvement; formally agreed to be part of KU panel</p> <p>September 25: a senior mental health advisor at a university; met in person September 25 at CIMH, then connected via email and phone call on November 16 - formally agreed to be part of KU advisory panel</p> <p>September 27: a post-secondary student who experienced psychosis– email and in-person correspondence; met Oct 9 and he formally agreed to be part of KU advisory panel</p> <p>October 1: a research scientist part of the knowledge mobilization coordinator for FRAYME. Email and in person correspondence; met October 1 and agreed to formally be part of KU advisory panel (referred to contact this individual at a conference)</p>
<p>May 2019: KU Reaction and Dissemination Plan Meeting</p>	<p>Held on May 16 from 4:00-5:40 pm to present my results, gather feedback, and talk about dissemination activities; 4 out of 7 KUs made the in-person meeting</p>
<p>June 2019: Met with 2 KUs</p>	<p>Met with 2 KUs on June 4 from 5:30-6:30 who could not attend meeting held on May 16. Provided additional feedback which was incorporated into “implications” section.</p>

Additional Document 1.0 – Knowledge User Invitation Letter

My name is Victoria Sanderson. I am a Registered Nurse currently enrolled in the University of Ottawa Masters of Nursing program (thesis stream). I am writing to invite you to participate to be a Knowledge User (KU) in a research study I am conducting. I am conducting a mixed-methods systematic review of the literature that will address the following objectives:

- 1) To describe the socio-demographic, clinical, and service-use characteristics of PS students across all included studies.
- 2) To identify the prevalence of PS students with symptoms of psychosis.
- 3) To identify and describe factors associated with the development of symptoms of psychosis in PS students.
- 4) To assess the effectiveness of interventions for PS symptoms of psychosis.
- 5) To explore the experiences of PS students who have symptoms of psychosis.

You have been identified as a KU with interests and experience relevant to the research objectives.

Your involvement could include participation in one or more of the following activities (you are not required to participate in all components of the research to participate in the project):

1. Providing feedback via e-mail of included studies in the review, and to suggest additional studies to be included in the review that were not identified by the primary search.
2. Participating in a one-hour teleconference/in-person meeting: this will occur once the data extraction phase of the study is complete. The specific objectives of this meeting will be: 1) to discuss the relevance of risk and protective factors; 3) to identify relevant screening tools that warrant further analysis (psychometric quality of instruments and evaluation of the effectiveness of instruments); and 4) to identify relevant interventions that warrant further analysis (the outcome and results of each type of intervention).
3. Participating in a one-hour teleconference/in-person meeting: this will occur once the data synthesis phase is complete, with outcomes, results, and recommendations formulated. The specific objectives of this meeting will be: 1) To obtain feedback from KUs related to outcomes, results, and recommendations; 2) To discuss possible end-of-study knowledge translation activities, including dissemination of findings and recommendations to other relevant KUs.

End-of-study dissemination activities:

I would like to consult with you and other KUs, in regard to how study findings can be disseminated to other local KUs within your context, to help drive research findings into

Additional Document 1.0 (Continued.) – Knowledge User Invitation Letter

practice. Though it is not possible to predict the results of the study, I would like to gather your feedback about possible activities you might be interested in participating in (e.g. lunch and learn lessons within your organization, dissemination of study findings through narrative briefings, etc.). End-of-study knowledge translation activities will be aimed at:

1. Increasing knowledge and awareness of risk factors and protective factors of students who experience symptoms of psychosis, interventions, and screening methods for this population.
2. Provide evidence to inform current practices in the delivery of healthcare within post-secondary campuses and supports from administrators and peers.
3. Informing future research in this area.

Please let me know via email or telephone by *insert date here* if you are willing to participate by contacting me at (insert email), or (insert phone number).

Participation is voluntary:

Participation in this project is completely voluntary, and you may discontinue your participation at any time. Approximately *insert number* KUs will be asked to participate in one or more of the activities listed above.

Confidentiality:

All the information we receive from you, including your name and any other identifying information (if applicable), will be strictly confidential and will not be recorded. We will not use any information that would make it possible for anyone to identify the opinions you contributed in any presentation or written report about this project. Feedback from meetings will be recorded onto Word documents without using identifying information, with your verbal consent.

Risks and Benefits of Participating:

There is a slight risk your organization's name could be disclosed, but all efforts are made to reduce this possibility. The benefit of participating in this project is the knowledge that you are assisting me with in moving forward research related to strategies to improve care and prognosis of post-secondary students who experience symptoms of psychosis, and to identify gaps in the literature to inform my PhD thesis. No individual names will be mentioned in the summary of results and recommendations.

If you have questions about this project:

If you have questions about this project, you may “reply” to this email and I will respond to your questions as soon as possible. You may also call me at (insert phone number).

Thank you for considering participating in this project.

Regards,

Victoria Sanderson, RN, BScN, (MScN candidate)

Additional Document 1.0 (Continued.) – Knowledge User Invitation Letter

Phone: (insert phone number)

Email: (insert email)

Additional Document 2.0 – First and Second Level Screening Guide

Quick Reference Guide for First and Second Level Screening: Symptoms of psychosis in post-secondary students: A mixed-methods systematic review

The aim of this study is to conduct a mixed-methods systematic review to synthesize research to date on risk factors and interventions for post-secondary students with symptoms of psychosis, and to explore the experiences of these individuals.

What do I mean by psychosis?

It is important to note that psychosis is a symptom of mental illness and occurs along a spectrum. Psychosis is a thought disorder which can be broadly defined as loss of contact with reality (American Psychiatric Association, 2000). Psychosis is a symptom of a psychotic disorder (Halter, 2014) that is characterized by delusions, hallucinations, and/or disordered thinking. These symptoms are specific in nature and quality and occur along a spectrum (Bhati, 2013). Delusions are fixed, false beliefs a person holds that are incongruent with reality and hallucinations refer to a sensory experience or perception for which no external stimulus exists (Halter, 2014). The term “psychotic” refers to the presence of certain symptoms, and varies according to the combination, duration, and severity of symptoms (American Psychiatric Association, 2000). Therefore, symptoms of psychosis vary according to individual presentation and psychiatric diagnosis. Psychosis may present as subtle, making it difficult to differentiate a psychotic state from a normal mental state in some individuals (Heckers et al., 2013).

Psychotic disorders are defined by the level, number, and duration of psychotic signs and symptoms. A diagnosis of severe psychotic disorders is formulated with mental status assessments and elimination of other etiological factors, such as substance use or medical illness (Heckers et al., 2013). As per the DSM-5, there are both chronic psychotic disorders (e.g. schizophrenia and schizoaffective disorder), and time-limited psychotic disorders (e.g. brief psychotic disorder and schizophreniform disorder) (American Psychiatric Association, 2013). Other mental disorders may present with psychotic symptoms, such as delirium, Alzheimers, major depressive disorder with psychotic features (American Psychiatric Association, 2000), or be labeled as other psychotic disorder (such as attenuated psychosis syndrome).

The continuum model of psychosis posits that nonclinical populations experience varying degrees of psychosis that do not reach full criteria for full-blown psychosis (Johns & van Os, 2001). The continuum of psychosis may be related to a continuum of risk, with some never experiencing psychosis, and others experiencing sporadic episodes of varying frequency and severity, and others with full-blown psychosis (Escher, Romme, Buiks, Delespaul, & van Os, 2002; Johns & van Os, 2001; Smeets, Lataster, van Winkel, deFraaf, Ten Have, & van Os, 2012).

Many terms have been cited in the literature that refer to the varying levels of psychosis, including prodrome or proneness to psychotic features, sub-clinical psychotic experiences, ultra-high risk for psychosis, psychotic-like experiences (including hallucination-like experiences and delusional thinking) (Barahmand & Heydari Sheikh Ahmad, 2016), schizotypy (Barnes, 2011), psychosis risk syndrome (or psychosis risk symptoms), aberrant salience.

Additional Document 2.0 (Continued.) – First and Second Level Screening Guide

The specific objectives are:

- 1) To describe the socio-demographic, clinical, and service-use characteristics of PS students across all included studies.
- 2) To identify the prevalence of PS students with symptoms of psychosis.
- 3) To identify and describe factors associated with the development of symptoms of psychosis in PS students.
- 4) To assess the effectiveness of interventions for PS students with symptoms of psychosis.
- 5) To explore the experiences of PS students with symptoms of psychosis.

Objectives

The study will address the following objectives:

	Objective	Output	Data Required
1.0	1.0 To describe the socio-demographic, clinical, and service-use characteristics of PS students who experience symptoms of psychosis.	1.1 A profile of PS students who experience symptoms of psychosis, including socio-demographic, clinical, and service-use characteristics, based on aggregated data from all studies.	Information captured in study sample descriptions.
2.0	2.0 To identify the prevalence of symptoms of psychosis among PS students in the included studies.	2.1 The reported prevalence of symptoms psychosis across study samples.	Quantitative data on the prevalence of symptoms of psychosis.

3.0	To identify and describe factors associated with the development symptoms of psychosis in PS students.	2.1 The reported effects of each risk factor.	Quantitative data will be drawn from all studies regarding the relationship of biological, psychological, and environmental factors associated with the development of symptoms of psychosis in PS students.
		2.2 A catalogue of factors associated with the development of symptoms of psychosis in PS students based on the categories outlined in the diathesis-stress-model of schizophrenia (Halter, 2014).	Results from output 2.1.
4.0	To assess the effectiveness of interventions for PS symptoms of psychosis	3.1 Catalogue and description of interventions delivered to PS students with symptoms of psychosis	Information on intervention characteristics
		3.2 List of outcomes assessed and summary of the effectiveness of each intervention related to these outcomes	Quantitative results will be reported related to the effectiveness of interventions
5.0	To explore the experiences of PS students who have symptoms of psychosis.	4.1 A meta-aggregation of findings	Qualitative findings about the experiences, views, and perceptions of PS students with symptoms of psychosis

Additional Document 2.0 (Continued.) – First and Second Level Screening Guide

Eligibility Criteria

Eligibility Criteria were created using the PICO statement, as specified in the JBI methodology (2014). This statement was favoured over others, because the research inquiry involves a specific population, phenomenon of interest, and context. The PICO statement (population, intervention comparison, outcome) (Stone, 2002) or SPICE statement (setting, perspective, intervention or exposure of interest, comparison, evaluation) (Booth, 2004) were less appropriate because they involve interventions and comparisons not aligned with the research objectives. Eligibility criteria and limits include:

Information Sources

PICO	Inclusion	Exclusion
Population	Adults (persons aged 17 years and older) Students in any year of PS education	<ul style="list-style-type: none"> ● Non-PS age individuals ● e.g. children, adolescents <17, people NOT in post-secondary education
Phenomenon of Interest	Experience of symptoms of psychosis (formally diagnosed or self-reported), or who have a diagnosis of a psychotic disorder as per the DSM-5, or who have self-reported psychotic disorder <ul style="list-style-type: none"> ● ultra high risk (UHR) for psychosis ● sub-clinical psychotic experiences ● psychosis risk syndrome ● psychosis risk symptoms ● psychotic-like experiences ● psychotic symptoms: hallucinations, delusions, paranoia, disorganized behaviour, etc. ● aberrant salience ● psychoticism when referring to psychosis spectrum 	<ul style="list-style-type: none"> ● Cognitive impairment ● Co-occurring autism spectrum disorder (rational: risk factors may differ for these populations, and healthcare and services for these populations are delivered differently). ● Psychoticism when referring to personality domains/personality measures (e.g. you might see neuroticism, psychoticism) ● Schizotypy unless an article measures schizotypy as a risk factor for developing symptoms of psychosis ● Schizotypal personality disorder (unless an article measures this as a risk factor for developing symptoms of psychosis) ● Interventions that focus solely on medication treatments

Context	PS institutions of any kind	High school or elementary school, work settings
Limits	Inclusion	Exclusion
Types of literature	All published peer-reviewed literature	<p>Non-peer reviewed:</p> <ul style="list-style-type: none"> •Conference proceedings • Thesis • Dissertation •Books •Letters to the editor •editorials <p>Non full text (i.e. abstracts)</p>
Language	English (language of the researcher)	Studies written in a language other than English.
Date range	<p>2006-2018</p> <p>Rational: This date range will capture generation Y (oldest age in 2018 is 38) and generation Z (oldest age in 2018 is 23) – which will capture the most recent generations of PS students, as well as the most recently studied risk factors, interventions, and personal strategies/supports.</p> <p>With input from the KUs, we agreed to this date range was appropriate based on the aforementioned rational, in addition to identifying the most recently studied risk factors, interventions, and experiences of PS students with symptoms of psychosis. This will help to ensure that findings are feasible and applicable to the KUs current contexts.</p>	
Location	No limits will be placed on the studies' country of origin	

Additional Document 2.0 (Continued.) – First and Second Level Screening Guide

Online database search strategy

The search strategy will combine systematic searches of multiple electronic databases combined with secondary searches. In consultation with a library scientist (L.S.) at the University of Ottawa, a pilot search was conducted of the PsycINFO database using appropriate MeSH headings and keywords based on the aforementioned PICO. The first 300 citations were reviewed for relevance to the PICO question. The citations were deemed relevant, and I translated this search strategy to the Medline database. Once I translated this search strategy, it was sent to L.S. and my thesis supervisor (A.V.) for peer review. Modifications were made to the search strategy as per suggestions from L.S. and A.V. Once the final search strategy was approved by L.S., I translated it to all included databases.

A search was conducted in MEDLINE, Pubmed, Embase, Cochrane Library, CINAHL, PsycINFO, Education Source, ERIC (Proquest), and the Joanna Briggs Library databases, using keywords and MeSH headings based on three concepts, including psychosis, PS student, and PS institution (see Appendix _ for full search strategies). Three groups of concepts were combined using “AND,” and within each group the concepts were combined using “OR.” Limits imposed on the search included date range from 2006-current.

I will also run a secondary search once the review is nearly complete to check for eligible articles published between conducting the initial search and writing of the report. This is important to ensure research findings are up to date as new studies emerge (Piper, 2013).

Study Selection

Two reviewers (myself and an identified peer in the Master of Science in Nursing program) will independently engage in the study selection process to reduce the possibility of rejecting relevant reports (Shamseer et al., 2015). Covidence©, an online citation screening tool, will be used to facilitate and monitor study selection. This software program allows for complete screening of citations, clearly displays differences in reviewers’ ratings, and will help mitigate any issues pertaining to inter-rater reliability.

After removing duplicate citations, we will select studies for inclusion based on a two-level screening process. First, we will independently screen titles and abstracts for congruence with eligibility criteria (first-level screening). At this stage, results will be compared using Covidence© and a meeting will be held to discuss all instances of discrepancy, and all potentially relevant citations and those with insufficient information to determine eligibility will be retained. Second, we will independently screen the full-texts of the retained articles for congruence with eligibility criteria (second-level screening). Using Covidence©, we will document the justification for excluding citations. A final consensus meeting will be held to agree upon the final set of included citations.

Additional Document 2.0 (Continued.) – First and Second Level Screening Guide

Hierarchy of exclusion

1. Off topic
2. Wrong outcomes
3. Wrong intervention
4. Wrong patient population
5. Wrong setting
6. Non-English language
7. Non peer review
8. Protocol only
9. Abstract only
10. No full text (including no abstract)
11. Duplicate

Hand search and consultation process

I will conduct a hand-search using reference lists of all included articles with referenced citations (found using citation tracking).

Audit trail

I will maintain a detailed record of all search strategy procedures to ensure a transparent and replicable process. This will include: databases searched, subject headings and keywords used for each database, hand-search sources, and all KU feedback. The screening and selection process using the PRISMA-P flow chart will be reported (Moher et al., 2009) (Appendix C).

Methodological Quality Assessment

I will conduct a quality appraisal of included citations using the Joanna Briggs Critical Appraisal Tools online (The Joanna Briggs Institute, 2017). Tools are available for all study designs, as well as discussion articles. The purpose of this quality appraisal is to comment on the state of science on this topic; therefore, I have reported on the complete critical appraisal results. I anticipate a small number of included studies, and if this occurs, all studies will be used in the data synthesis phase (regardless of quality measure). If a large number of final studies for inclusion results, I will conduct a sensitivity analysis to evaluate the effect of including and excluding low quality studies on the results. I will consult thesis committee members, when necessary, to settle discrepancies in ratings.

Data Extraction

I created a data extraction template in accordance with each objective in Microsoft Excel. This was reviewed by my thesis supervisor for revision, and modifications were made based on feedback. Next, the template was pilot-tested by myself and my thesis supervisor for inter-rater reliability using three included citations. These citations included: The association between sleep dysfunction and psychosis-like experiences among college students (Andorko et al., 2017), The

effects of improving sleep on mental health (OASIS): A randomised controlled trial with mediation analysis (Freeman et al., 2017), and “The Meaning of Higher Education for people Additional Document 2.0 (Continued.) – First and Second Level Screening Guide

Diagnosed with a Mental Illness: Four Students Share Their Experiences,” (2007). These three citations were chosen based on their ability to fulfill all outlined objectives.

Once the template is finalized, I will extract data from each included study using this template. Data will be checked by complete independent data extraction by two individuals Discrepancies in data extraction will be resolved through discussion and consensus with thesis committee members.

Additional Document 3.0 – Data Extraction Guide

There are 26 articles, that report on 22 studies. This means that some articles have used the same sample population, so you will run into extracting “duplicate” information. For example:

Anglin (2015) and Anglin (2018) use the same population of students

Wang et al., 2015; Shi et al., 2017a; Shi, Shi et al., 2017b; Shi et al., 2016 use the same population of students

Note: A discrepancy was found across all three articles regarding the reported characteristic of sex. Wang et al. (2015) reported 13 females and 19 males in the sample, whereas Shi et al. (2017) and Shi et al. (2016) reported 19 females and 13 males in the sample. I e-mailed the authors requesting clarification. The authors e-mailed back acknowledging the error in reporting in the narrative summary of participant characteristics in the Wang et al. (2015) article and clarified that 19 females and 13 males across all three articles. Therefore, I included this statistic in my data analysis.

1. Read the article once to get a sense of it
2. Read through again and highlight what you will extract (e.g. for study characteristics you will extract, title, author(s), year of publication, etc.)
3. Start extracting study characteristics, and continue from there to meet all objectives
4. Include means, standard deviations, frequencies, percentages, whatever is reported...
5. If something isn't reported just put NR
6. You can either extract per article and fill in all relevant data extraction forms, or extract per objective (e.g. do all prevalence data extraction first, then do all risk factor data extraction next, whatever works best for you)

The following is a breakdown of where you will extracted data from each article:

TOTAL = 26, broken down per objective of what you should extract from each article (*and anything additional you may find)

The association between sleep dysfunction and psychosis-like experiences among college students

(Andorko, 2017)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

Cannabis use, psychotic-like experiences and aberrant salience in a sample of Belgian students (Bernardini, 2018)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

Additional Document 3.0 (Continued.) – Data Extraction Guide

Cannabis use and non-clinical dimensions of psychosis in university students presenting to primary care

(Skinner, 2010)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

Psychotic-like experiences and substance use in college students

(Fonseca-Pedrero, 2016)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

Impact of addiction to internet on a number of psychiatric symptoms in students of Isfahan Universities (Alvari, 2012)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

Social identify and psychosis: Associations and psychological mechanisms(McIntyre 2018)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

Subclinical psychotic experiences in healthy young adults: associations with stress and genetic predisposition

(Bruenig, 2014)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

The role of ethnic identity, self-concept, and aberrant salience in psychotic-like experiences (Cicero, 2018)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

Additional Document 3.0 (Continued.) – Data Extraction Guide

Aberrant Salience, Self-Concept Clarity, and Interview-Rated Psychotic-Like Experiences
(Cicero, 2015)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

Stress sensitivity mediates the relationship between traumatic life events and attenuated positive psychotic symptoms differentially by gender in a college population sample
(Gibson, 2014)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

Insecure attachment predicts proneness to paranoia but not hallucinations
(Pickering, 2008)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

Protective factors in Chinese university students at clinical high risk for psychosis
(Shi, 2008)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

Psychotic experiences in the context of depression: The cumulative role of victimization
(Nam, 2016)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

Comorbid Mental Disorders and 6-Month Symptomatic and Functioning Outcomes in Chinese University Students at Clinical High Risk for Psychosis
(Shi, 2017)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

Additional Document 3.0 (Continued.) – Data Extraction Guide

Why does relative deprivation affect mental health? The role of justice, trust and social rank in psychological wellbeing and paranoid ideation

(Wickham, 2014)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

Family perception and 6-month symptomatic and functioning outcomes in young adolescents at clinical high risk for psychosis in a general population in China

(Wang, 2015)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

Anglin et al (2015)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

Anglin et al (2018)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Risk factors

Enhancing the therapy relationship in acceptance and commitment therapy for psychotic symptoms

(Baruch, 2009)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data

Intervention

The effects of improving sleep on mental health (OASIS): a randomized controlled trial with mediation analysis

(Freeman, 2017)

Study characteristics

Sociodemographic, clinical, service-use characteristics

Prevalence data
Intervention

Additional Document 3.0 (Continued.) – Data Extraction Guide

Effects of rational emotive behavior therapy (REBT) intervention program on mental health in female college students
(Xu, 2017)

Study characteristics
Sociodemographic, clinical, service-use characteristics
Prevalence data
Intervention extraction

Systemic Therapy for Youth at Clinical High Risk for Psychosis: A Pilot Study
(Shi, 2017)

Study characteristics
Sociodemographic, clinical, service-use characteristics
Prevalence data
Intervention extraction

Motivational Interviewing in a Patient With Schizophrenia to Achieve Treatment Collaboration: A Case Study (Ertem, 2016)

Study characteristics
Sociodemographic, clinical, service-use characteristics
Prevalence data
Intervention extraction

Postsecondary academic achievement and first-episode psychosis: A mixed-methods study
(Roy, 2016)

Study characteristics
Sociodemographic, clinical, service-use characteristics
Prevalence data
Experiences

Comparing life experiences of college students with differing courses of schizophrenia in Korea: case studies (Sung, 2006)

Study characteristics
Sociodemographic, clinical, service-use characteristics
Prevalence data
Experiences

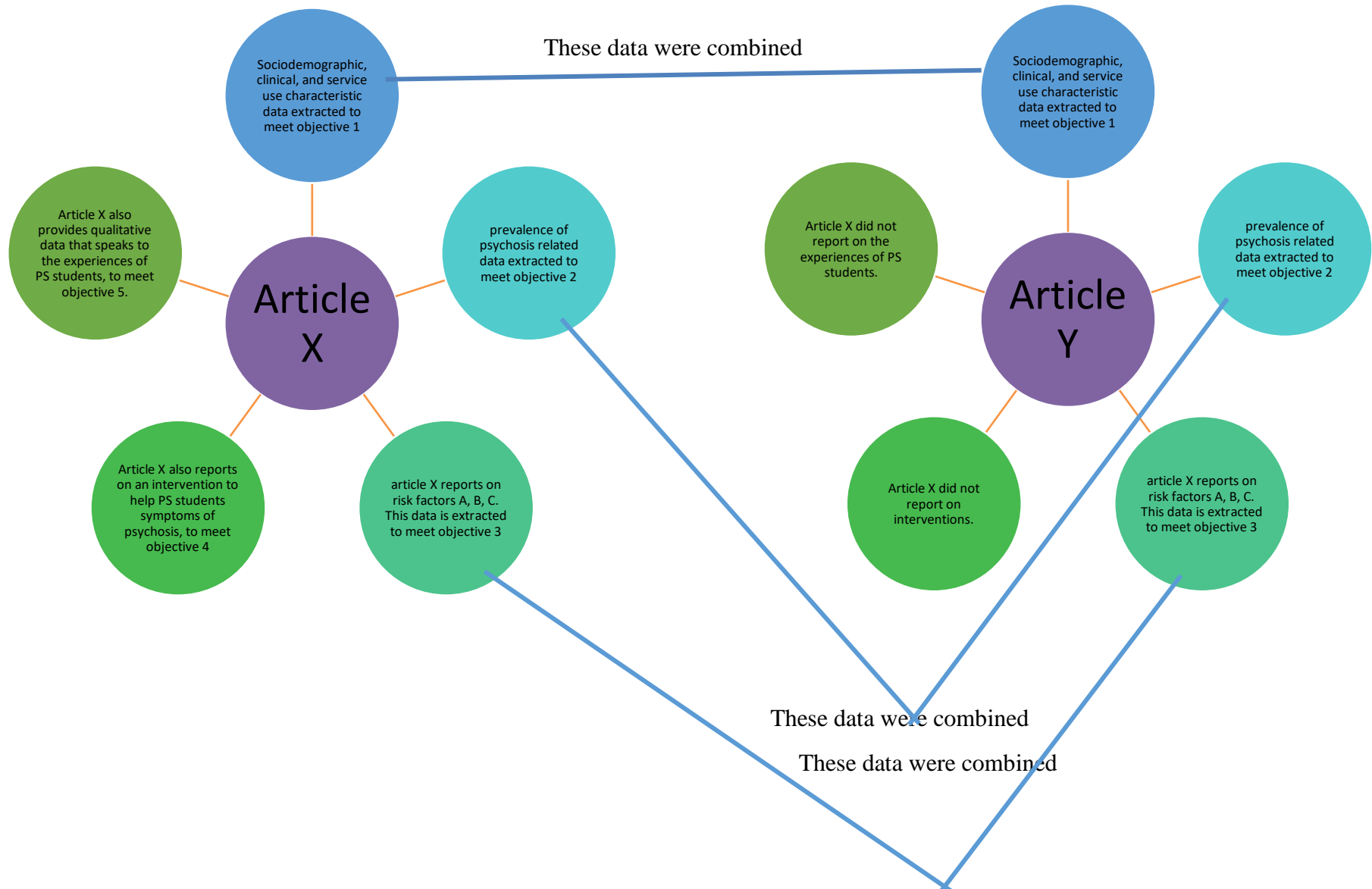
Schizophrenia in college students in Korea: a qualitative perspective (Sung et al, 2006) Study characteristics

Sociodemographic, clinical, service-use characteristics
Prevalence data

Experiences

Additional Figure 1.0 – Data Extraction and Synthesis

Across 26 included citations, data were extracted from each to meet the 5 objectives. Not every article met each objective, but data extracted from each were analyzed and combined (if possible) to meet each objective where appropriate. For example:



Additional Table 2.0 – Study Characteristics (Blank Data Extraction)

*NR= not reported, T = treatment group, C=control group, M=mean, SD= standard deviation,
N=total

Title	Author(s)	Year of publication	Journal of publication	Study type (qualitative/ quantitative / mixed)	Study design (e.g. cross-sectional, RCT)	Total sample size (Treatment / control groups too)	Setting
article 1	sanderson	2017	nursing journal	qualitative	thematic analysis	N=8	college campus of Ottawa U
article 2							

1

2

Author	Country of study	Type of post-secondary institution	Type of students	Theory used
article 1	Canada	university	undergraduate nursing students	transtheoretical model of change
article 2				

Additional Table 2.0 (Continued.) – Study Characteristics (Blank Data Extraction)

3

Author	Objectives / aims / goals (page #)	Hypothesis / hypotheses (page #)	Data collection method(s)	Data analysis method(s) (e.g. statistics bivariate, thematic analysis)	Ethics obtained (yes / no)
article 1	primary: To determine whether nursing students study well secondary: to determine whether nursing students are struggling in school	NR	in depth interviews	descriptive, thematic analysis	yes
article 2					

Additional Table 3.0 – Socio-demographic Characteristics (Blank Data Extraction)

M= mean

SD = standard deviation

NR = not reported

T = treatment/experimental group

C= control group

1

Author	Sample size (total, T / C, other)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)
		e.g. Age	e.g. sex / gender (note whether authors report as sex or gender)	ethnicity / race (Report whether the author reports as ethnicity or race)	keep adding characteristics as they come...
article 1 (author name/year)					
article 2					

2

Author	Sample size (total, T / C, other)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)
			keep adding characteristics as they come...		

Additional Table 4.0 – Clinical Characteristics (Blank Data Extraction)

*NR= not reported, T = treatment group, C=control group, M=mean, SD= standard deviation,
N=total

1

Author	Sample size (total, T / C)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)
		characteristic 1 (e.g. psychiatric diagnosis made by a doctor)	characteristic 2 (psychiatric diagnosis self- reported by the participants)	characteristic 3	characteristic 4
article 1	N=100	e.g. anxiety disorder: 50% depression: 50%	NR		
article 2	N=200	NR	eating disorder: 70% psychotic disorder: 30%		

2

Author	Sample size (total, T / C)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)
		keep adding characteristics as they come...		

Additional Table 5.0 – Service-Use Characteristics (Blank Data Extraction)

*NR= not reported, T = treatment group, C=control group, M=mean, SD= standard deviation,
N=total

1

Author	Sample size (total, T / C)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)
		e.g. Psychological therapy	e.g. contact with mental health services	keep adding characteristics as they come...	
article 1					
article 2					

2

Author	Sample size (total, T / C)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)	Characteristic (count/% out of sample sizes / average value reported)
		keep adding characteristics as they come...			

Additional Table 6.0 – Prevalence of Symptoms of Psychosis (Blank Data Extraction)

Author	Sample size (total, T / C)	Prevalence rates of psychosis of entire sample [count/%] and how it was reported/how it was measured	Is criteria for participants to be psychotic? (yes or no)	Sex / gender breakdown from sample	Prevalence rate per sex / gender category [count/%]
		e.g. 82% of sample reported psychotic-like experiences...	i.e. is the entire sample psychotic or no?		

*report psychosis however the authors report it, e.g. “ultra high risk for psychosis”, hallucinations, paranoia, psychotic-like experiences, etc. just say how it was measured

Additional Table 7.0 – Risk Factors Associated with the Development of Symptoms of Psychosis
(Blank Data Extraction)

*NR= not reported, T = treatment group, C=control group, M=mean, SD= standard deviation,
N=total

Risk factors broken down into two tables per study

Put the title of the study + author here

1

Factor associated symptoms of psychosis	What relationship is being tested?	measurement tools (s) / validated in current study or previous study? (yes/no with evidence)	Sample size (total, T / C /other)	Statistical test(s) used	Bivariate / multivariate	Result(s) quotes (authors report, p #)
Self-concept clarity	correlation between self-concept clarify and psychotic like experiences (PLEs)	validated in current study: Self-concept clarity scale: .89 PLEs: Perceptual aberration/magical ideation scale combined = PerMag=.91 to measure PLEs	N total=663	zero-order correlation	bivariate	“self-concept clarify was negatively associated with PLEs” (p105)

Additional Table 7.0 (Continued). – Risk Factors Associated with the Development of Symptoms of Psychosis (Blank Data Extraction)

2

Factor	What relationship is being tested?	Test result (e.g. r value) and weak, moderate, strong (indicate table)	P value(s)	Direction of relationship Positive: + Negative: -	Sex/gender breakdown from sample	Personal notes (e.g. what do these results mean?)
self-concept clarity	correlation between self-concept clarity and psychotic like experiences (PLEs)	$r = -0.34$	$p < 0.05$	(-)	NR	as self-concept clarity increases, PLEs decrease i.e. self-concept clarity may be protective over experiencing psychosis (based on means on scores of the entire sample)

Additional Table 8.0 – Interventions – TIDIER (Blank Data Extraction)

X = no

✓ = yes

NR= not reported, T= treatment group, C=control group; interventions broken down into 3 tables
per study to cover all areas*

Put the title of the study/author

1

Sample size (total, T / C)	Name / description	Design of intervention based on theory	Goal of intervention (p#)	resource requirements / materials needed	
Total N=	e.g. CBT-based therapy for psychosis	e.g. based on cognitive behavioural therapy		Physical	✓
T:				Informational	✓
C:					

2

Description of the procedures (treatments /activities /processes used) i.e. basic description of the intervention	who provided the intervention?	mode of delivery (individual / group; in person / virtual)		location of intervention	# times intervention was delivered	# of sessions, duration of each session, how long intervention spanned
brief description of the intervention provided by the author	e.g. group therapist	Individual	✓	e.g. school clinic	one	e.g. six sessions – lasts an average of 10 minutes each spanning 10 weeks
		Group	X			
		In person	X			
		Virtual	✓			

Additional Table 8.0 (Continued.) – Interventions – TIDIER (Blank Data Extraction)

3

tailoring / personalization of intervention	modifications made during course of the study	Adherence (total dropout rate, dropout rate from treatment group , dropout rate from control group)	evaluation (how well it was delivered as planned) – fidelity
was the intervention personalized for individuals in some way?	None identified	T:	did the authors report whether it was delivered as intended or were many modifications made?
		C:	

Additional Table 9.0 – Interventions – Outcomes (Blank Data Extraction)

Put the title of the study/author here

1

Outcome(s) [only those related to psychosis / elements of psychosis]	Tools used to measure outcomes	Is tool validated by the developer or in present study? (yes or no)	Statistical test(s) used	Bivariate / multivariate
e.g. Primary outcome results: Sleep treatment effects on paranoia	e.g. PaDS	Yes (present study)	Linear mixed effects regression model for repeated measures (continuous variables)	multivariate
Secondary results: effects of sleep treatment on mania	Altman mania scale	Yes (present study)	T-test (continuous variables)	bivariate

Additional Table 9.0 (Continued.) – Interventions – Outcomes (Blank Data Extraction)

2

Outcome(s) as reported above	Results reported by author (page #) per outcome	Test result (e.g. r value) page#	P value	Personal notes / interpretation of results
Primary outcome results: Sleep treatment effects on paranoia	CBT treatment was associated with significant reductions, at all timepoints, in paranoia, and hallucinations compared with the control group. Reduction after treatment in psychotic experiences was small	treatment group week 1: $r=0.3\dots$	$P<0.0001$	how do you interpret the data?
		treatment group week 2	$P<0.0001$	
		treatment group week 3	$P<0.0001$	
Secondary results: effects of sleep treatment on mania	CBT was associated with a reduction in manic symptoms	week 1: $r=0.3$	$P<0.0001$	e.g. CBT lead to improvements in mania scores over time
		week 2: $r=0.3$	$P<0.0001$	

Additional Table 10.0 – Experiences of Post-Secondary Students with Symptoms of Psychosis
(Blank Data Extraction)

Put title + author name here

1

sample size (total, and sample of psychotic participants)	category name(s) / theme(s)	sub categories	definition of sub category (with page numbers)
N=12	e.g. failure to cope with illness	Verbal interaction deficiency with family	did authors provide a definition of the category or subcategory?
		Difficulty making friends	
		Loneliness	
		Despair due to mental illness	
		Motivation loss with school life	
		Loss of interest	

2

Category name	Sub category name	Exemplars/quotes (page #)	Personal notes
failure to cope with illness	Verbal interaction deficiency with family	e.g. “I had difficulty talking with my brothers and sisters when I began to hear the voices” (p86) exemplar: Gary had difficulty interacting with his family when he began exhibiting symptoms of schizophrenia, he didn’t know how to start or maintain conversations most of the time (p86)	how do you interpret these results? Are quotes/exemplars provided for each category or subcategory?
	Difficulty making friends	...	
	Loneliness	...	
	
	
	
	

Additional Table 11.0 – Complete Search Strategies

Step 1	Medline (375)	PsycINFO (560)	Embase (904)	JB1 (61)	ERIC Proquest (38)
1	exp "schizophrenia spectrum and other psychotic disorders"/	exp PSYCHOSIS/	exp psychosis/	exp "schizophrenia spectrum and other psychotic disorders"/	(MAINSUBJECT. EXACT.EXPLODE("Psychosis") OR if((psychosis OR psychoses OR psychotic*)) OR if(schizophreni*) OR if(schizoaffective) OR if(delusion*)) AND ((MAINSUBJECT .EXACT("Vocational Schools") OR MAINSUBJECT. EXACT("Secondary Schools")) OR (MAINSUBJECT. EXACT("College Environment") OR MAINSUBJECT. EXACT.EXPLODE("Colleges")) OR (MAINSUBJECT. EXACT.EXPLODE("Higher Education") OR MAINSUBJECT.
2	(psychosis or psychoses or psychotic*).tw.	schizoaffective disorder/	(psychosis or psychoses or psychotic*).tw.	(psychosis or psychoses or psychotic*).tw.	
3	schizophreni*.tw.	delusions/	schizophreni*.tw.	schizophreni*.tw.	
4	schizoaffective.tw.	(psychosis or psychoses or psychotic*).tw.	schizoaffective.tw.	schizoaffective.tw.	
5	delusion*.tw.	schizophreni*.tw.	delusion*.tw.	delusion*.tw.	
6	1 or 2 or 3 or 4 or 5	schizoaffective.tw.	1 or 2 or 3 or 4 or 5	1 or 2 or 3 or 4 or 5	
7	exp Universities/	delusion*.tw.	exp university/	exp education, professional/ or universities/ (1)	
8	exp education, continuing/ or exp education, graduate/ or education, medical/ or education, nursing/ or education,	1 or 2 or 3 or 4 or 5 or 6 or 7	exp medical education/	(college* or universit*).tw.	

	public health professional/ (college* or universit*).tw.	college environment/ exp nursing education/ post secundar*.tw.			EXACT.EXPLOD E("Graduate Medical Education") OR MAINSUBJECT. EXACT.EXPLOD E("Professional Education")) OR MAINSUBJECT. EXACT.EXPLOD E("Postsecondary Education") OR if((college* OR universit*)) OR if(post secundar*) OR if(postsecondar*) OR if("tertiary educat*") OR if("higher educat*") OR if("vocational education")) AND (MAINSUBJECT. EXACT.EXPLOD E("College Students") OR if((undergrad* OR graduate* OR postgraduate* OR doctoral* OR
9					
10	post secondar*.tw.	vocational education/ (college* or universit*).tw.		postsecondar*.tw.	
11	postsecondar*.t w.	(college* or universit*).tw.	post secundar*.tw.	(higher adj educat*).tw.	
12	(higher adj educat*).tw.	post secundar*.tw.	postsecondar*.tw.	vocational education.tw.	
13	(tertiary adj educat*).tw.	postsecondar*.tw.	(higher adj educat*).tw.	exp students/ (undergrad* or graduate* or postgraduate* or doctoral* or doctorate*).tw	
14	vocational education.tw.	(tertiary adj educat*).tw.	(tertiary adj educat*).tw.		
15	7 or 8 or 9 or 10 or 11 or 12 or 13 or 14	(higher adj educat*).tw.	vocational education.tw.	(freshm#n* or junior* or sophomore* or senior*).tw.	
16	exp students/ or students, health occupations/ (undergrad* or graduate* or postgraduate* or doctoral* or doctorate*).tw.	vocational education.tw.	exp vocational education/ (undergrad* or graduate* or postgraduate* or doctoral* or doctorate*).tw.	scholar*.tw. learner*.tw.	
17		students/ or business students/ or dental students/ or international students/ or law students/ or medical students/ or reentry students/ or transfer students/ or vocational school students/			

18	(freshm#n* or junior* or sophomore* or senior*).tw.	(undergrad* or graduate* or postgraduate* or doctoral* or doctorate*).tw.	(freshm#n* or junior* or sophomore* or senior*).tw.	student*.tw.	doctorate*)) OR if((freshm?n OR junior* OR sophomore* OR senior*)) OR if(scholar*) OR if(learner*) OR if(student*)) AND pd(20060101-20181231)
19	student*.tw.	(freshm#n or junior* or sophomore* or senior*).tw.	scholar*.tw.	(tertiary adj educat*).tw.	
20	scholar*.tw.	scholar*.tw.	learner*.tw.	7 or 8 or 9 or 10 or 11 or 12 or 19 (
21	learner*.tw.	learner*.tw.	student*.tw.	13 or 14 or 15 or 16 or 17 or 18	
22	16 or 17 or 18 or 19 or 20 or 21	student*.tw.	*college student/ or *physician assistant student/ or *postgraduate student/ or *male nursing student/ or *athletic training student/ or *nursing student/ or *medical student/ or *university student/ or *graduate student/ or *PhD student/ or *dental student/ or *midwifery student/ or *pharmacy student/ or *occupational therapy student/ or *allied health student/ or *paramedical student/ or *social work student/ or *baccalaureate nursing student/ or *dental hygiene student/ or	6 and 20 and 21	

			*dietetics student/ or *health student/ or *audiology student/ or *premedical student/ or *undergraduate student/ or *chiropractic student/ or *graduate nursing student/ or *physical therapy student/ (50643)		
23	6 and 15 and 22	9 or 10 or 11 or 12 or 13 or 14 or 15 or 16	7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16	limit 22 to yr="2006 -Current"	
24	limit 23 to yr="2006 - Current"	17 or 18 or 19 or 20 or 21 or 22	17 or 18 or 19 or 20 or 21 or 22		
25		8 and 23 and 24	6 and 23 and 24		
26		limit 25 to yr="2006 - Current"	limit 25 to yr="2006 - Current"		

Step 1	CINAHL (362)	Education Source (335)	Cochrane Wiley (30)	PUBMED (69)
1	(MH "Psychotic Disorders+")	DE "Universities & colleges" OR DE "Academic departments (Universities & colleges)" OR DE "Academic medical centers" OR DE "Agricultural colleges" OR DE "Art colleges" OR DE "Art in universities & colleges" OR DE "Baptist universities & colleges" OR DE "Buddhist universities & colleges" OR DE "Bullying in universities & colleges" OR DE "Business schools" OR DE "Catholic universities & colleges" OR DE "Christian universities & colleges" OR DE "Cluster colleges" OR DE " ...	MeSH descriptor: [Schizophrenia Spectrum and Other Psychotic Disorders] explode all trees	((((((((schizophrenia and disorders with psychotic features[MeSH Terms])) OR delusions[MeSH Terms]) OR ((psychosis[Title/Abstract] OR psychoses[Title/Abstract] OR psychotic*) AND Title/Abstract)) OR schizophreni*[Title/Abstract]) OR schizoaffective[Title/Abstract]) OR delusion*[Title/Abstract])) AND (((((((universities [MeSH Terms]) OR vocational education[MeSH Terms]) OR ((college*[Title/Abstract] OR universit*) AND

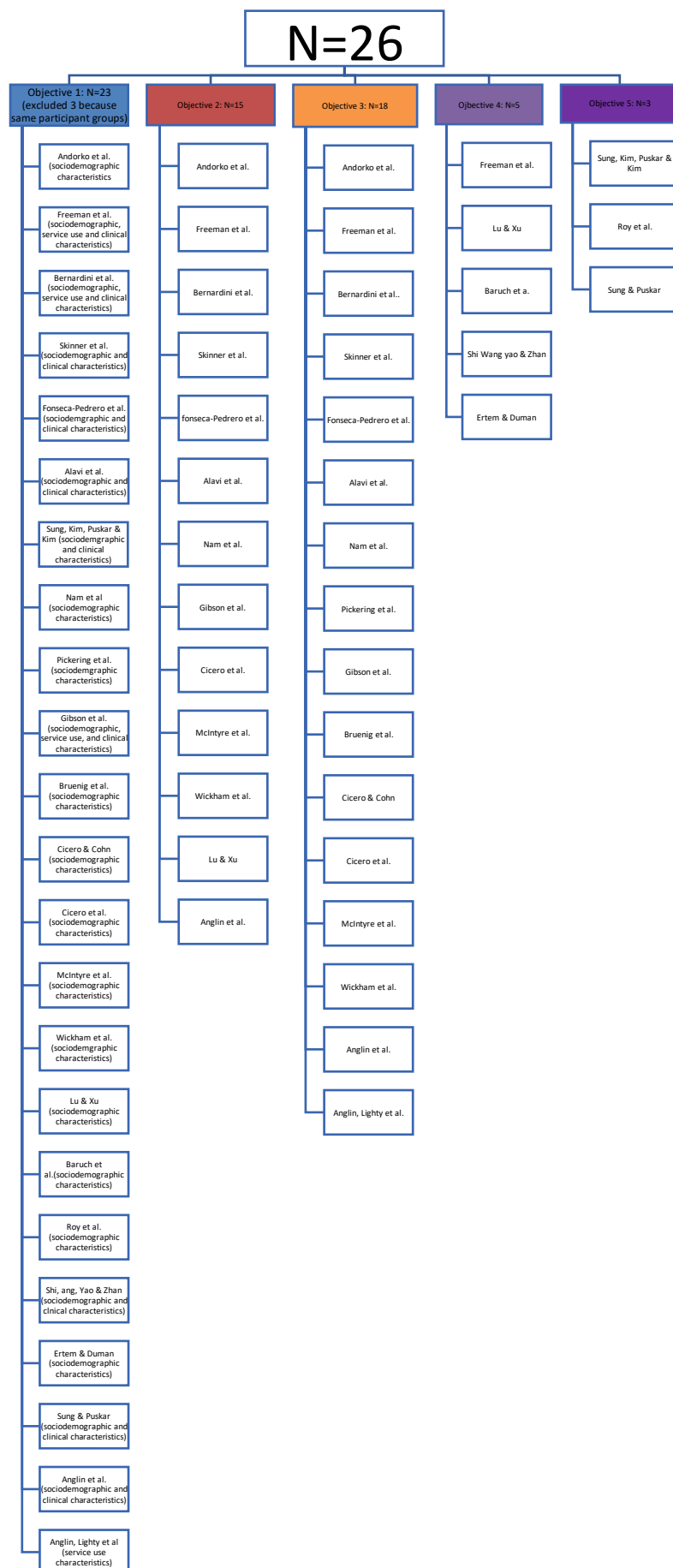
2	(psychosis or psychoses or psychotic*)	(college* or universit*) (MeSH descriptor: [Delusions] this term only	Title/Abstract)) OR post secondar*[Title/Abstract]) OR
3	schizophreni*	post secondar*	(psychosis or psychoses or psychotic*):kw (Word variations have been searched)	postsecondar*[Title/Abstract]) OR
4	schizoaffective	postsecondar*	schizophreni*:kw	higher educat*[Title/Abstract]) OR tertiary educat*[Title/Abstract]) OR
5	delusion*	"tertiary educat*"	schizoaffective:kw	vocational education[Title/Abstract]))
6	(MH "Delusions") ("higher educat*"	delusion*:kw	AND
7	S1 OR S2 OR S3 OR S4 OR S5 OR S6	"vocational education"	(#1 or #2 or #3 or #4 or #5 or #6)	(((((students[MeSH Terms]) OR ((undergrad*[Title/Abstract] OR graduate*[Title/Abstract] OR postgraduate*[Title/Abstract] OR doctoral*[Title/Abstract] OR doctorate*) AND Title/Abstract)) OR ((freshman[Title/Abstract] OR freshmen[Title/Abstract] OR junior*[Title/Abstract]
8	(MH "Colleges and Universities+")	DE "College students" OR DE "Adult college students" OR DE "Bisexual college students" OR DE "Catholic college students" OR DE "Christian college students" OR DE "Church college students" OR DE "College athletes" OR DE "College dropouts" OR DE "College freshmen" OR DE	MeSH descriptor: [Universities] this term only	

		"College juniors" OR DE "College seniors" OR DE "College sophomores" OR DE "College student interests" OR DE "College student parents" OR DE "College students in missionary work" OR DE "College students with disabilities" OR DE "Co ...		ract] OR sophomore*) AND Title/Abstract)) OR scholar*[Title/Abs tract]) OR learner*[Title/Abs tract]) OR student*[Title/Abs tract]) AND (((
9	(MH "Education, Health Sciences+")	(undergrad* or graduate* or postgraduate* or doctoral* or doctorate*)	MeSH descriptor: [Vocational Education] this term only	"2006/01/01"[PDa t] : "2018/12/31"[PDa t]))
10	(MH "Vocational Education")	(freshm?n or junior* or sophomore* or senior*)	(college* or universit*):kw	
11	(college* or universit*)	student*	post secondar* :kw	
12	post secondar*	scholar*	postsecondar* :kw	
13	postsecondar*	learner*	(higher near/1 educat*):kw	
14	(higher N1 educat*)	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7	(tertiary near/1 educat*):kw	

15	(tertiary N1 educat*)	S8 OR S9 OR S10 OR S11 OR S12 OR S13	vocational education:kw	
16	vocational education	KW (psychosis OR psychoses OR psychotic* OR schizophreni* OR schizoaffective OR delusion*)	(#8 or #9 or #10 or #11 or #12 or #13 or #14 or #15)	
17	S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16	AB (psychosis OR psychoses OR psychotic* OR schizophreni* OR schizoaffective OR delusion*)	MeSH descriptor: [Students] this term only	
18	(MH "Students, College") OR (MH "Students, Graduate+") OR (MH "Students, Health Occupations+") OR (MH "Students, Undergraduate")	SU (psychosis OR psychoses OR psychotic* OR schizophreni* OR schizoaffective OR delusion*)	(undergrad* or graduate* or postgraduate* or doctoral* or doctorate*):kw	
19	(undergrad* or graduate* or postgraduate*	TI (psychosis OR psychoses OR psychotic* OR schizophreni* OR	(freshm?n* or junior* or sophomore* or senior*):kw	

	or doctoral* or doctorate*)	schizoaffective OR delusion*)		
20	(freshm?n* or junior* or sophomore* or senior*)	S16 OR S17 OR S18 OR S19	scholar*:kw	
21	student*	S14 AND S15 AND S20	learner*:kw	
22	scholar*	Limiters - Published Date: 20060101- 20181231	student*:kw	
23	learner*			
24	S18 OR S19 OR S20 OR S21 OR S22 OR S23			
25	S7 AND S17 AND S24			
26	S7 AND S17 AND S24 Published Date: 20060101- 20181231			

Additional Figure 2.0 – Breakdown of Objectives across Articles



Additional Table 12.0 – Summary of Characteristics of Included Articles

	Characteristics of Included Studies (N=22)							
Study	Author/year	Country	Sample	Population	Methodology (Study Design)	Purpose	Data collection method(s)	Measurement tool(s) used
1	Andorko et al., 2017	USA	N=409	Undergraduate students	Quantitative (Cross-sectional survey)	To investigate the relationship between sleep dysfunction and psychotic-like experiences.	Self-report questionnaires	Prodromal Questionnaire-Brief (PQ-B)
2	Alavi et al., 2011	Iran	N=250	University students not specified	Quantitative (Cross-sectional survey)	To investigate the impact of internet addiction on psychiatric symptoms.	Self-report questionnaires	Symptoms Level Checklist-90-Revised (SLC-90-R)
3	Article 1 Anglin et al., 2014	USA	N=644	undergraduate students	Quantitative (Cross-sectional survey)	To investigate the relationship between racial discrimination and symptoms of psychosis.	Self-report questionnaires	Prodromal-Questionnaire-Likert (PQ-Likert) Racial discrimination: experiences of discrimination instrument (EOD)
	Article 2 Anglin et al., 2018	USA	N=644	Undergraduate students	Quantitative (Cross-sectional survey)	To investigate the relationship between ethnic identity, racial	Self-report questionnaires	45 item positive subscale of the 92-item Prodromal

						discrimination, and symptoms of psychosis.		<p>Questionnaire-Likert</p> <p>Racial discrimination: Experiences of discrimination (EOD)</p> <p>Ethnic identity: multigroup ethnic identity measure-revised (MEIM-R)</p>
4	Baruch et al., 2009	USA	N=1	University student not specified	Not specified (Case study)	To investigate Acceptance and Commitment Therapy combined with Functional Analytical Therapy in a case study of a patient with psychotic symptoms.	NR	NA
5	Bernardini et al., 2018	Belgium	N=257	Undergraduate students	Quantitative (Cross-sectional survey)	To investigate the relationship between cannabis use and psychotic experiences.	Self-report questionnaires (paper version administered after classes)	Community Assessment of Psychotic Experiences-42 (CAPE-42)
6	Bruenig et al., 2014	Australia	N=182	University students not specified	Quantitative (Cross-sectional survey)	To investigate if genes involved in the wider dopamine system are associated with	self-report questionnaires / DNA collection via saliva sample	CAPE-42

						stress and psychotic experiences.		
7	Cicero & Cohn, 2018	USA	N=663	Undergraduate students	Quantitative (Cross-sectional survey)	To investigate the interactions between aberrant salience, self-concept clarity, and ethnic identity and the effect on psychotic-like experiences.	online self-report questionnaires	<p>Self-concept clarity scale</p> <p>Perceptual aberration and magical ideation scales combined (PerMag)</p> <p>Aberrant salience inventory (ASI)</p> <p>MEIM-R</p>
8	Cicero, Docherty et al., 2015	USA	N=162	Undergraduate students	Quantitative (Cross-sectional survey)	To investigate the interaction between aberrant salience and self-concept clarity and the association with psychotic-like experiences.	self-report questionnaires	<p>ASI</p> <p>Structured Interview for Prodromal Symptoms (SIPS)</p> <p>Scale of Prodromal Symptoms (SOPS)</p> <p>SIAPA: Structured Interview for Assessing</p>

								Perceptual Anomalies Self-concept clarity scale Magical ideation scale (MagicId) Perceptual aberration scale (PerAb) Revised social anhedonia scale (SocAnh)
9	Ertem & Duman, 2016	Turkey	N=1	University student not specified	Not specified Case study	To improve treatment collaboration through the use of Motivational Interviewing in a patient with treatment-resistant schizophrenia.	self-report questionnaires / reported some quotes from the patient (no formal qualitative data collection reported)	Morisky Medication Adherence Scale, Drug Attitude Inventory scale
10	Fonseca-Pedrero et al., 2016	Spain	N=660	College students not specified	Quantitative (Cross-sectional survey)	To investigate the relationship between substance use and psychotic-like experiences.	Self-report questionnaires	CAPE-42, Peters Delusion Inventory (PDI)

11	Freeman et al., 2017	United Kingdom	Total: N=375 5 T: N=189 1 C: N=186 4	Full or part-time university students	Quantitative (Single-blind Randomized Controlled Trial)	To test whether a cognitive behavioural therapy-based intervention would improve sleep and psychotic experiences.	online data collection; participants filled out self-report questionnaires and this data was collected	Green et. al Paranoid Thought Scale Part B Specific Psychotic Experiences Questionnaire-Hallucinations Subscale Altman Mania Scale Prodromal Questionnaire-16 (PQ-16)
12	Gibson et al., 2014	USA	N=671	Undergraduate students	Quantitative (Cross-sectional survey)	To investigate whether stress sensitivity mediates the relationship between traumatic life experiences and symptoms of psychosis.	Self-report online questionnaires	45 item positive subscale of the 92-item Prodromal Questionnaire-Likert
13	Lu & Xu, 2017	China	Total: N=60 T: N=25 C:	University students not specified	Quantitative (Randomized Controlled Trial)	To test the effects of a Rational Emotive Behavioural Therapy intervention in students with symptoms of psychosis.	self-report surveys	SLC-90-R

			N=35					
14	McIntyre et al., 2018	England	N=1167	University students not specified	Quantitative (Cross-sectional survey)	To investigate the relationship between social identification, self-esteem, psychosis, and depression.	self-report questionnaires/survey (“mental health survey”)	PaDS Audiovisual hallucinations (AVH): adapted scale from the Launay-Slade hallucination scale
15	Nam et al., 2016	USA	N=799	Undergraduate college students	Quantitative (Cross-sectional survey)	To investigate the effects of childhood sexual trauma and/or bullying exposure on psychosis.	Self-report questionnaires / surveys	PQ-B
16	Pickering et al., 2008	United Kingdom	N=503	University students not specified	Quantitative (Cross-sectional survey)	To investigate the effects of childhood attachment styles on symptoms of psychosis.	Self-report online questionnaires	PaDs Launay-Slade Hallucination scale
17	Roy et al., 2016	Canada	Total: N=100 T: N=50 C: N=50	Post-secondary students not specified	Mixed-Methods (cross-sectional survey with a control group (comparative study) / grounded theory)	To explore the personal and environmental factors associated with positive and negative academic outcomes, and the strategies used by students who live	self-report questionnaires / in-depth individual semi-structured interviews	NA

						with first-episode psychosis.		
18	Article 1 Shi, et al., 2017b	China	Total: N=26 T: N=13 C: N=13	University students not specified	Quantitative (Single-blind Randomized Controlled Trial)	To investigate the effectiveness of systemic therapy for students at clinical high risk for psychosis.	self-report measurement scales	PQ-16
	Article 2 Wang et al., 2015	China	N=32	Undergradua te students	Quantitative (Longitudina l pre-post survey)	To investigate the characteristics of family functioning in clinical high risk individuals and the association with symptoms of psychosis.	Self-report questionnaire	The family adaptability and cohesion evaluation scale, second edition, Chinese version (FACESII-CV) Family functioning: McMaster Family Assessment Device (FAD) Scale of prodromal symptoms (SOPS): positive, negative,

								disorganized, general score
	Article 3 Shi et al., 2016	China	N=32	University students not specified	Quantitative (Longitudinal pre-post survey)	To investigate the association between comorbid mental disorders with symptoms of psychosis.	self-report questionnaires	Structured interview for psychosis-risk syndromes (SIPS)
	Article 4 Shi et al., 2017a	China	Total: N=64 T: N=32 C: N=32	University students not specified	Quantitative (Longitudinal pre-post survey)	To investigate whether and to what extent self-esteem, social support and resilience influence the severity of symptoms in students in the prodromal phase of schizophrenia.	Self-report questionnaire	SIPS: positive, negative, disorganized, general symptoms
19	Skinner et al., 2011	Ireland	N=1049	University students not specified	Quantitative (Cross-sectional survey)	To investigate the relationship between cannabis use and psychotic, anxious, and depressive symptoms.	Self-report questionnaires	CAPE-42
20	Sung & Puskar, 2006	South Korea	N=21	College students not specified	Generic qualitative	To identify the salient themes that characterize the life experiences of college students with schizophrenia.	in-depth interviews through semi-structured questionnaire	NA
21	Sung, Kim, Puskar & Kim, 2006	South Korea	N=8	College students not specified	Qualitative (Case Studies)	To identify the experiences of students' living with	In-depth interviews	NA

						schizophrenia according to their disease progression.		
22	Wickham et al., 2014	England	N=683	University students not specified	Quantitative (cross-sectional survey)	To investigate the relationship between perceived relative deprivation (PRD) (and associated variables) and symptoms of psychosis.	Self-report surveys / collection of data via the Office of National Statistics (objective measures of IMD scores)	<p>Perceived inequality in childhood scale (PICS)</p> <p>PaDS</p> <p>Launay-Slade hallucination scale</p> <p>IMD: collected data from 7 different domains (government records)</p>

Additional Table 13.0 – JBI Critical Appraisal Checklists

JBI Critical Appraisal Checklist for Case Control Studies

Criteria	Wang 2015
Were the groups comparable other than the presence of disease in cases or the absence of disease in controls?	X
Were cases and controls matched appropriately?	X
Were the same criteria used for identification of cases and controls?	X
Was exposure measured in a standard, valid and reliable way?	X
Was exposure measured in the same way for cases and controls?	X
Were confounding factors identified?	-
Were strategies to deal with confounding factors stated?	-
Were outcomes assessed in a standard, valid and reliable way for cases and controls?	X
Was the exposure period of interest long enough to be meaningful?	NA
Was appropriate statistical analysis used?	-
Total /10	6/9

‘X’ refers to when the criterion was met.

NA: not applicable

Additional Table 13.0 (Continued.) – JBI Critical Appraisal Checklists

JBI Critical Appraisal Checklist for Case Series

Criteria	Shi, Wang, Yao, Su 2017
Were there clear criteria for inclusion in the case series?	X
Was the condition measured in a standard, reliable way for all participants included in the case series?	X
Were valid methods used for identification of the condition for all participants included in the case series?	X
Did the case series have consecutive inclusion of participants?	-
Did the case series have complete inclusion of participants?	-
Was there clear reporting of the demographics of the participants in the study?	X
Was there clear reporting of clinical information of the participants?	-
Were the outcomes or follow up results of cases clearly reported?	X
Was there clear reporting of the presenting site(s)/clinic(s) demographic information?	X
Was statistical analysis appropriate?	X
Total /10	7/10

‘X’ refers to when the criterion was met.

Additional Table 13.0 (Continued.) – JBI Critical Appraisal Checklists

Critical Appraisal Checklist for Analytical Cross Sectional Studies

Criteria	Pickering 2008	Alavi 2010	Skinner 2011	Anglin 2014	Bruenig 2014	Gibson 2014	Wickham 2014	Cicero 2015	Nam 2016
Were the criteria for inclusion in the sample clearly defined?	X	X	X	X	X	-	-	X	-
Were the study subjects and the setting described in detail?	-	-	X	X	-	-	-	-	X
Was the exposure measured in a valid and reliable way?	X*	X	X*	X*	X	-	X	X	-
Were objective, standard criteria used for measurement of the condition?	NA	NA	N/A	-	X	NA	NA	X	N/A
Were confounding factors identified?	X	X	X	X	-	X	X	-	X
Were strategies to deal with confounding factors stated?	X	X	X	X	-	X	X	-	X
Were the outcomes measured in a valid and reliable way?	X	X	X	X	X	-	-	-	X
Was appropriate statistical analysis used?	X	X	X	X	X	X	X	X	X
Total /8	6/7	6/7	7/7	7/8	5/8	3/7	4/7	4/8	5/7

‘X’ refers to when the criterion was met.

*Validated tool, but not validated in current study.

NA: not applicable.

Additional Table 13.0 (Continued.) – JBI Critical Appraisal Checklists

JBI Critical Appraisal Checklist for Analytical Cross Sectional Studies (Continued)

Criteria	Fonseca - Pedrero 2016	Shi 2016	Andork o, 2017	Angli n 2018	Bernardi ni 2018	Cicero 2018	McIntyre 2018
Were the criteria for inclusion in the sample clearly defined?	X	X	X	X	X	-	-
Were the study subjects and the setting described in detail?	-	-	X	-	-	-	-
Was the exposure measured in a valid and reliable way?	X	X	X	X	X*	X*	X
Were objective, standard criteria used for measurement of the condition?	N/A	X	N/A	-	N/A	NA	NA
Were confounding factors identified?	X	-	X	X	X	-	X
Were strategies to deal with confounding factors stated?	X	-	X	X	X	-	X
Were the outcomes measured in a valid and reliable way?	-	X	-	X	X	X	X
Was appropriate statistical analysis used?	X	X	X	X	X	X	X
Total /8	5/7	5/8	6/7	6/8	6/7	3/7	5/7

‘X’ refers to when the criterion was met.

*Validated tool, but not validated in current study.

NA: not applicable.

Additional Table 13.0 (Continued.) – JBI Critical Appraisal Checklists

JBI Critical Appraisal Checklist for Case Reports

Criteria	Baruch 2009	Ertem 2016
Were patient's demographic characteristics clearly described?	X	-
Was the patient's history clearly described and presented as a timeline?	X	X
Was the current clinical condition of the patient on presentation clearly described?	X	-
Were diagnostic tests or assessment methods and the results clearly described?	X	-
Was the intervention(s) or treatment procedure(s) clearly described?	X	X
Was the post-intervention clinical condition clearly described?	X	X
Were adverse events (harms) or unanticipated events identified and described?	X	-
Does the case report provide takeaway lessons?	X	X
Total /8	8/8	4/8

'X' refers to when the criterion was met.

Additional Table 13.0 (Continued.) – JBI Critical Appraisal Checklists

JBI Critical Appraisal Checklist for Randomized Control Trials

Criteria	Freeman 2017	Shi 2017	Xu 2017
Was true randomization used for assignment of participants to treatment groups?	X	unclear	X
Was allocation to treatment groups concealed?	X	-	-
Were treatment groups similar at the baseline?	X	X	X
Were participants blind to treatment assignment?	X	X	unclear
Were those delivering treatment blind to treatment assignment?	N/A	-	-
Were outcomes assessors blind to treatment assignment?	X	X	-
Were treatment groups treated identically other than the intervention of interest?	X	unclear	unclear
Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?	-	X	X
Were participants analyzed in the groups to which they were randomized?	X	unclear	unclear
Were outcomes measured in the same way for treatment groups?	X	X	X
Were outcomes measured in a reliable way?	X	-	X
Was appropriate statistical analysis used?	X	X	-
Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial?	X	X	unclear
Total /13	11/12	7/13	5/13

‘X’ refers to when the criterion was met.

Additional Table 13.0 (Continued.) – JBI Critical Appraisal Checklists

JBI Critical Appraisal Checklist for Qualitative Research

Criteria	Sung, Kim, Puskar & Kim 2006	Sung 2006	Roy 2016
Is there congruity between the stated philosophical perspective and the research methodology?	-	-	-
Is there congruity between the research methodology and the research question or objectives?	X	X	X
Is there congruity between the research methodology and the methods used to collect data?	X	X	X
Is there congruity between the research methodology and the representation and analysis of data?	X	-	X
Is there congruity between the research methodology and the interpretation of results?	X	-	X
Is there a statement locating the researcher culturally or theoretically?	-	-	-
Is the influence of the researcher on the research, and vice-versa, addressed?	-	-	-
Are participants, and their voices, adequately represented?	X	-	unclear
Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	X	X	X
Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	X	-	unclear
Total /10	7/10	3/10	5/10

‘X’ refers to when the criterion was met. Additional Table 13.0 (Continued.) – JBI Critical Appraisal Checklists

Additional Table 14.0 – JBI Critical Appraisal Checklist for Studies Reporting Prevalence Data

Criteria	Alavi 2011	Andork o 2017	Anglin 2018	Bernardi ni 2018	Cicer o 2015	Fonseca - Pedrero 2016	Freema n 2017	Gibson 2014	McInty re 2018
Was the sample frame appropriate to address the target population?	X	-	X	X	-	-	X	X	X
Were study participants sampled in an appropriate way?	-	-	-	-	-	-	X	unclear	unclear
Was the sample size adequate?	unclear	unclear	X	unclear	unclear	X	X	X	X
Were the study subjects and the setting described in detail?	X	X	X	X	-	X	X	X	-
Was the data analysis conducted with sufficient coverage of the identified sample?	X	X	X	X	X	unclear	X	X	-
Were valid methods used for the identification of the condition?	X	X	X	X	X	X*	X	-	X
Was the condition measured in a standard, reliable way for all participants?	X	X	X	X	X	X	X	X	X
Was there appropriate statistical analysis?	-	X	-	X	X	X	X	X	X
Was the response rate adequate, and if not, was the low response rate managed appropriately?	unclear	X	X	X	X	X	X	X	X
Total /9	5/9	6/9	7/9	7/9	5/9	6/9	9/9	7/9	6/9

*X refers to when the criterion was met.

* Validated tool, but not validated in current study.

NA: not applicable

Additional Table 14.0 (Continued.) – JBI Critical Appraisal Checklist for Studies Reporting Prevalence Data

Criteria	Nam 2016	Skinner 2011	Wang 2015	Wickham 2014	Xu 2017
Was the sample frame appropriate to address the target population?	unclear	-	-	-	-
Were study participants sampled in an appropriate way?	-	-	-	-	-
Was the sample size adequate?	X	X	unclear	unclear	unclear
Were the study subjects and the setting described in detail?	-	X	X	-	-
Was the data analysis conducted with sufficient coverage of the identified sample?	NA	X	X	X	X
Were valid methods used for the identification of the condition?	X	-	-	-	X
Was the condition measured in a standard, reliable way for all participants?	X	X	X	X	X
Was there appropriate statistical analysis?	X	X	X	X	X
Was the response rate adequate, and if not, was the low response rate managed appropriately?	X	X	X	X	X
Total /9	5/8	6/9	5/9	4/9	5/9

‘X’ refers to when the criterion was met.

* Validated tool, but not validated in current study.

NA: not applicable

Additional Table 15.0 – Summary of Participant Socio-demographic, Clinical, and Service Use Characteristics

Socio-demographic Characteristic	Number of Studies	Total sample size	Mean weighted Frequency (%)
Age (years)	N=22	N=12,015	Mean: 21.1 Range: 17-63
Sex	N=22	N=12,015	Female: 8,292 (70) Male: 3,613 (30) Other: 36 (<1) Missing: 74 (<1)
Ethnicity	N=13	N=9,572	White/Caucasian: 6,490 (68) Black: 372 (4) Asian: 884 (9) Other: 527 (6) Multi-ethnic/mixed: 516 (5) Missing: 307 (3) Hispanic/Latino: 199 (2) African American: 113 (1) Pacific Islander: 107 (1) Asian American: 3 (<1) American Indian: 10 (<1) Arab: 26 (<1) French-Canadian: 18 (<1)
Civil Status	N=4	N=1,779	Single/separated: 1,695 (95) Married: 116 (7) Missing/unreported: 55 (3) Divorced: 4 (<1)
Level of Study/ Education	N=3	N=1,089	First year: 193 (18) Second year: 293 (27) Third year: 295 (27) Fourth year: 299 (28) Missing: 9 (<1)

	N=1	N=3,755	Undergraduate: 2,741 (73) Postgraduate: 953 (25) Missing: 61 (2)
Birth place	N=1	N=644	United states: 354 (55)
Immigrant Status	N=1	N=644	First-generation: 296 (46) Second-generation: 292 (46) Non-immigrant: 52(8)
Program of study	N=1	N=60	Management: 12 (20) Psychology: 15 (25) Medicine: 13 (22) Other subjects: 20 (33)
Employment Status	N=1	N=660	Unemployed: 572 (87) Employed: 83 (12) Unreported: 8 (1)
Family Members	N=1	N=8	Has a father: 7/8 (88) Has a mother: 8/8 (100) Has a sister: 2/8 (25) Has a brother: 3/8 (38)
Single child	N=1	N=32	26 (81)
Relationship of Parents	N=1	N=32	Harmony: 17 (53) Ordinary: 8 (25) Frequent quarrels: 2 (6) Separated or divorced: 5 (16)
Raised by others (not parents) in childhood	N=1	N=32	13 (41)
Family monthly income	N=1	N=32	<2000: 2 (6) 2000-4999: 10 (31) 5000-9999: 16 (50) 10000-19999: 4 (13) >20000: 0 (0)
Family annual income	N=1	N=644	M: 2.8 SD: 2.6

			“mean family income level for the sample was closest to the \$40-60,000 range category” USD	
Students’ source of income	N=1	N=38	Family: 19 (50) Other: 19 (50)	
Student annual income	N=1	N=38	M: 13,088.1	
Number of friends	N=1	N=38	M: 5.5	
Living arrangements	N=1	N=38	With family: 28 (74) Not with family: 10 (26)	
Clinical Characteristic	Number of Studies	Total sample size	Frequency (%)	
Psychiatric Diagnosis Breakdown	N=4 N=4*	N=1,045 N=224	224 (21) sleep disorder: 189 (84) internet addiction: 38 (17) schizophrenia: 8 (4) Social phobia: 6 (3) OCD: 4 (2) Panic attack: 3 (1) Agoraphobia: 3 (1) Specific phobia: 3 (1) Depression: 3 (1) Dysthymia: 3 (1) Somatization disorder: 1 (<1) Body dysmorphic disorder: 1 (<1)	
Family history of psychiatric disorders	N=3	N=1,594	315 (20)	
Cannabis use	N=3	N=1,966	Lifetime cannabis use (smoked at least once): 675 (34)	

Other drug use	N=3	N=1,966	81 (4)	
Family history of psychotic disorders	N=2	N=1,306	63 (5)	
Age when first diagnosed with schizophrenia	N=1	N=21	M: 18.9 Range: 15-22	
Duration of illness (schizophrenia)	N=1	N=21	M: 52.5 months Range: 30-92 months	
Self-reported psychiatric diagnosis	N=1	N=3,755	1231 (33)	
Taking psychiatric medications	N=1	N=3,755	893 (24)	
Physical disorders	N=1	N=257	34 (13)	
Medical treatments	N=1	N=257	34 (13)	
Service use characteristic	Number of Studies	Total sample size	Frequency (%)	
Psychological therapy	N=1	N=3,755	281 (7)	
Sought/received counselling	N=1	N=644	37 (6)	
Receiving/seeking treatment	N=1	N=644	85 (13)	

Contact with mental health services	N=2	N=4,804	843 (18)		
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*Some participants had more than one psychiatric diagnosis.

Additional Table 16.0 – Measurement Tool Descriptions

Measurement tool name (abbreviation)	Clinician-diagnosed or self-report	Description	Scoring	Total score
Mild or Non-Specific Symptoms (N=9)				
Symptom Level Checklist – 90 – Revised (SLC-90-R) ¹	Self-report	Multidimensional symptom inventory consisting of 90 questions in total, which are divided into nine symptom dimensions: somatization, obsessive-compulsive disorder, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism as a measure of psychosis.	Each item rated on a Likert scale from 0-4 (not at all to extremely) by how much the person is bothered by the symptom (e.g. having thoughts that are not your own) in the last seven days. Summed to totals per symptom dimension. All Likert values are added up per dimension, divided by the number of endorsed items to get a mean value. There are ten items on the psychoticism dimension. A score equal to, or greater than two in any of the nine dimensions is indicative of a mental health issue in that particular dimension.	Maximum total score per dimension: 10
Peters Delusion Inventory (PDI-21) ²	Self-report	21 item questionnaire assessing delusional experiences or propensity for delusions.	21 items with yes/no answers. Each item has 3 subscales measuring the degree of conviction, preoccupation, and distress. Scored using a Likert scale with five categories (1-5). Total score is obtained by adding the positive responses to each item.	Maximum total score: 21

			A higher score is indicative of delusional symptoms or propensity for delusions.	
Persecution and Deservedness Scale (PaDS) ³	Self-report	Measures persecution as an indicator of symptoms of paranoia and whether persecution is perceived as deserved.	Ten items measure perceived persecution, and ten secondary questions measure whether persecution is perceived as deserved (secondary questions are answered only if perceived persecution is endorsed). 5-point Likert scale (0=certainly false, 4=certainly true); total score summed.	Maximum total score on persecution measure: 20 Maximum score on deservedness scale: 20 Maximum total score: 40
Launay-Slade Hallucination scale ⁴	Self-report	Participants address questions regarding experiencing subclinical hallucinatory experiences.	Scores are calculated by summing scored responses from each item; possible scores range from 10-50, where 10 is strongly not endorsing any item and 50 is strongly endorsing each item.	Maximum total score: 50
Magical Ideation Scale (MagicId) ⁵	Self-report	35 item true-false scale that measures schizophrenic-like distortions in perceptions.	Items endorsed as “true” are summed to a total score.	Maximum total score: 35
Perceptual Aberration Scale (PerAb) ⁶	Self-report	30-item true-false scale designed to measure beliefs in the form of causation that are untrue by conventional standards. Scores are calculated by summing affirmative answers. *Note: Scores on PerAb and MagicId can be added together to form a single perceptual	Items endorsed as “true” are summed to a total score.	Maximum total score: 30

		aberration/magical ideation score, which some researchers/clinicians use to measure whether a person meets threshold for psychotic experiences.		
Revised Social Anhedonia Scale (SocAnn) ⁷	Self-report	40-item true-false scale that measures lack of pleasure from social relationships and interactions.	Items endorsed as “true” are summed to a total score.	Maximum total score: 40
Dissociative experiences scale (DES) ⁸	Self-report	Participants address 28 questions about experiences that people have in daily life (not under the influence of substances). E.g. Some people sometimes have the experience of feeling that their body does not belong to them. Select a number to show what percentage of the time this happens to you.	Participants answer each item from 0-10 (0= 0% never, 10=100% always, indicating the percentage of time they have the experience). Answer in increments of 10 (e.g. 0%, 10%, 20%, 30%). Add up the mean numerically (e.g. 1 + 2 + 3 +2 for all 28 then divide by 28).	Maximum total score: 100% on all 28 items
Community Assessment of Psychotic Experiences-42(CAPE-42) ⁹	Self-report	42-item self-report questionnaire. Assesses three dimensions of psychosis (positive, negative, depressive dimensions).	Uses two 4-point Likert scales (one evaluating frequency of experiences, one evaluating degree of distress associated with experiences). The 4-point Likert scale measures the frequency from “never”, “sometimes”, “often”, and “nearly always”).	Frequency scores: Positive symptoms: 20 Negative symptoms: 14 Depressive symptoms: 8

			<p>Overall scores and a total score per dimension (positive, negative, depressed) can be calculated and scores of frequency questions are summed for a total score. Distress scores are calculated adding up the scores of distress questions.</p> <p>The weighted score per dimension is the sum score per dimension divided by the amount of items filled in by the subject. CAPE positive, negative and depression scores can be expressed as units standard deviation (standardized scores) in order to remove scale difference.</p>	<p>Maximum total score: 160</p> <p>Weighted scores Positive symptoms: 4 Negative symptoms: 4 Depressive symptoms: 4 (mean of 1=never, mean of 2=sometimes, mean of 3= often, mean of 4= nearly always)</p>
Prodromal Phase (N=5)				
Prodromal Questionnaire – Brief ¹⁰	Self-report	<p>21-item questionnaire examining psychotic-like experiences within the past month.</p> <p>Focuses on positive symptoms of psychosis (unusual thinking, perceptual disturbances, suspiciousness, grandiosity, disorganized communication, social functioning,</p>	<p>All initial items are answered with yes/no – any positive endorsements are then rated in terms of distress associated with the experience on a Likert-type scale from 1-5 (no distress to severe distress).</p> <p>Participants are asked to disregard reporting experiences related to substance use (i.e. experiences occurring under the influence of</p>	<p>Maximum total score: 21</p> <p>Maximum distress score: 105</p>

		academic/occupational functioning).	alcohol, drugs, etc.). Total score ranges from 0-21.	
45 item positive subscale of the 92-item Prodromal Questionnaire ¹¹	Self-report	45-item positive symptom scale (a subscale of the 92 item Prodromal Questionnaire) that participants endorse within the past month. Asks individuals to endorse whether they have experienced positive symptoms (not under the influence of substances), and whether endorsed symptoms were distressing.	The 92-item Prodromal Questionnaire is comprised items are answered true/false and sum to form four major subscales: 1) Positive symptoms (e.g. unusual thinking and perceptual abnormalities), 2) Negative symptoms (e.g. flat affect and social isolation), 3) Disorganized symptoms (e.g. odd behaviour) and 4) General symptoms (e.g. depression and role functioning). The 45 items on the positive subscale is answered in a yes/no fashion and summed for a total score.	Maximum total score: 92 on the entire scale, 45 on the positive subscale
Prodromal Questionnaire – 16 ¹²	Self-report	Questionnaire with 16 items, assessed over the responders' lifetime. Nine items cover perceptual abnormalities, five cover unusual thought content and paranoia and two cover negative symptoms.	Each item is marked true/false, with endorsed symptoms rated on a scale of distress ranging from 0-3 (no distress to severe distress). Scored by summing the distress scores (range 0–48) or the total number of symptoms endorsed (range 0–16). This scale uses a cut-off score of 6 for determining which students are at clinical high risk for psychosis and is used to screen individuals for psychosis risk.	Maximum total score: 16 Maximum score on distress scale: 48
Structured Interview for Prodromal Psychosis (SIPS)/Scale of	Administered by a trained clinician	The interview includes a biopsychosocial history and ratings along four major symptom dimensions on the SOPS: positive, negative, disorganized and	Diagnosis by a clinician based on the results of the interview.	Clinician-administered, requires clinical judgement to make the diagnoses versus

Prodromal Symptoms (SOPS) ¹³		general/affective symptoms. This scale diagnoses three types of prodromal syndromes, including Attenuated Positive Symptom Prodromal Syndrome (APS), Brief Intermittent Psychosis Prodromal Syndromes (BIPS), and Genetic Risk and Deterioration Syndrome (GRDS).*		a total maximum score.
Structured Interview for Assessing Perceptual Anomalies (SIAPA) ¹⁴	Administered by a trained clinician	Assesses perceptual anomalies (internal stimuli) that a person may be experiencing, in the domains of auditory, visual, tactile, olfactory and gustatory hallucinations. Interviewees are asked to be rated based on experiences and symptoms during the preceding week (including the day of the interview).	15 questions in total are asked, rated on a Likert scale from 1-5 (never to always). Scores are added up to a total (the higher the score, the more frequently the person is experiencing perceptual anomalies).	Maximum total score: 75

*1) Attenuated Positive Symptom Prodromal Syndrome (APS): Attenuated positive psychotic symptoms present at least once per week, started or worsened in that past year (unusual thought content/delusional ideas, suspiciousness/persecutory ideas, grandiosity, perceptual abnormalities/distortions, and conceptual disorganization; 2) Brief Intermittent Psychosis Prodromal Syndrome (BIPS): Brief and intermittent fully psychotic symptoms that have started recently; 3) Genetic Risk and Deterioration Prodromal Syndrome (GRDS): Either a family history of a psychotic disorder in any first-degree relative and decline of at least 30% in the past 12 months on the GAF scale, or, meets criteria for schizotypal personality disorder and has had a decline of 30% on the GAF in the past year.

1. https://dmu.trc.upenn.edu/dmumain/PDF_Files/scl.pdf
2. Not available
3. <https://pdfs.semanticscholar.org/9b71/a3f66a4d0f82f4a45fa2484035c3381fae9c.pdf>
4. Not available
5. Not available
6. Not available
7. Not available
8. <https://www.hebpsy.net/files/ruZXkl5YGeKcvt6dBZpS.pdf>
9. <http://cape42.homestead.com/files/CAPE-42.htm>
10. <http://www.mmcri.org/ns/wp-content/uploads/2015/07/MAY-Screening-Letter-and-Tool.pdf>
11. Not available
12. www.mcpap.com/pdf/PQ-16.pdf
13. [http://easa.pdx.edu/PDF/SIPS_5-5_032514\[1\]%20correct.pdf](http://easa.pdx.edu/PDF/SIPS_5-5_032514[1]%20correct.pdf)
14. https://watermark.silverchair.com/25-3-577.pdf?token=AQECAHi208BE49Ooan9kkhW_Ercy7Dm3ZL_9Cf3qfKAc485ysgAAAnIwggLuBgkqhkiG9w0BBwagggIfMIICWwIBADCCAIQGCSqGSIb3DQEHATAeBgIghkgBZQMEAS4wEQQMH9qXRXXK74Dxykk5AgEQgIICJSU4kuz3AEtIdI1_JwXePIPr8A0Av6q2aTWtU3ka9jALq_ICM_wyk_ca9TnjAma7dBbyKxgqEOpHycHrTk1GespICVsVvfj5c1gj7xODGvpsOxHSvXecUFdWW75fZgDIV2Itu1KIxXLvmF-Zl6Zfxl__491KzJWMsAQpbKqx_3M3Emloy7IfEKAo7bTMTgw3ydVVlKmttdjizYOqFf4ayJxAxZLi6hhXjUWG22OwPqTVsmlPVV-d1nX5pbFUIBMZ6dRysxnhNvSFpwEaVjr-ZRHWIyрмаhtMbZoyR5BUDyEPQaut_wHayDPFQbtMPbDMWhDjS09-zoe148TkAnlME6jr6oRqimfYgoEOk59T7Olheq7xKDuiRX7TQ4zzcBPyvjHQZhKo5mSJqE5LSvGka2Q-TGlvkGcWx2RqwMnoBVc5V8Gg7gFY-wIswjEcUehR6UhEaNbVNuRco2c9ECB83px0uwoYvIWjHEs2_zC0gn6kOKssrLMoY5Th3jFwzs_bPT7FAXGS5k5z4-E5hrIcTkz1hE-TODPQIsqLLM683MjWEeT_S-KpExq771ncoax3reo5yIVqyf_tsXlVbuzhdxrrtOLTns3AJRgWmKvJwfiQGCvDKy1tD491haxFx1J9nM4D_-gvfh8AivG6uRqQ57cz8tiBmV0-J5vgXJyzsLu0-FGjPzy5VxKQPT-K27bxKGc6QhE_jGHHyFmsl7DQwq2P4BQ6Gg

Additional Table 17.0 – Prevalence of Symptoms of Psychosis across Studies

	Clinician-diagnosed or self-report	Used as Intended or Modified	N studies reporting	Total population	Frequency (%)	Measurement tool/ Interpretation of Result	*Quality Appraisal Score
	Mild or Non-Specific Symptoms						
- et (5)	Self-report	Modified	N=1	N=330	317 (96%)	Peters Delusion Inventory (PDI-21) ₁ 96% of participants positively reported endorsing at least one item on the PDI-21, thus endorsed experiencing delusions at least once in their lifetime.	6/9
t (5)	Self-report	Used as intended	N=1	N=2,100	162 (8%)	PerAb, MagicId, SocAnh ₂ 8% of the sample met the threshold for high risk on PerAb, MagicId, and/or SocAnh.	5/9
ini	Self-report	Modified	N=1	N=257	Positive psychotic symptom score (often, almost always): 139 (54%)	Community Assessment of Psychotic Experiences (CAPE-42) ₃ Over half the sample endorses at least 1 item on the positive,	7/9

					Negative psychotic symptom score (often, almost always): 165 (64%)	negative, or depressed dimension of the CAPE-42.	
					Depressive psychotic symptom score (often, almost always): 189 (74%)		
- et 5)	Self-report	Modified	N=1	N=660	Item 24: Positive psychotic symptom score (often, almost always): 0.6%	Community Assessment of Psychotic Experiences (CAPE-42) ₃ Item 24: “Do you ever feel as if the thoughts in your head are being taken away from you?” 0.6% of participants endorsed this symptom.	6/9
					Item 6 20.3%	Item 6: “Do you ever feel as if some people are not what they seem to be?” 20.3% of	

						participants endorsed this symptom.	
	Prodromal Phase						
	Self-report	Modified	N=1	409	337 (83%)	Prodromal Questionnaire – Brief ⁴ 83% of the population in this study endorsed at least one psychotic-like experience as per the PQ-B.	6/9
et (3)	Self-report	Modified	N=2	1,315	1,159 (88%)	45 item positive subscale of the 92-item Prodromal Questionnaires ⁵	7/9
et (4)						88% of students endorsed at least one of the 45 positive psychotic items on the scale.	7/9
n	Self-report	Used as intended	N=2	6,091	2,028 (33%)	Prodromal Questionnaire – 16 ⁶ 33% of students reached the cut off score of greater than 6 for being deemed clinical high risk for psychosis.	9/9
e (5)							5/9

*Quality appraisal score was obtained using the Joanna Briggs Institute Appraisal Checklist for Studies Reporting Prevalence Data (2017).

1. Peters, E., Joseph, S., & Garety, P. (1999). Measurement of Delusional Ideation in the Normal Population: Introducing the PDI (Peters et al. Delusions Inventory). *Schizophrenia Bulletin*, 25(3), 553-576.

2. Eckblad, M., Chapman, L., & Garfield, Sol L. (1983). Magical ideation as an indicator of schizotypy. *Journal of Consulting and Clinical Psychology*, 51(2), 215-225.
 Chapman, L. J., Chapman, J. P., & Raulin, M. L. (1978). Body-image aberration in Schizophrenia. *Journal of Abnormal Psychology*, 87(4), 399-407.
 Chapman, L. J., Chapman, J. P., Raulin, M. L., & Eron, L. (1976). Scales for physical and social anhedonia. *Journal of Abnormal Psychology*, 85(4), 374-382.
3. Stefanis, N. C., Hanssen, M., Smirnis, N. K., Avramopoulos, D. A., Evdokimidis, I. K., Stefanis, C. N., . . . Van Os, J. (2002). Evidence that three dimensions of symptoms of psychosis have a distribution in the general population. *Psychological Medicine*, 32(2), 347-358. <http://dx.doi.org/10.1017/S0033291701005141>
4. Loewy, R. L., Pearson, R., Vinogradov, S., Bearden, C. E., & Cannon, T. D. (2011). Psychosis risk screening with the Prodromal Questionnaire--brief version (PQ-B). *Schizophrenia research*, 129(1), 42-6.
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6. Ising, H. K., Veling, W., Loewy, R. L., Rietveld, M. W., Rietdijk, J., Dragt, S., Klaassen, R. M., Nieman, D. H., Wunderink, L., Linszen, D. H., . . . van der Gaag, M. (2012). The validity of the 16-item version of the Prodromal Questionnaire (PQ-16) to screen for ultra high risk of developing psychosis in the general help-seeking population. *Schizophrenia bulletin*, 38(6), 1288-96. <https://doi-org.proxy.bib.uottawa.ca/10.1093/schbul/sbs068>

Additional Table 17.0 (Continued.) – Prevalence of Symptoms of psychosis Across Studies

	Clinician-diagnosed or self-report	Used as Intended or Modified	N studies reporting	Total population	Mean	Measurement tool/ Interpretation of Result	*Quality Appraisal Score
	Mild or Non-Specific Symptoms						
	Self-report	Used as intended	N=2	N=310	5.08	Symptom Level Checklist – 90 – Revised (SLC-90-R) ₁	5/9
						Mean score equal to, or greater than 2 is indicative of having a mental health issue (in this case, specifically the psychoticism dimension). Therefore, the sample mean score indicates that an average score of greater than 2 was obtained on the psychoticism dimension.	5/9
e	Self-report	Modified	N=1	N=1167	9.88	Dissociative Experiences Scale (DES) ₄ Note: McIntyre et al. (2018) used a single item on the DES: “Some people sometimes find that they hear voices inside their head that tell them to do things or comment on things that they are doing” and participants rated this from “never” to “always” on a 10-point scale. A mean of 9.88 indicates	6/9

						that the average person endorsed auditory hallucinations.	
e	Self-report	Modified	N=1	N=1167	12.83	<p>Persecution and Deservedness Scale (PaDs)₂</p> <p>Assessed paranoia with 5 items taken from the persecution subscale of the PaDS (Likert scale for each item 1=strongly disagree, 5= strongly agree; maximum score=25). A mean score of 13 indicates that the average person endorses at least half of the persecutory items.</p>	6/9
	Self-report	Used as intended	N=1	N=683	13.84	<p>Persecution and Deservedness Scale (PaDs)₂</p> <p>Used the persecutory items only (Likert scale for each item 1=certainly false, 4= certainly true) (maximum score=40). A mean score of 14 indicates that the average person does not endorse majority of the persecutory items.</p>	4/9
	Self-report	Used as intended	N=1	N=683	15.49	<p>Launay-Slade Hallucination Scales₃</p> <p>With a score of 10 indicating strongly not endorsing symptoms, and 50 indicating strongly endorsing</p>	4/9

					symptoms, the average score of 15 indicates that the average participant did not strongly endorse hallucinations.	
Self-report	Used as intended	N=1	N=1,049	Positive psychotic symptom score: M weighted: 1.29	Community Assessment of Psychotic Experiences (CAPE-42) ⁵ The mean scores (all <2) translate to the average participant endorsing positive, negative, and depressive psychotic symptoms as per the CAPE-42 between “never” and “sometimes”.	6/9
				Negative psychotic symptoms score: M weighted: 1.66		
				Depressive psychotic symptom score: M weighted: 1.66		
Prodromal Phase						
Self-report	Used as intended	N=1	N=799	19.14	Prodromal Questionnaire – Brief ⁶ The mean score indicates that the average person scored 19.14/21, meaning the average person endorsed 19 items on the questionnaire.	5/8

*Quality appraisal score was obtained using the Joanna Briggs Institute Appraisal Checklist for Studies Reporting Prevalence Data (2017).

7. Derogatis, L. R. (1979). Symptom Checklist-90-Revised (SCL-90-R). *Lyndhurst, NJ: NCS Pearson*.
8. Melo, S., Corcoran, R., Shryane, N., & Bentall, R. (2009). The persecution and deservedness scale. *Psychology and Psychotherapy: Theory, Research and Practice*, 82(3), 247-260.
9. Launay, & Slade. (1981). The measurement of hallucinatory predisposition in male and female prisoners. *Personality and Individual Differences*, 2(3), 221-234.
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11. Stefanis, N. C., Hanssen, M., Smirnis, N. K., Avramopoulos, D. A., Evdokimidis, I. K., Stefanis, C. N., . . . Van Os, J. (2002). Evidence that three dimensions of psychosis have a distribution in the general population. *Psychological Medicine*, 32(2), 347-358.
<http://dx.doi.org/10.1017/S0033291701005141>
12. Loewy, R. L., Pearson, R., Vinogradov, S., Bearden, C. E., & Cannon, T. D. (2011). Psychosis risk screening with the Prodromal Questionnaire--brief version (PQ-B). *Schizophrenia research*, 129(1), 42-6.

Additional Table 18.0 – Risk Factor Categorization Rationale

Category	Definition	Studies	Author (year)	Rationale
Genetic predisposition	Includes inherited risk alleles and genetic mutations, genes that are relevant to HPA axis function (e.g., FKBP5 and BDNF) (Pruessner et al., 2017).	N=0		
Brain Structure Abnormality	it is theorized that structural abnormalities in the brain may disrupt functioning, such as in schizophrenia. Factors may include enlarged lateral cerebral ventricles, a dilated third ventricle, ventricular asymmetry, or a combination of these. Reduced cortical, frontal lobe, hippocampal, or cerebellar volumes. Increased size of the sulci (fissures) on the surface of the brain, or a combination of one or more (Halter, 2014).	N=0		
Neurobiological	This may include factors associated with the dopamine theory (dopamine is thought to play a role in the development of psychotic disorders such as schizophrenia), serotonin theory (serotonin is thought to play a role in the development of psychotic disorders such as schizophrenia), and glutamate	N=1	Bruenig et al. (2014)	Investigated whether genes involved in the wider dopamine system are associated with stress and psychotic experiences.

	theory (glutamate is thought to play a role in the development of psychotic disorders such as schizophrenia), or a combination of one or more (Halter, 2014).			
Early Life Adversity	Includes, but are not limited to, pre-, peri-and post-natal stress and insults, childhood trauma, poor parental bonding (Pruessner et al., 2017). Pre-natal stressors may include a history of pregnancy or birth complications (viral infection, poor nutrition, hypoxia, and exposure to toxins, or psychological trauma to the mother during pregnancy).	N=2	Pickering et al. (2008)	Investigated whether childhood insecure attachment and correlation with symptoms of psychosis.
			Nam et al. (2016)	Investigated whether childhood bullying and/or sexual trauma is associated with symptoms of psychosis.
Chronic or repeated stress: Psychological stressors	Includes stressful life events (Pruessner et al., 2017), developmental stressors, family stressors, social stressors, physical stressors, exposure to psychological trauma (Halter, 2014), or substance use (Pruessner et al., 2017).	N=7	Bernardini et al. (2018)	Investigated whether substance use is associated with symptoms of psychosis.
			Skinner et al. (2010)	Investigated whether substance use is associated with symptoms of psychosis.
			Fonseca-Pedrero et al. (2016)	Investigated whether substance use is associated with symptoms of psychosis.
			Shi et al. (2017a)	Investigated the role of social supports and friendship groups (or lack thereof) and association with symptoms of psychosis (social stressors).
			McIntyre et al. (2018)	Investigated the role of one's social identity and symptoms of psychosis
			Wang et al. (2015)	Investigated family functioning and association with symptoms of psychosis (family stressors).

			Gibson et al. (2014)	Investigated traumatic life events and association with symptoms of psychosis.
Chronic or repeated stress: Environmental stressors	Includes factors may include social adversity (living in chronic poverty and/or high-crime areas), migration to and/or growing up in a foreign culture (Halter, 2014), low socio-economic status, ethnic minority status, or city living (Pruessner et al., 2017).	N=3	Wickham et al. (2014)	Investigated social rank in society, childhood deprivation, justice, trust in society and association with symptoms of psychosis.
			Anglin et al. (2014) Anglin et al. (2018)	Investigated family income and symptoms of psychosis.
			Anglin et al. (2014)	Investigated immigrant status and symptoms of psychosis.
			Anglin et al. (2018)	Investigated ethnic identity and racial discrimination and symptoms of psychosis.
			Anglin et al. (2014)	Investigated racial discrimination and symptoms of psychosis.
Other (outside of the model)		N=12	Alavi et al. (2014)	Investigated internet addiction and symptoms of psychosis.
			Wickham et al. (2014)	Investigated poor well-being and association with symptoms of psychosis.
			Andorko et al. (2018)	Investigated depression, sleep dysfunction and symptoms of psychosis.
			Nam et al. (2016)	Investigated depression, race, sex and symptoms of psychosis.
			Anglin et al. (2018)	Investigated depression, anxiety, age and symptoms of psychosis.
			Anglin et al. (2014)	Investigated depression, anxiety, age, sex and symptoms of psychosis.

			Shi et al. (2016)	Investigated comorbid psychopathology, self-esteem, resilience and symptoms of psychosis.
			Skinner et al. (2010)	Investigated personal history of mental health problems, age, sex, family history of mental health problems and symptoms of psychosis.
			McIntyre et al. (2018)	Investigated age, self-esteem, country of birth identification and symptoms of psychosis.
			Gibson et al. (2014)	Investigated age, sex and symptoms of psychosis.
			Cicero et al. (2015)	Investigated self-esteem, aberrant salience, self-concept clarity and symptoms of psychosis.
			Cicero et al. (2018)	Investigated aberrant salience, self-concept clarity and symptoms of psychosis.
			Cicero et al. (2018)	Investigated how strongly people identify and associate with their ethnic identity and this relation to symptoms of psychosis.

Additional Table 19.0 – Summary of Intervention Studies

Interventions (N=5)						
Author/ Intervention	Study Design/ Description	Goal(s)	Sample Size	Outcome(s)	Result(s)	p value
Freeman et al. (2017) Sleepio	Single-blind randomized control trial	Improving sleep will lead to a reduction in psychotic experiences.	Total: N=3755 T: N=1891 C: N=1864	Sleep treatment effects on paranoia	Adjusted difference between treatment and control (95% CI) Week 3: 0.15 Week 10: 0.19 Week 22: 0.24	p<0.0001 p<0.0001 p<0.0001
				Sleep treatment effects on hallucinations	Week 3: 0.12 Week 10: 0.24 Week 22: 0.23	p<0.0001 p<0.0001 p<0.0001
				Sleep treatment effects on mania	Week 10: 0.93 (0.67 to 1.19), - 0.31 Week 22: 0.75 (0.46 to 1.03), - 0.25	p<0.0001 p<0.0001 p<0.0001
				Secondary dichotomous results:	Adjusted odds ratio (95% CI) at Week 10: 2.01 (1.48-2.73) Adjusted odds ratio (95% CI) at Week 22: 1.89(1.34-2.66)	p<0.0001 p<0.0001
				Sleep treatment effects on prodromal psychosis	Week 10: -0.81 (-1.03 to - 0.60), 0.24 Week 22: -0.74 (-0.98 to - 0.51), 0.22	p=0.0002 7 p<0.0001

				Secondary dichotomous results UHR psychosis	Adjusted odds ratio (95% CI) at week 10: 0.26(0.15-0.46) Adjusted odds ratio (95% CI) at week 22: 0.33(0.18-0.59)	p=0.0002 6
Xu & Xiu, (2017) Rational Emotive Behaviour Therapy (REBT)	Randomized control trial	“The aim of the study is to test the effects of a REBT programme on perceived mental symptoms for female college students” (p. 157).	Total: N=60 T: N=25 C: N=35	Paranoid thoughts before and after REBT program Psychosis symptoms before and after REBT program	*NR NR	NR NR
Baruch et al. (2009) Acceptance and Commitment Therapy and Functional Analytic Therapy	Clinical case study	“To increase responding mindfully to paranoid thoughts, to move toward his values, increasing mindful reactions to internal experiences evoked by therapeutic relationships, and pursuing his valued goals” (p. 247).	Case study of one person	(1)Participant no longer met criteria for psychotic disorder (2) Self-monitored frequencies of experiencing psychotic symptoms and corresponding mindful responses	NR (2) Sessions 11-20: 21 symptoms responded mindfully 29% of the time Sessions 21-30: 17 symptoms responded mindfully 76% of the time Sessions 31-37: 1 symptom responded mindfully 100% of the time	*NA NA NA

				(3) Symptoms, interpersonal problems, social role functioning, and quality of life	<p>(3) Total OQ-45 score intake score(baseline): 112 termination score (at end of treatment): 77 follow-up score (one month post-treatment): 81</p> <p>Symptom distress: intake score: 65 termination score: 41 follow-up score: 45</p> <p>Interpersonal relations: intake score: 30 termination score: 24 follow-up score: 25</p> <p>Social role: intake score: 17 termination score: 12 follow-up score: 11</p>	
Shi et al. (2017b) Systemic Therapy	Single-blind Randomized control trial	“To contextualize attenuated psychotic symptoms by addressing an individual’s social system to which he/he attaches importance” (p. 2).	Total: N=26 T: N=13 C: N=13	Positive symptoms of psychosis	<p>T: $t=4.326$ C: $t=1.934$</p> <p>Difference pre-post: $F=11.157$</p> <p>Time x group: $F=0.003$</p> <p>Difference between groups: $F=0.266$</p> <p>T: $t=0.454$ C: $t=0.054$</p>	<p>$p=0.005$ $p=0.077$</p> <p>$p=0.003$</p> <p>$p=0.957$</p> <p>$p=0.611$</p> <p>$p=0.658$ $p=0.958$</p>

				<p>Negative symptoms of psychosis</p> <p>Clinical significance outcome of attenuated psychotic symptoms</p>	<p>Difference pre-post: $F=0.137$</p> <p>Time x group: $F=0.087$</p> <p>Difference between groups: $F=0.049$</p> <p>$X^2=0.619$</p>	<p>$p=0.715$</p> <p>$p=0.770$</p> <p>$p=0.827$</p> <p>$p=0.431$</p>
<p>Ertem & Duman,(2016)</p> <p>Motivational Interviewing</p>	Case study	To improve treatment collaboration and medication adherence.	Case study of one person	<p>(1) Change in responses in Morisky Medication Adherence Scale</p> <p>(2) Change in responses in Drug Attitude Inventory</p>	<p>(1) Interview 1: Reported “yes” for 3/4 statements = low adherence to medications.</p> <p>Interview 6: Reported “yes” for 2/4 statements = moderate adherence.</p> <p>(2) Interview 1: Reported “always” to the statements “I have difficulty using medications” and “using the drug makes me tired and drowsy” and “never” to the statement “I can reduce the possibility of a new exacerbation by continuing to use drugs.”</p>	<p>NA</p> <p>NA</p>

				<p>(3) Description of patient progress</p>	<p>Interview 6: Reported “sometimes” to the statements “I have difficulty using medications” and “using the drug makes me tired and drowsy” and “always” to the statement “I can reduce the possibility of a new exacerbation by continuing to use drugs” (p. 153).</p> <p>Interview 2: “At the beginning of the interview, the patient did not believe that the antidepressant and antipsychotic drugs that he took were useful. Although he did not want to take his medications, he felt that he had to. He stated that he had difficulty swallowing his medications and did not want to take them but took them upon his parents' requests. He also added that he might feel bad. He said, “My parents say, if I stop taking them, I may feel bad” asked, “doesn’t taking the medications lead to addiction?” However, he also admitted, “I felt depressed and</p>	NA
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					<p>as if my spirit left my body” (p. 152).</p> <p>At interviews 3 and 4: “The patient thought that the drugs that he was given were strongly addictive, which was the main reason for his rejection of treatment. He commented, ‘This drug is addictive because I have heard that when one stops taking this drug... When I didn’t take it occasionally, I experienced discomfort, similar to that encountered in addiction’” (p. 152).</p> <p>“The patient's thinking that drugs cause addiction was discussed again and he identified some side effects of addictive drugs (p. 152).</p> <p>At interview 5: “The patient noted that he had difficulty taking oral medications; we asked him to describe these experiences. He said that during his previous hospitalization, drugs were administered by injection, a satisfactory method in his</p>	
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					<p>opinion. Therefore, he requested consideration for being prescribed an injectable form of his antipsychotic drug and time to think about it” (p. 153)</p> <p>At interview 6: “At the end of the interview, the patient had changed his mind and decided to fully collaborate with the health staff in his treatment. He verbalized an awareness of the negative aspects of his current status and the advantages of a change in his behavior. The use of different forms of medication, which was discussed in the previous interview, was discussed again. The patient noted that he could use the injectable form of his drug more easily and that the oral form of his drug could be replaced by an injectable form” (p. 153).</p>	
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*NA: Not applicable

*NR: Not reported

Additional Table 20.0 – Summary of Qualitative Findings

Qualitative category	Category definition	Sub-category with exemplar and/or supporting quote(s)	Credibility†
Sung <i>et al.</i> (2006)			
Recovering course of illness	“Operational criteria for recovery, which requires that they were maintaining their school life and social activities, and they were interacting with friends...complying with their treatment and were being in symptom remissions” (p. 84).	<p>Family support: (no definition)</p> <p>Y.S. was a 25-year-old senior majoring in fine arts. She lived with her parents and a younger brother. Her mother was supportive and she had a favorable relationship with her brother since before the onset of her schizophrenia. Her relationship with her father was less favorable, but in the last 2 or 3 years they became closer and engaged in discussions about her future. Attending a 2-year college made her feel inferior, so when her psychotic symptoms were in remission she pursued university admission. With the encouragement of her father, she finally passed the test for transfer to a university. Concerning this life event, she recalled: “Getting into the university was a very important accomplishment for me because it helped me to overcome the complex I had about academic success and to find value in my life. My family encouraged me in my studies, and whenever I experienced difficulties I knew they would support me. Now I’m finishing my bachelor’s degree. It’s been very hard, but I still want to go to graduate school because I really love my major” (p. 85).</p> <p>“I usually talk with my mom and sisters. When I share my feelings and thoughts with them, I get the feeling that they</p>	Unequivocal

understand me. It makes me feel better, even though I know I have a long way to go” (Appendix).

“When I was really depressed, I felt completely isolated from my family. But now I know that I can let my family close to me and talk with them. Paradoxically speaking, I recovered my relationship with my family because of my illness. Sharing conflicts seems to give me emotional support” (Appendix).
 “I don’t get treated by my family like somebody “strange” even when I respond to my auditory hallucinations. It’s like they understand my mental illness now” (Appendix).

Seeking intimacy: (no definition)

Unequivocal

Y.S. But she had serious concerns about how her mental illness might affect her ability to marry and have a family.

“Sometimes I’m afraid about my future, especially finding someone to marry who will understand my illness. I am still a mentally disabled person. And the antipsychotic drugs make me gain weight. Although I have some male friends at school, I have a poor self-image and I’m afraid I’m not attractive to men. How can I ever hope to marry a normal guy? I feel really discouraged about the possibility of marriage in my future” (p. 85).

“In school, I think it’s very important to me to have good relationships in Christian meetings in school.

This supports me even though I have no close friends in my class. It’s also very helpful in reducing my persecutory delusions. I’m realizing through these experiences that if I want to be better than I am now, I need to make friends in my class” (Appendix).

“I was socializing with some patients during my admission to a psychiatric inpatient unit. Some became good friends, and I have still met them at the day care center. We encourage each other through sharing our feelings, and it makes me feel comfortable to have friends from whom I don’t need to conceal my illness. I’m sure that’s one of the reasons for the recovery I’ve achieved” (Appendix).

“Now I have many friends at school. I think I’m just as good as they are, except I have an illness. I’m also sharing my academic interests and plans for the future with my friends. It makes me feel hopeful that I can overcome my schizophrenia” (Appendix).

Satisfaction with academic performance: (no definition)

Unequivocal

Y.S.: “I am very proud of myself when I participate in various school events because I can show my ability in art. Also I’ve started to go to art galleries on the weekends. I think I’m doing well even though I have a mental illness. This makes me happy. I won’t give up on life any more because I have a reason to live in this world” (p.85).

Satisfaction with academic performance: “I’m feeling that I actually have some aptitude for academic work, and I’ve gotten good grades in most of my classes. I’m proud of my abilities. I feel so much more motivated to keep on trying” (Appendix).

“Whenever I finished a semester, even if I get some low grades, I still feel some real satisfaction. That’s the most valuable fact in my current life” (Appendix).

“I’m proceeding with my academic goals, and academic achievement is significant for me because it gives me a chance

	to live in society even though I am a mentally disabled person” (Appendix).	
	<p>Accepting a mental illness: (no definition)</p> <p>Y.S.: She felt that taking antipsychotic drugs was a burden, but she understood well the necessity for taking medication. (85) “Frankly, I don’t like taking antipsychotic drugs, but I know it’s important for getting better. I can live normally because I’ve learned to trust my doctor and have found good medication. I don’t feel nearly so depressed. I can sleep normally and concentrate on what I’m doing. Before, I had frequently auditory hallucinations, but these have decreased. Now it’s sometimes just a low sound, like a whisper. I am not 100% free of schizophrenic symptoms; that might be impossible. I believe I’m recovering but not recovered. Through all the hardships I’ve had, I’ve had a better understanding of mental illness and if I should get worse, I’m prepared. I trust in God and have hope” (p. 85). “After taking regular medication, I could sleep normally and my delusions of persecution were decreased. Then I knew my symptoms could be controlled like a physical illness” (Case 1). “I’ve learned to think of mental illness not as something stigmatizing and shameful. I have friends symptoms of psychosis just like me. I’ve gained a real awareness of the gravity of the illness and the importance of treatment” (Appendix).</p> <p>“I live more or less normally now because I’ve learned to trust my doctor, who has helped me to find good medications. I am much better than before. Now I can sleep normally and concentrate” (Appendix).</p>	Unequivocal
	Attaining a new identity as a mental illness patient: (no definition)	Unequivocal

	<p>She also attained a new understanding of herself and began to develop the will to make the best of life despite the hardships (p. 85).</p> <p>“I am changing from destructive to constructive. I’m trying to be more hopeful about the future. I feel a lot more comfortable with myself as I’ve developed a new understanding about mental illness” (Appendix).</p> <p>“I’ve developed a new understanding of myself as a person with mental illness. Because I know that nobody is perfect” (Appendix).</p> <p>“Through all of the difficulties I’ve faced, I have a better understanding of people with mental illness. I am trying to make the best of my life and this is my way to overcome my illness” (Appendix).</p>
<p>Deteriorating course of illness</p> <p>“...getting worse positive and negative schizophrenic symptoms than before. They showed diminished participation in social activities, more absences from school, and fewer peer relationships (p. 86).</p>	<p>Verbal interaction deficiency with family (no definition)</p> <p>H.T.: H.T. was 25 years old and had been absent from school after finishing his junior year. He lived with his mother. His father died during his last year of high school. His four sisters were married.</p> <p>“My mother works all day. There’s nobody in the family at home all day. After my relapse and having dropped out of school, I don’t really have much to talk about with my mom. I hardly ever see my sisters. A few times a month, one sister calls me, but I have nothing to say to her. It’s real hard to find anything to talk about.” He had nearly no verbal interaction with his family. Looking back at his life after the relapse, he said: “I have a psychosis that is destroying me. I nearly didn’t ask any help from my family, and my family hardly knew what’s truly wrong with me. Actually, I can’t figure out what I’m feeling, thinking, and doing” (p. 86).</p> <p>Unequivocal</p>

“Only my sister, who married a few years ago, cares about me. I think my parents are too old to care. We have hardly any conversation or interaction. My sister is my only contact person, but I can talk with her only rarely” (Appendix).

“My family members usually don’t talk with each other. I’ve been lonely not just at school but also at home. Now I don’t even have any desire to talk with my family” (Case 5). “I’m alone at home in the daytime. I keep my problems to myself because my family members are indifferent” (Appendix).

Difficulty making friends: (no definition)
Beginning with childhood, he showed that he was very introspective. He made few friends and was almost isolated. He had difficulties interacting with fellow students at college (p. 86).

Unequivocal

“I couldn’t seek out friends by myself. I was always alone, so when I was with someone I felt discomfort” (p. 86).

“I’m not the type to go out and make friends. I don’t know how to do it. But I really wish I could have a friend” (Appendix).

“I could never find friends by myself. I’ve always been alone. Actually, I’m unaccustomed to being with somebody. So when I am with somebody, I’m uncomfortable. I don’t know what to do with them” (Appendix).

“I’m very afraid to let anybody know about my mental illness. I feel terribly burdened by my illness” (Appendix).

Loneliness: (no definition)
In particular, he had difficulty surviving in an environment that required initiative and self-direction. “Nobody told me where

Unequivocal

	<p>to go, what to do, etc., at school. I couldn't maintain school life because I had no friends and no role. I really want to change my major, and I need help in learning how to study. After having been absent from school and even been fired from my part-time job, I have nearly no interaction with anyone; I am just alone at home" (p. 86).</p>	
	<p>Loneliness in interaction with friends: (no definition) "I've always felt isolated from other people. I never had a close friend to whom I could pour my heart out. I've always felt loneliness" (Case 4). "I'd always been withdrawn from schoolmates. I was extremely ambivalent about being with somebody. When I was alone, I felt comfortable; at the same time, I was so lonely!" (Appendix). "I can't share my feeling with anybody. When I need to talk about something, I can't touch anybody by myself. Loneliness is all I feel" (Appendix).</p>	<p>Unequivocal</p>
	<p>Difficulty with academic performance: (no definition) "I worked hard to pass the entrance test because I was really eager to enter college. This was the best thing in my whole life. But I couldn't understand the lectures or how to do homework because it was too hard. My grades were bad. I got two warnings from school" (p. 86). "I couldn't concentrate and understand the lectures. I thought I was the only one in this situation" (Appendix). "I couldn't understand the lectures or how to do the homework because it was too hard. My grades were bad and twice I got warnings from school" (Appendix). "Learning computer languages requires concentration and I couldn't keep pace with the professor because of my mental</p>	<p>Unequivocal</p>

	<p>condition. I was cautioned by the school because of my poor grades but there didn't seem to be anything I could do. Even when I registered for courses, I knew there wasn't any way I could do the work" (Appendix).</p>	
	<p>Motivation loss with school life: (no definition)</p> <p>"I want to finish college, but I don't know if I can. Frankly, I lost my will and was very lazy, so often I didn't go to school because I couldn't wake up" (p. 86).</p> <p>"Since my relapse, I just don't have the will to continue my studies. I have no self confidence that I can survive at school" (Appendix).</p> <p>"I didn't study, mostly because of my laziness. Often I didn't even go to school because I couldn't wake up" (Appendix).</p> <p>"I lost any will for school life after I was absent because of relapse" (Appendix).</p>	<p>Unequivocal</p>
	<p>Loss of interest in everyday life: (no definition)</p> <p>"Now everyday life annoys me. I lost my interests in everything. I am doing nothing even though bored" (p. 86-87).</p> <p>"It seems that there's nothing fun in my life. I'm board everyday but I don't want to do anything. Since I left school, I just stay at home doing nothing" (Appendix).</p> <p>"Now everyday life annoys me. I've lost interest in everything. I am doing nothing even though I'm bored. I don't call anybody, I don't answer the phone" (Appendix).</p> <p>"Whenever I'm board, I take a nap. I have no hobby and no will to do anything. I can't tell you how bored I am!" (Appendix).</p>	<p>Unequivocal</p>

		<p>Despair due to mental illness: (no definition)</p> <p>“As a result, I am much worse, and once tried to commit suicide. I can’t believe my current state. Why does my life keep getting worse?” (p. 87).</p> <p>“I’m afraid I have an incurable disease. I can’t do anything because of my mental illness” (Appendix).</p> <p>“I can’t believe my current state! I’m so much worse, I feel like I’m in hell. My future is hopeless. I’ll never get married” (Appendix).</p> <p>“I have no future for a job, marriage, a family. I’m scared of what will happen to me. Gradually I’m dropping out of the world because of my mental illness” (Appendix).</p>	Unequivocal
Fluctuating course (of illness)	“Repeatedly getting worse and better during college life” (p. 87).	<p>Motivation loss in school life: (no definition)</p> <p>S.J. was 22 years old. She went to college for 2 years, but after that she withdrew from school. Before her withdrawal, she had adapted well to school life; her academic performance was particularly good. But she suffered a schizophrenic relapse after breaking up with her boyfriend who had promised marriage. After that, she began having difficulty with academic performance and experienced loneliness. As a result, she had to leave college for one semester. She began school again, aiming to become the equivalent of a certified public accountant (p. 87).</p> <p>It was too challenging to me; I lost self-confidence. So I had to withdraw myself from school again and changed my major. If it were not for the relapse, I believe I might have been successful in my studies. Now I lost my will and ability (p. 87).</p>	Unequivocal

		S.J.: After that, she began having difficulty with academic performance and experienced loneliness (p. 87).	
		Denial of self-identification as a mental illness patient: (no definition)	Not supported
		Despair due to mental illness: (no definition) S.J.: She continuously deteriorated. When she learned her diagnosis was schizophrenia, paranoid subtype, she experienced severe emotional distress. Her depression deepened, and she slept too much. She also experienced weight gain from the medication prescribed (p. 87).	Not supported
		S.J.: I can't do anything by myself. Nobody knows my dire situation. I am getting too much sleep these days; I am being stupid and getting too fat. I feel alienated from the world. I'm afraid of falling behind" (p. 87).	
		Seeking intimacy: (no definition) S.J. "I really want to go to school because if I could meet my friends, I don't think I'd feel so isolation [sic] and alone. I'd feel like I was still a member of society. Now I can only talk with my friends by phone. If they'd be available, I'd be willing to meeting them: (p.87).	Not supported
		Positively accepting mental illness: (no definition)	Not supported
Qualitative category	Category definition	Sub-category with exemplar and/or supporting quote(s)	Credibility†
		Roy <i>et al.</i> (2016)	
Personal conditions	NR	Long-term academic goals: (no definition) I know I can do it because it's so important for me. So that instead of going out, I stay at home, I stay in a calm place so that I can study, focus on that, my school things, to reach my goals and be able to provide for my family in the future (p. 46).	Credible

		Cognitive difficulties: (no definition) “Well, what really affects my performance in school are my skills, my skills that are not the same as before. I’ve lost reading skills, listening skills, the things that are said to me, it’s really hard for me to remember them. It’s not as bad if it’s written down. So that’s a real obstacle, because it really affects my ability to focus and listen, in school or anywhere else” (p. 48).	Credible
Systemic conditions	NR	No quotes/exemplars	Not supported
Actions/ Interactions	NR	Prioritizes educational achievement over other Developmental domains: (no definition) Participant: I’m not being a very good friend these days. I haven’t seen any of my friends for a month. That’s not super. Interviewer: Why is that? Participant: I stopped seeing them when I got back to school . . . because the first session was really hard. I was so tired I couldn’t do anything, anything after 5 p.m. So you get your priorities right, you study on the weekends, you study seven days a week. (p47)	Credible
		Reflexive decision-making: (no definition) We’re adults, it’s not like high school, no one is checking if we do the extra work. When I’m home, I don’t do many homework, I do what is necessary, then I get some rest to get on with the next day. That’s how I’m going to get to the next step. That might be the next class or the next year. (p48)	Credible
consequences	NR	no quotes/exemplars	Not supported
Qualitative Category	Category Definition	Sub-category with Example Supporting Quote(s)	Credibility[†]
Sung & Puskar (2006)			

Narrative summary (no exemplars or quotes provided)

25 themes were grouped into six categories that reflected the life experiences of 21 college students, but not definitions, exemplars, or quotes were provided. Categories included experiences involving family interactions (broken down into 4 sub-categories), experiences involving interactions with friends (5 sub-categories), experiences of school life (broken down into 5 sub-categories), experiences of everyday life (broken down into 3 sub-categories), experiences of social role performance (broken down into 3 sub-categories), and experiences of a mental illness (broken down into 5 sub-categories). The article counted the frequency of each sub-category, but no quotes or exemplars were provided. Overall, most participants had little to no contact their family, encountered loneliness, difficulty making or withdrawing from friends, (p 29), and participants often had to stay away from school due to psychiatric relapse, which could have interfered with academic progress (p30). Although more negative experiences were reported than positive, some students reported positive feelings about school and a desire to continuing academic goals (p30). Participants also reported feelings of being out of touch with reality, denial of mental illness; while others reported acceptance of mental illness and formation of new identities as mentally ill patients (p31).

†Credibility is separated into three categories as per JBI (2019).

(i) Unequivocal (U) – “relates to evidence beyond reasonable doubt which may include findings that are matter of fact, directly reported/observed and not open to challenge” (JBI 2019 2.7.3).

(ii) Credible (C) – “those that are, albeit interpretations, plausible in light of data and theoretical framework. They can be logically inferred from the data. Because the findings are interpretive they can be challenged” (JBI 2019 2.7.3).

(iii) Not Supported (NS) – “when 1 nor 2 apply and when most notably findings are not supported by the data” (JBI 2019 2.7.3).

NR: not reported

Additional Document 4.0 – E-mail Invitation to Knowledge Users for Reaction Meeting and

Dissemination Plan

Email One (Invitation)

Hello everyone,

I'm emailing to update you on my thesis project titled: *Symptoms of Psychosis in Post-Secondary Students: A Mixed-Methods Systematic Review*. I am finally close to completing the project and would like to share my results with you.

As discussed previously, I would like to set up a meeting with you all to share my results and gather your feedback and implications for practice in the following domains: clinical practice, policy, research, and education. I plan to embed your feedback into the "implications" portion of my thesis.

The meeting should run for no longer than one to one and a half hours. If you are unable to attend the meeting, I can schedule a phone call with you or a separate in-person meeting to discuss my findings and gather individual feedback.

Please use the following doodle poll link to vote for the date and time that best fits your schedule. I will send out a meeting agenda prior to the meeting date.

I look forward to hearing from all of you and would like to thank you for your collaboration and your time!

Sincerely,

Vicky Sanderson

Email Two (Subsequent e-mail after doodle poll completed by KUs)

Hello everyone,

Thanks again for participating in the Knowledge User reaction meeting, as part of my master's thesis project, and for allowing me to gather your feedback.

The doodle poll indicated that all of you voted on **Thursday, May 16, at 4pm**. It should last between an hour to one and a half hours. Light refreshments and drinks will be provided, as well as parking vouchers. The objectives of the meeting are:

- 1) To present my thesis project and results
- 2) To obtain feedback related to implications for clinical practice, policy, research, and education
- 3) To brainstorm ways of disseminating the preliminary results of my project

Additional Document 4.0 (Continued.) – E-mail Invitation to Knowledge Users for Reaction Meeting and

I have attached an agenda of the meeting. I will also ask you to sign an acknowledgement letter, to indicate if, and how you would like to be acknowledged in my master's thesis and subsequent article publications. I have attached this document for you to review but will have copies of it at the meeting for you to sign.

If you have any questions prior to the meeting, or are not able to attend, email or phone me at any time (insert phone number).

Thanks again, and I look forward to meeting with you all!

Vicky

Additional Document 4.0 (Continued.) – E-mail Invitation to Knowledge Users for Reaction Meeting and Dissemination Plan

Summary of Results for Knowledge Users

Post-Secondary Students with Symptoms of Psychosis: A Mixed-Methods Systematic Review

Purpose of the meeting

- 1) To present my results
- 2) To gather feedback from KUs regarding implications for practice, policy, education, and research

Objectives of my systematic review and summary of the results

Objective 1: To describe the socio-demographic, clinical, and service-use characteristics of post-secondary students across studies.

- Age of post-secondary students: average 21 (range 17-63)
- Sex of post-secondary students: 69% female, 30% male, <1% “missing or other”
- Ethnicity of post-secondary students: 68% Caucasian, 9% Asian, 5% multi-ethnic/mixed, remainder other

Objective 2: To identify the prevalence of symptoms of psychosis among post-secondary students.

- Inconclusive: Unable to reach conclusion due to multiple measurement tools used, prevalence reported differently as percentages, means, etc.

Objective 3: To identify and describe factors associated with the development of symptoms of psychosis in post-secondary students.

- Psychological stressors: substance use, social factors, traumatic life experiences, family functioning
- Environmental stressors: racial discrimination, social status in society, ethnic identity, immigrant status
- Early life adversity: attachment styles in childhood, bullying, sexual abuse
- Neurobiological: certain genotypes associated with psychotic disorder
- Other risk factors: depression, younger age, anxiety, self-esteem, aberrant salience, self-concept clarity, internet addiction, co-morbid psychopathologies, personal history of mental health problems, sleep dysfunction, resilience, family history of mental health problems, race, ethnicity

Objective 4: To assess the effectiveness of interventions for post-secondary students with symptoms of psychosis

- 5 interventions were found in the literature:

Additional Document 4.0 (Continued.) – E-mail Invitation to Knowledge Users for Reaction

Online-CBT	Rational Emotive Behaviour Therapy	Systemic Therapy	ACT/FAP	Motivational Interviewing
<p>Aimed to improve sleep in individuals with insomnia and ultimately decrease symptoms of psychosis</p> <p>Lead to significant reductions in paranoia, hallucinations, and psychotic experiences in treatment group compared to control</p>	<p>Aimed to test the effects of REBT on mental health symptoms (including symptoms of psychosis)</p> <p>Treatment group experienced reduction of psychotic symptoms compared to control</p> <p>QA score: 5/13</p>	<p>Aimed to help participants with psychotic symptoms contextualize their symptoms by addressing their social systems</p> <p>Significant decrease in psychotic symptoms compared to control group</p> <p>QA score: 7/13</p>	<p>Case study – used to test ACT/FAP on a student experiencing psychosis</p> <p>Outcome: diminished symptoms of psychosis over one year</p> <p>QA score: 8/8</p>	<p>Case study – used MI to increase medication adherence in a student with schizophrenia</p> <p>Outcome: improved medication adherence and understanding of medications</p> <p>QA score: 4/8</p>

Objective 5: To explore the experiences of post-secondary students who have symptoms of psychosis.

- 3 studies were found in the literature, only 1 study had sufficient quotes and exemplars describing the experience of post-secondary students symptoms of psychosis:

Sung et al., 2006

- Explored the experience of 8 college students with schizophrenia
- Participants highlighted academic success as being key to a normal life, family and other social supports help engage in school life and provide emotional support while attending school, and school and career prospects give life meaning
- Loneliness and social withdrawal were illustrated, which had a negative effect on the wellbeing of students. Symptoms also interfered with academic success due to cognitive difficulties
- Overall, all students experienced despair and stigma

Some questions to think about prior to the meeting:

- 1) What is missing in the current literature regarding post-secondary students who experience psychosis?
- 2) Have you ever used any of the interventions in clinical practice, or had any of the interventions described in my results? What further interventions should be tested to help students who experience psychosis?
- 3) Have you seen similar risk factors/protective factors in students who experience psychosis as the ones identified in this systematic review?
- 4) How should policies on school campuses be reformed or changed to better assist students who experience psychosis?
- 5) How can we educate students, clinicians, or educators about the risks/protective factors and services available for students symptoms of psychosis?

Additional Document 4.0 (Continued.) – E-mail Invitation to Knowledge Users for Reaction

Meeting and Dissemination Plan

Meeting Agenda



KU Reaction Meeting:

“Symptoms of Psychosis in Post-Secondary Students: A Mixed-Methods Systematic Review”

Minutes

Location: Roger Guidon Hall, University of Ottawa, **Room:** TBD (meet at front entrance of RGN).

Date: May 16, 2019

Attendees: Victoria Sanderson (presenter), Amanda Vandyk (thesis supervisor), Jean-Daniel Jacob (thesis committee member), Sophie Lightfoot (meeting recorder), Carmen Hust, Meriem Benlamri, A.MacInnes, Crystal Morris

Time: 4:00pm-5:00pm

I. Introductions

II. Presentation of master’s thesis: “Symptoms of Psychosis in Post-Secondary Students: A Mixed-Methods Systematic Review”

III. Discussion: Feedback and Implications

Implications for clinical practice

Implications for policy on post-secondary campuses

Implications for education for post-secondary students

Implications for future research

IV. Dissemination Ideas

How can these preliminary results be disseminated?

Additional Document 4.0 (Continued.) – E-mail Invitation to Knowledge Users for Reaction Meeting and Dissemination Plan

v. Adjournment

Acknowledgement Letter



I am invited to take part in a stakeholder reaction meeting as part of my Masters thesis project entitled “*Symptoms of Psychosis in Post-Secondary Students: A Mixed-Methods Systematic Review*”.

Thesis Committee Members:

Amanda Vandyk, RN, PhD
Associate Professor, School of Nursing, Faculty of Health Sciences
Telephone: (insert)

Jean Daniel Jacob, RN, PhD
Associate Professor, School of Nursing, Faculty of Health Sciences
Telephone: (insert)

Ian D Graham, PhD, FCAHS
Professor, Department of Epidemiology and Community Medicine, University of Ottawa Senior Scientist, Ottawa Hospital Research Institute
Telephone: (insert)

Purpose: To review and discuss the findings of my systematic review with local stakeholders

What is required of me: As a stakeholder, I will provide feedback of results, and engage in a discussion of the implications for clinical practice, policy, education, and research. **I am not a research participant.** I may leave the meeting at any time and/or opt against answering questions. If I choose to leave, I can indicate whether the feedback I provided may be used or not by the student in their written thesis report.

Acceptance: I, _____ agree to participate in the above meeting conducted by Victoria Sanderson of the Nursing Department, faculty of Health Sciences under

Additional Document 4.0 (Continued.) – E-mail Invitation to Knowledge Users for Reaction Meeting and Dissemination Plan

the supervision of Dr. Amanda Vandyk, Dr. Jean Daniel Jacob, and Dr. Ian Graham. I understand that by accepting to participate I am in no way waiving my right to leave the meeting.

Indicate whether you want to be acknowledged in my written thesis report, and how you would like to be acknowledged (by initials, full name, title, profession, etc.)

- Yes, I would like to be acknowledged. How?

-
- No, I would not like to be acknowledged.

Indicate whether you would like to be a co-author (and engage in related activities) on a future research article related to my thesis project, if appropriate.

- Yes, I would like to be a co-author.
- No, I would not like to be a co-author.

If I have any questions about the meeting or my participation, I may contact the student and/or her/his professor at the number mentioned above at any time.

There are two copies of the consent form, one of which is mine to keep.

Participant's signature:

Date:

Student's signature:

Date:

(insert contact information for study)

Additional Document 5.0 – Summary of the Reaction Meeting and Dissemination Plan

Summary of Stakeholder Reaction Meeting Minutes:

“Symptoms of Psychosis in Post-Secondary Students: A Mixed-Methods Systematic Review”

Location: Roger Guindon Hall, University of Ottawa, Room: 1111 (meet at front entrance of RGN).

Date: May 16, 2019

Attendees: Victoria Sanderson (presenter), Amanda Vandyk (thesis supervisor), Sophie Lightfoot (meeting recorder), Jean Daniel Jacob (thesis committee member), Carmen Hust, Meriem Benlamri, April MacInnes, Crystal Morris

Time: 4:00pm-5:40pm

Summary: Victoria provided a presentation on her master’s thesis, including a summary of results, and a discussion was held regarding feedback on results and implications for practice, policy, education, and research. A verbal agreement was accepted from stakeholders to allow for recording of meeting minutes in a Microsoft Word document, and acknowledgement letters were signed and photocopied.

Discussion: Feedback and Implications

Implications for Clinical Practice

1. Risk and protective factors that were found to be “inconclusive” should still be considered in clinical practice, as all risk factors identified in this research study have anecdotally been reported or observed.
2. Clinicians need to consider modifiable and nonmodifiable risk and protective factors when creating a plan of care and considering the recovery process.
3. It is critical to incorporate community and social supports and links into care and the recovery process, because anecdotally, post-secondary (PS) students who have a greater support network have better outcomes in the long-run.
4. Systemic therapy was an intervention identified in the literature, and it has been used in clinical practice; more intervention studies should be tested on systemic therapy with PS students because incorporating community and social support networks is crucial for the recovery process.
5. Although clinicians have standards of practice when caring for PS students symptoms of psychosis, it is a challenge because there is variability in ability to provide education to students, families, and communities, due to lack of resources and funding.
6. Certain students may not disclose whether they are experiencing symptoms of psychosis because registration barriers may present later in their careers if they are in a discipline that has a regulatory body (e.g. physicians, nurses).

Additional Document 5.0 (Continued.) – Summary of the Reaction Meeting and Dissemination Plan

Implications for Policy

1. Barriers to reasons why students don't disclose whether they are experiencing symptoms of psychosis

- OSAP funding
- Getting re-enrolled into school
- Losing funding from scholarships, bursaries, other school and government funding programs
- University policies and scholarship/funding/tuition policies make it difficult for students to drop to part-time; students have very little time in a semester
- If they miss a week or 2 of classes they may fall drastically behind, all while trying to deal with onset or recurrence of psychotic symptoms
- Anecdotally, the number of students clinicians see go back into school after dropping out due to psychosis is very high
- If students experience psychosis and have to drop out of school, this may go on permanent record and interfere with future programs, career opportunities, funding, etc.
- If students drop out, they may have even less supports and health care resources (such as student academic success services, academic advisors, health care clinics, peer support groups, etc.).

2. Students are navigating a number of issues, while dealing with new onset or recurrence of psychotic symptoms is extremely challenging

- E.g. figuring out financial situations
- Academic issues
- Housing
- The health care system and finding the right care at the right time
- There are no “simple pathways” that exist for these students.

3. Legal implications

- PS students are legally adults, so PS institutions are not responsible for their health, yet these students study are in “loco parentis” meaning institutions such as colleges and schools must act in the best interests of the students as they see fit
- Many institutions, for example the University of Ottawa, are not funded to provide medical and healthcare services to an enormous number of students.
- Who is ultimately responsible for noticing or taking care of PS students who experience symptoms of psychosis? This is a huge gap in care.
- Educators at an institution have a responsibility to report if they suspect or if they know of students experiencing health issues. This is referred to as “duty to inquire” which is captured in the Ontario Human Rights Commission on Mental Illness (<http://www.ohrc.on.ca/en/policy-preventing-discrimination-based-mental-health-disabilities-and-addictions>).

Additional Document 5.0 (Continued.) – Summary of the Reaction Meeting and Dissemination Plan

4. Transitions in care

During teenage years, PS students had their high school as a resource, and schools/school boards have a responsibility as well as some funding to support them in schools, as well as their home communities; moving to a different country, or a different city, or the same city but living outside of the home can be challenging.

- There are also different health care systems between provinces, and between countries to try and navigate, as well as long wait lists to try and receive appropriate care.

5. **Financial issues:** even if a student gets diagnosed with symptoms of psychosis, school insurance or health care insurance won't necessarily cover all costs (e.g. counselling, psychotherapy, drug prescriptions). Long wait times for "Free" or low-cost public services, private services are very expensive and outside most student budgets.

7. **Resources:** universities don't necessarily get funding for health, they often draw from grants, even though academic institutions are almost becoming hospitals or "discharge destinations."

8. International students

- Might be more isolated socially, which makes it more difficult for them to connect to services, international visas also expire, they deal with financial stressors, which all impact their recovery.
- Immigration to the country they study can also become affected if they need to take time off school for health reasons.
- If international students go down to part-time or take a leave, it is more complicated to re-enroll compared to local students

Implications for Education

1. People who should be educated regarding the risk/protective factors, and signs and symptoms of psychosis

- Although education regarding psychosis is crucial, PS institutions lack resources and funding to provide adequate education and training
- People who live with the student experiencing psychosis: roommates, residential dons
- Family members, friends, communities within the PS institution
- Student clubs and support services: e.g. at University of Ottawa there is SASS, initiative 15, peer support programs
- Protection services on campus: they are often first responders to students who may be experiencing symptoms of psychosis

Additional Document 5.0 (Continued.) – Summary of the Reaction Meeting and Dissemination Plan

1. Forms of education that would be useful

- Students and educators on campus should have an online training module, toolkit or video, or training methods/courses used by the community showcasing the risk factors, protective factors, signs and symptoms and services available to students who may experience symptoms of psychosis and other mental health issues (e.g. SafeTALK, ASIST).
- A fact sheet/tip sheet would be helpful, especially for “non-clinical” people who still need to know information regarding PS students who experience symptoms of psychosis
- A toolkit or checklist could be created for people to know who they can call if they are aware of a student experiencing symptoms of psychosis (e.g. linking a student with a mobile assessment/crisis team on campus).
- Stigma education, e.g. via social media would be helpful to eliminate fears, misconceptions, and misunderstandings about psychosis
- More resources available other than French or English, especially for international students or students with disabilities

Implications for Research

1. Gap in qualitative literature

- Interviewing students who have experienced psychosis, to talk about the risk and protective factors they can identify, interventions or services they may have accessed, and their overall experience would provide a wealth of information.
- Limitations of qualitative data: students may hesitate to disclose their symptoms, but it’s important to decrease stigma and increase understanding about psychosis
- We need to hear the student voice in order to inform health care services on campus, in the community, to design and implement interventions, and to validate risk and protective factors identified anecdotally and in previous research

2. Other research ideas to consider

- Research on when PS students experience psychosis – e.g. more susceptible in undergraduate degree, graduate degree, in other faculties, in specific disciplines?
- Research on whether certain sociodemographic factors are associated with developing symptoms of psychosis
- Research on the fear of speaking up about health issues as a PS student, because it is a huge issue we still face
- Consider grey literature in future research studies
- More iKT research, because it is so much more impactful – many people do not read research articles.
- More ethnic and gender diversity needs to be incorporated into research studies to represent a more diverse and realistic sample of PS students
- Research on symptoms of psychosis in international students

Additional Document 5.0 (Continued.) – Summary of the Reaction Meeting and Dissemination Plan

Dissemination Ideas

1. **Connect with “Art with impact” – they create 5 minute documentaries on mental health, most happen to be undergraduate students – could do one on psychosis**
2. **More Feet on the ground: create training for faculty, including videos about students on campus in Ontario**
3. **Useful to have a checklist/tool kit/fact sheet on a summary of my study to disseminate to various groups on university campuses**
4. **Campus for innovation in mental health network – disseminate your research/short summaries**
5. **Ontario Network EPION – PEAKT: can present at conferences and ask to post my research as an online resource**
6. **Give presentations at large events to reach a big audience, more efficient than 1:1 education**
7. **Connect with school podcast hosts that speak about mental health issues, to talk about my research (i.e. Genevieve LaRoche – “The Happiness Legacy” post-secondary student mental health podcast series on iTunes – local Canadian doctoral student sharing information about student mental health)**
8. **CACUSS Conference presentation/poster**
9. **CACUSS or Centre for Innovation in Campus Mental Health webinar**
10. **Centre for Innovation in Campus Mental Health – Regional Forums**
11. **Connecting with Canadian Mental Health Association and their website content**
12. **Patient/client advocacy groups around psychosis**
13. **Student clubs and federations and union related to campus mental health (i.e. Initiative 1 in 5, Student Athlete Mental Health Initiative, Do It For Daron, Yellow Bench, etc.**