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The impact of causal explanations on outcome in people experiencing psychosis: A
systematic review

Key Words

Causal beliefs, treatment outcome, stigma, psychosis, systematic review

Findings suggest that the way an individual understands their experiences has important consequences on subsequent health behaviour. One aspect of an individual's understanding is what they believe has caused their experiences. This has been associated with treatment outcome and attitudes towards mental health problems. The aim of this systematic review was to examine the impact of causal beliefs on treatment outcome and stigma in people experiencing psychosis.

Three main databases were searched and 21 articles that investigated various aspects of treatment outcome and stigma in relation to causal beliefs were included in the review.

Overall, there were a small number of replicated findings which limits the interpretation of results. There is an indication that causal explanations are associated with various treatment outcomes, including attitudes towards treatment and satisfaction with therapeutic relationships as well as internalised stigma. Spiritual beliefs appeared to be adopted as a coping mechanism and a way to reduce stigma but did not appear to be associated with treatment outcome.

Individuals with psychosis do appear to develop causal beliefs that may be associated with engagement with services and treatment, as well as impacting on their attitudes toward themselves and others with mental illness. This may have important implications for clinical practice.

Key Practitioner Message

- Individuals who have experience of psychosis develop their own subjective causal explanations, and these can be complex and contradictory.
- An individual's causal explanation may influence how they engage with services and treatment, as well as providing a way of coming to terms with their difficulties.
- Causal explanations may also contribute to the experience of stigma, which is often a significant barrier to recovery for this client group.

Introduction

Recently there has been increased attention paid to understanding how people perceive their mental health problems and how this can impact upon well-being and treatment outcome (Petrie, Broadbent, & Kydd, 2008). This has followed extensive research into the beliefs of patients with physical illness. Perceptions about cause, consequence, controllability and timeline (how long a problem will persist) are all thought to be associated with how an individual copes with, and responds to a health threat (Lobban, Barrowclough, & Jones, 2004). Models of health behaviour, such as the Self-Regulation Model (SRM; Leventhal, Nerenz, & Steel, 1984), view people as active problem-solvers in the treatment process, rather than passive recipients. Therefore, according to these models, an individual's response to a health threat, such as their adherence to treatment and overall outcome, follows logically from their own personal understanding of their condition (Diefenbach & Leventhal, 1996). Recently, models of illness perception have been successfully applied to mental health problems (Lobban et al., 2004) and some potentially interesting relationships have emerged (Baines & Wittkowski, 2013). For example, beliefs about negative consequences have been found to be significant predictors of poor outcome (Lobban et al., 2004), heightened perception of symptoms has been associated with anxiety (Watson et al., 2006), whilst increased perception of control is positively associated with better service engagement (Williams & Steer, 2011) in people with a range of mental health difficulties.

One aspect of an individual's illness perception is what they believe to be the cause of their problem. Causal reasoning is a natural cognitive process used to make sense of many human experiences (Danks, 2009). Individuals will automatically engage in causal searches when faced with a health threat, and report aetiology to be one of the most important pieces of information offered to them by their treating clinician upon diagnosis (Greenberg et al., 1984). In physical health, causal beliefs have been shown to influence the treatment an individual seeks out, as well as their emotional response to a health threat (Charmaz, 1987). If an individual believes their illness to be the result of something within their control (e.g. diet), they are more likely to alter their behaviour than those who attribute the cause to something they consider to be fixed (e.g. genetics). Furthermore, the way an individual integrates their experience into their self-identity, particularly if they feel at fault, can have both negative and positive psychological and behavioural consequences (Petrie & Weinman, 2006).

Research indicates that about a third of individuals with psychosis will disengage from care and treatment at some point during their contact with services, significantly reducing their chances of recovery (Kreyenbuhl, Nossel, & Dixon, 2009). The Schizophrenia Commission (2012) identified the need for a more flexible package of support for individuals experiencing psychosis, advocating for an empathic and non-judgemental approach, taking seriously the significance of an individual's own account of their illness. This shift to more patient-centred care encourages clinicians to explore, and therefore give meaning to, an individual's personal interpretation of their difficulties. This process is thought to promote greater collaboration and communication between the patient and clinician, optimising therapeutic relationships and improving clinical outcome (McCabe & Priebe, 2004a). Interestingly, research has found that individuals experiencing psychosis often understand these experiences using a psychosocial framework, placing emphasis on life experiences such as stress or trauma (Dudley, Siitarinen, James, & Dodgson, 2009; Lobban, Barrowclough, & Jones, 2005). Given that treatment for psychosis is predominantly pharmacological and based within a biomedical framework, this conflict could have important consequences for treatment outcome. Some clients may be less likely to view medication as helpful, and to comply, if they do not consider their problems to be biologically based. Similarly, a psychotherapeutic approach may not be helpful to an individual who prefers a biomedical perspective. A recent review investigating the

consequences of biogenetic explanations, reported that biological interpretations did not appear to negatively influence treatment usage. However, their focus was limited to investigating the impact of biological conceptualisations and reviewed mental health problems more generally, rather than focusing specifically on psychosis (Lebowitz, 2014). Therefore, one aim of this review is to examine the literature in order to explore the relationship between causal attributions and treatment in people experiencing psychosis, focusing primarily on engagement and satisfaction with treatment.

Causal beliefs have also been widely investigated in relation to the stigma associated with mental health problems (Angermeyer, Holzinger, & Matschinger, 2009). Negative attitudes toward people labelled with a psychiatric illness act as a significant obstacle to the recovery and provision of care for many people experiencing mental health issues (Sartorius, 2007). Furthermore, psychosis is one of the most stigmatized of these problems, being associated with attributes such as aggressiveness, a lack of self-control and unreasonable behaviour as well as an increased desire for social distance (Angermeyer & Matschinger, 1997; Jorm & Wright, 2008). Various national campaigns have attempted to tackle the stigma of mental health by associating psychological problems with physical rather than environmental factors, in the hope that this would reduce blame. However, evidence for the effectiveness of such campaigns in improving negative attitudes is largely absent (Schomerus et al., 2012). Furthermore, not only has research suggested that promoting a biogenetic viewpoint does not improve public attitudes toward mental health problems, but that it can actually make them worse (Bennett, Thirlaway, & Murray, 2008; Read, Haslam, Sayce, & Davies, 2006; Walker & Read, 2002). Based on these findings, it is possible that an individual's own causal model could be an important factor in the development of internalised stigma in people experiencing psychosis, as well as influencing their opinions about others who have these experiences. Internalised stigma occurs when individuals who are stigmatised against accept negative stereotypes as an accurate reflection of their own self-concept (Corrigan, Rafacz, & Rüsck, 2011). It is associated with significant emotional and behavioural consequences, including diminished self-esteem and self-efficacy and is often identified as a significant barrier to accessing help and support in affected individuals (Sartorius, 2007). Identifying factors associated with negative self-appraisals could have important consequences for the clinical process, especially in relation to the framework that is adopted when individuals first come into contact with services. Consequently a second aim of this paper is to review current findings in order to make possible conclusions about the relationship between causal beliefs and the experience of stigma, both towards themselves and others, in people experiencing psychosis.

Methods

Population

Studies were required to include a sample (>50%) of individuals who either (i) had a diagnosis (*international classification of diseases, version 10 (ICD-10; World Health Organization, 2004)* or *Diagnostic and Statistical Manual of Mental Disorders, version 4, (DSM-IV; American Psychiatric Association, 2000b)*) of a schizophrenia spectrum condition (for example schizophrenia, schizoaffective disorder, Schizophreniform disorder, psychosis not otherwise specified (NOS)) or (ii) met entry criteria for early intervention in psychosis services. Studies that included control groups with both healthy controls and individuals with psychiatric conditions other than psychosis were also included.

Types of study

All articles that looked at the effects of causal explanations on outcome and stigma in people experiencing psychosis were included in the review. Studies were required to include (i) at least one measure that assessed an outcome (e.g. treatment, symptoms) or stigma and (ii) at least one measure that specifically assessed causal explanations. Articles were excluded if they used measures that captured causal models but did not report these independently of other beliefs about an individual's illness perception (e.g. controllability or timeline). For example, some studies used the Illness Perception Questionnaire which does assess an individual's causal model, however they do not report these findings in their results section as it is not the focus of their research. Qualitative studies were included in the review where the relationship between causal attributions and outcome or stigma was being investigated. A range of study designs were considered for inclusion in the review.

Additional criteria

Only English-speaking articles were included in the review. Furthermore, only articles attainable through university libraries or by contacting the author were included. The inclusion criteria for this review did not contain restrictions on date or methodological rigour.

Search Strategy

Three databases were searched from their start dates; Embase (1946), Psychinfo (1806) and Medline (1974) and the following search terms were entered; psychosis OR psychoses OR psychoti* OR schiz* OR paranoi* OR delusion* OR hallucinat* AND explanatory model* or perception* about or causal belief* or causal model* or causal attribution* or causal explanation* or belief* about or belief model* or caused their AND treatment or adherence or outcome* or take up or follow up or course or compliance or stigma* or attitude* or stereotype* or discrimination or prejudice or recovery or prognosis'. Searches were undertaken using OVID search tools and references were searched by hand for further potentially relevant studies.

Results

No previous reviews investigating the relationship between the causal beliefs of individuals experiencing psychosis and treatment outcome or stigma were identified during the search process. *Figure 1* provides a flow-chart for the selection of eligible studies. The initial search generated 823 articles that were reviewed by one author for relevance. A total of 654 articles were excluded, primarily because their abstracts revealed that they were not relevant to the research question. The full-texts of the remaining 169 articles were read and a further 147 articles were excluded for not meeting the aforementioned criteria. Reading the reference lists of these 18 papers generated a further four potential papers, three of which were included in the review (Holzinger, Loffer, Muller, Priebe, & Angermeyer, 2002; Marcus et al., 2014; Van Dorn, Swanson, Elbogen, & Swartz, 2005). A total number of 21 papers from 20 individual studies were included. These are summarised in *Table 1*.

Study characteristics

The majority of the studies used consecutive sampling from a defined catchment area (80.9% n=17). Participants were predominantly recruited from mental health services (95.2%, n=20), including general outpatient clinics (n=16), inpatient units (n=3) or a combination of these services (n=1). One study recruited participants experiencing psychosis using an online survey (Wiesjahn, Jung, Lamster, Rief, & Lincoln, 2014). Of the 21 studies, 18 of these adopted a

quantitative approach, using cross-sectional techniques. The remaining three papers were qualitative. Of these, one applied an informal approach, combining a number of qualitative approaches (Lund & Swartz, 1998), one paper used the methods of grounded theory (Sayre, 2000), and the final qualitative paper applied content analysis (Napo, Heinz, & Auckenthaler, 2012). The sample sizes ranged from 10-203, with just over half of the studies conducted in non-industrialised cultures (n=11).

Participants

There were a total of 1699 people with a current diagnosis of a psychotic disorder (schizophrenia, or schizoaffective disorder) or meeting criteria for an early psychosis service, included in the studies. Two of the studies included in the review report data on the same sample (Johnson, Sathyaseelan, Charles, Jeyaseelan, & Jacob, 2012; Johnson, Sathyaseelan, Charles, Jeyaseelan, & Jacob, 2014). The mean age of participants was 36.6, based on data from 19 studies. The majority of the studies included only participants with a current clinical diagnosis of schizophrenia or a schizophrenia sub-type disorder (n=19). The remaining 2 studies recruited participants with an axis -1 disorder, however report samples in which more than half have a diagnosis of schizophrenia (Broadbent, Kydd, Sanders, & Vanderpyl, 2008; Rusch, Todd, Bodenhausen, & Corrigan, 2010). Six of the studies confirmed a diagnosis or the presence of symptoms using standardised instruments, such as the Schedule for Clinical Assessment in Neuropsychiatry (SCAN; World Health Organization, 1994), the Structured Clinical Interview (Spitzer, Williams, Gibbon, & First, 1990), Present State Examination (Wing, Cooper, & Satorius, 1974) and the Positive And Negative Syndrome Scale (Kay, Fiszbein, & Opfer, 1987).

Measurement of causal beliefs

A range of approaches and measures were used to capture beliefs about the aetiology of psychosis. Across the 17 quantitative studies, seven different measures were employed. Five of the studies describe and measure the concept of causal beliefs within a model of health behaviour. Behavioural models also incorporate an individual's beliefs about other aspects of their experiences such as, the course, treatment and prognosis of their condition (Broadbent et al., 2008; Freeman et al., 2013; Marcus et al., 2014; Watson et al., 2006; Wiesjahn et al., 2014). These studies all reported employing variations of the Illness Perception Questionnaire (IPQ-S; Lobban et al., 2005; Marcus et al., 2014; Weinman, Petrie, Moss-Morris, & Horne, 1996). The IPQ is a quantitative assessment that was designed to measure the five dimensions of the self-regulatory model (Leventhal et al., 1984). The measure has been widely used for studying illness behaviours in people with physical health problems (Petrie, Cameron, Ellis, Buick, & Weinman, 2002). More recently it has been adapted to measure the illness representations of people experiencing mental health problems (Wittman, Bolks, & Hutschemaekers, 2011), as well as a version designed specifically for individuals with a diagnosis of schizophrenia (IPQ-S; Lobban et al., 2005). This questionnaire consists of 26 potential causes including bio-genetic beliefs (e.g. heredity, brain abnormality, chemical imbalance), and psychosocial beliefs (stress, money worries, my upbringing) but does not capture spiritual beliefs.

Four studies (Charles, Manoranjitham, & Jacob, 2007; Johnson et al., 2012; Johnson et al., 2014; McCabe & Priebe, 2004b) reported using the Short Explanatory Model Interview (SEMI; Lloyd et al., 1998). The SEMI is a semi-structured interview that allows for a qualitative assessment of an individual's illness beliefs within a structured framework. The interview was devised based on the notion of explanatory models proposed by Kleinman (1978), which places value on understanding an individual's interpretation of their experiences. The measure is

divided into five sections covering the subject's background, nature of problem, help-seeking behaviour, relationship with treating physician and beliefs about illness. The interview explores illness perceptions within a cultural framework, and was therefore employed in studies that focus on the cultural aspects of causal explanations. Holzinger et al. (2002) adopted a similar approach in their study. They used the 'Interview on subjective illness theory', a semi-structured interview that allows participants to freely articulate their views around a specific topic, however the final analysis is carried out using a quantitative approach. Similarly, Burns, Jhazbhay, and Emsley (2011) organised responses to an open-ended question ('what do you think is the cause of your illness?') into three categories covering spiritual, scientific and 'other' explanations.

Three studies employed structured questionnaires to capture causal beliefs in their sample. These included, the causal belief questionnaire (CBQ; Angermeyer & Klusmann, 1988), which captures beliefs across five dimensions including psychosocial, biological and spiritual causes. The responsible causes of disease questionnaire (Lan, Shiau, & Lin, 2003) which consists of 13 questions covering psychosocial, biological and esoteric perspectives, and finally the Spiritual Attitude Questionnaire (SAQ; Kulhara, Avasthi, & Sharma, 2000) which measures only esoteric interpretations (e.g. Gods will, witchcraft and bad deeds in previous life). One study (Mak & Wu, 2006) employed the Causal Dimension Scale (CDS; McAuley, Duncan, & Russell, 1992). This questionnaire asks respondents for specific explanatory models as well as measuring internal and external attributions (e.g. 'something about you' and 'over which you have power'). The three remaining quantitative studies adopted less standardised approaches. Van Dorn et al. (2005) provided six possible causes and asked participants how likely each factor is to have caused a mental health problem, capturing genetic, current circumstances and spiritual explanations. Rusch et al. (2010) asked two specific questions that measured endorsement of neurobiological and genetic causes only, and finally one study asked open-ended questions about the participant's spiritual beliefs and therefore did not capture alternative explanatory models (Huguelet, Mohr, Gillieron, Brandt, & Borrás, 2010).

The qualitative studies included in the review applied a combination of semi-structured and unstructured approaches to elicit the causal beliefs of participants. For example, one study asked questions that covered five broad topics, including the person's experience of their condition, their understanding of aetiology and their experience of treatment (Lund & Swartz, 1998). Napo et al. (2012) developed a semi-structured interview that focused on why participants believed they were in hospital, and what treatment they thought would be helpful. Finally, Sayre (2000) reported using a less structured approach, asking non-specific questions around aetiology and treatment of psychosis.

Causal beliefs in people experiencing psychosis

For the purpose of this review, causal explanations have been separated into three main categories based on how they are usually referred to in the literature. These include, (a) psychosocial beliefs (e.g. recent stress, trauma, lifestyle and behaviour), (b) biogenetic beliefs (e.g. genetics, neurological, chemical imbalance and other disease based interpretations), and (c) spiritual beliefs (e.g. gods will, specific cultural beliefs and fate). Of the studies included in this review, 13 report data on a range of causal beliefs in people experiencing psychosis (Broadbent et al., 2008; Burns et al., 2011; Charles et al., 2007; Conrad et al., 2007; Freeman et al., 2013; Holzinger et al., 2002; Huguelet et al., 2010; Johnson et al., 2012; Judge, Estroff, Perkins, & Penn, 2008; Kulhara et al., 2000; Lund & Swartz, 1998; McCabe & Priebe, 2004b; Napo et al., 2012; Rusch et al., 2010; Sayre, 2000; Van Dorn et al., 2005). Environmental

causes was the most preferred causal explanation, with seven studies reporting a preference (n=6), or an equal preference (n=1) for psychosocial interpretations over alternatives. In a study that recruited a relatively large sample (n=203) Broadbent et al. (2008) found that drug use, childhood upbringing and stress were the most common specific causes provided by their respondents. Freeman et al. (2013) found that 70% of their sample endorsed 'stress' as the main cause of their experiences and a further study reported 'a crisis' to be the most favoured attribution in their sample of inpatients (Sayre, 2000). The only study to report a preference for biological causal beliefs (Van Dorn et al., 2005) found that 'a chemical imbalance' was the most endorsed factor in their sample of consumers (n=93; 89.4%). However, this paper adopted a slightly different method, as they did not elicit beliefs about cause in relation to the individual's own experiences of psychosis, but the experience of a fictional individual using a vignette, referring to them as someone with 'schizophrenia'.

Cultural differences

Those studies that did not report a preference for psychosocial explanations tended to be those based within specific developing cultures. These reported a tendency to endorse spiritual or supernatural causal beliefs over alternative explanations. One study recruited a sample in South India and reported an overwhelming preference (73%) for esoteric explanations (e.g. black magic), with only 14.3% ascribing cause to genetics, and 10.7% endorsing a psychosocial understanding of their condition (Johnson et al., 2012). Lund et al (1998) reported similar findings, of the ten people they interviewed in Cape Town, 7 explained their experiences in a spiritual or mystical way, and Napo et al (2012) commented on a significant preference for external causes (e.g. evil eye) in their study based in Mali. Burns et al. (2011) found a general preference (n=25, 49%) for spiritual causes in their sample, however combined psychosocial and genetic causes as part of their analysis, therefore a distinction between these cannot be commented on. One study that did not report a similar trend, found an equal preference for both non-medical and medical explanations in their sample from India (Charles et al., 2007); however, they also did not distinguish between psychosocial and disease interpretations. Two studies compared different ethnic groups as part of their analysis (Conrad et al., 2007; McCabe & Priebe, 2004b). Conrad et al. (2007) found no significant differences between the causal beliefs of German and Jordanian participants, both equally citing psychosocial factors as the most likely cause of their experiences. Conversely, McCabe and Priebe (2004b) compared the causal beliefs of four groups from distinct cultural backgrounds including, African-Caribbean, Bangladeshi, West-African and UK white. Overall they found social factors (interpersonal problems, stress, childhood adversity) to be the most cited causal explanation (16.2%), however reported significant differences between the four groups. They found the effect to be somewhat localised, as whites were distinguished from the other three groups in four cases, including a preference for biological over social causes of their experiences.

Changeable and contradictory

A number of studies comment on the complex nature of explanatory models (Broadbent et al., 2008; Charles et al., 2007; Conrad et al., 2007; Huguelet et al., 2010; Johnson et al., 2012; Van Dorn et al., 2005). Two studies measured the causal beliefs of their sample longitudinally (Huguelet et al., 2010; Johnson et al., 2012) and observed a gradual change in illness beliefs. They found that endorsement of a medical model increased over time. Furthermore, although the majority of studies report a 'preferred' causal belief, many comment on the presence of competing and contradictory beliefs. Conrad et al. (2007) found that around half of their participants endorsed one single cause, however the remaining 50% believed there to be several interconnected or unrelated causes. A further study asked open-ended questions about the cause

of psychosis (Sayre, 2000), and found that 74% (n= 73) provided two or more types of causal beliefs. Similarly, Johnson et al (2012) reported that 22% of their sample held multiple causal models, and one study that investigated the explanatory models of people with psychosis in South India (Charles et al., 2007), reported a tendency to hold ‘multiple and contradictory’ models of illness causation.

Treatment outcomes

Of the 21 studies, 17 examined treatment-related outcomes. It was noted that the search captured various psychological outcomes that were not explicitly intended outcomes of the original review. These included items such as depression, self-esteem and functioning; processes that are often intended outcomes of treatment, and associated with recovery in this client group (Pitt, Kilbride, Nothard, Welford, & Morrison, 2007). These outcomes are included in the review, under treatment-related outcomes. Therefore, in total, 16 different outcomes associated with treatment were studied. These were; treatment preference, treatment expectations, treatment satisfaction, attitude to medication, adherence to medication, take-up of therapy, functioning, remission, help-seeking behaviour (e.g. missed appointments, hospital visits), emotional dysfunction, psychopathology, duration of untreated psychosis, and therapeutic relationships. These have been organised into three mutually exclusive groups, (a) Attitudes and behaviour; (b) Symptoms and recovery; (c) Help-seeking. The various outcomes were measured using the following rating scales; Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988); Beck Depression Inventory-II (BDI; Beck, Steer, & Brown, 1996); Belief about Medicines Questionnaire (BMQ; Horne, Weinman, & Hankins, 1999); Brief Psychiatric Rating Scale (BPRS; Overall & Gorham, 1962); Clinical Global Impression Scale (CGI; CGI; National Institute of Mental Health, 1976); Camberwell Assessment of Need (CAN; Slade, Thornicroft, Loftus, Phelan, & Wykes, 1999); Concept Scale for Schizophrenic Patients (Linden, Nather, & Wilms, 1988); Global Assessment of Functioning (GAF; American Psychiatric Association, 2000a); Helping Alliance Scale (HAS; Priebe & Gruyters, 1993); Health Locus of Control Scale (HLC; Wallston, Wallston, Kaplan, & Maides, 1976); Manchester Short Assessment of Quality of Life (MANSA; Priebe, Huxley, Knight, & Evans, 1999); Medication Adherence Questionnaire (MAQ; Morisky, Green, & Levine, 1986); Medication Adherence Rating Scale (MARS; Thompson, Kulkarni, & Sergejew, 2000); Patient Care Satisfaction Questionnaire (PCSQ; Barker, Shergill, Higginson, & Orrell, 1996); Positive and Negative Syndrome Scale (Kay et al., 1987); Present State Examination interview (PSE-9; Wing et al., 1974); Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965); Schedule for Assessment of Insight into Psychosis (SAI-E; Kemp & David, 1997); WHO Disability Assessment Schedule (WHODAS II; World Health Organisation, 2001); World Health Organisation Quality of Life (WHOQOL; The WHOQOL Group, 1998).

Attitudes and Behaviour

Of the included studies six of these explored the relationship between causal beliefs and treatment preference or satisfaction in people experiencing psychosis (Conrad et al., 2007; Lund & Swartz, 1998; McCabe & Priebe, 2004b; Napo et al., 2012; Sayre, 2000; Wiesjahn et al., 2014). One study based in the UK, investigated the relationship between explanatory models and various different aspects of treatment outcome (McCabe & Priebe, 2004b). They found that participants who attributed cause to biological factors were more satisfied with treatment ($p=0.041$), were more likely to say they were receiving the right treatment for them ($p=0.021$), and had better relationships with their keyworkers ($p=0.006$) than those who cited social causes. Whereas individuals with social causal beliefs were most likely to accept they had a mental health problem. However, this study found no relationship between causal beliefs

and treatment compliance. One study that explored attitudes toward medication using an online survey (Wiesjahn et al., 2014), found a significant positive relationship between endorsement of biological causal beliefs and positive attitudes toward medication ($P < 0.001$). In their qualitative study, Sayre (2000) reported associations between attribution style and attitudes towards treatment. Those who attributed cause to disease, or problems associated with personal qualities or behaviours, were more likely to view medication as helpful. Conversely, participants who regarded their problems as a 'response to a crisis', reported that they complied with medication to be viewed as cooperative. However, some studies did not report a relationship between explanatory models and perceptions of treatment. These tended to be those studies carried out in non-industrialised cultures. Two qualitative studies found that even when culturally-related phenomena was assumed the most likely cause of their experiences, participants still preferred and expected treatment with modern medicine (Lund & Swartz, 1998; Napo et al., 2012). Similarly, in a cross-sectional study, comparing two cultural groups (Conrad et al., 2007), endorsement of non-biological causal attributions was not found to be associated with less trust in medical treatment. None of the Jordanian participants, compared to 26% of German participants ($p = .007$), attributed the main cause of their experiences to biology yet there was no reported differences between the two groups in relation to trust in medication. Charles et al (2007) reported similar findings in their study; only 32% of their sample cited disease as the cause of their experiences, however 95% believed that treatment from a doctor could cure their illness.

The relationship between treatment adherence and causal attributions was explored by seven of the included studies (Freeman et al., 2013; Holzinger et al., 2002; Huguelet et al., 2010; Lan et al., 2003; Marcus et al., 2014; Watson et al., 2006; Wiesjahn et al., 2014). Three studies investigated the relationship between adherence to medication and causal beliefs, with the hypothesis that biological casual beliefs would be associated with better adherence (Holzinger et al., 2002; Lan et al., 2003; Wiesjahn et al., 2014). Whilst Lan et al. (2003) and Holzinger et al. (2002) failed to find an association between these variables, Wiesjahn et al. (2014) did report a significant positive relationship between biological causal beliefs and treatment preference, which when entered into a path analysis with other variables, partially predicted adherence to medication ($B = -0.31$; $p < 0.001$). A further study investigated the relationship between attribution style and self-reported medication adherence (Watson et al., 2006) and found that attributing cause to other people ($r = -0.20$, $p = < 0.05$) or poor medical care ($r = -0.24$, $p = < 0.05$) was associated with poor self-reported adherence. One study investigated the relationship between medication adherence within the context of spiritual beliefs. They hypothesised that individuals who held a belief that contradicted taking medication would be less likely to adhere to their medication regime. However, they did not identify a relationship between these two factors, suggesting a contradiction between beliefs and behaviour (Huguelet et al., 2010).

Two studies investigated the role of aetiological beliefs in relation to engagement with psychological therapy (Freeman et al., 2013; Marcus et al., 2014), providing mixed findings. Freeman et al. (2013) reported several significant differences between the explanatory models of people who engage at different levels with cognitive behavioural therapy. Most relevant is the finding that participants in the 'full-therapy' group were more likely to endorse 'state of mind' as the cause of their experiences than the 'partial therapy' group ($\chi^2 = 8.83$, $p = 0.003$). They were also more likely to believe that 'personality' contributed to their experiences than individuals in the 'partial therapy' group ($\chi^2 = 5.89$, $p = 0.015$) and the 'no therapy group' ($\chi^2 = 3.88$, $p = 0.049$). This was entered into a linear discriminant function analysis, alongside two other variables (cure/control and timing); in which 58.1% of cases were classified correctly. However, in a later study, Marcus et al. (2014) investigated the predictive power of

causal attributions on engagement with therapy and did not identify any significant relationships between these two variables. They proposed that this may be attributable to the characteristics of the sample and the intensity of the intervention, indicating the need for a more systematic approach to measuring the influence of beliefs on engagement with therapy.

Symptoms and other outcomes

Three studies investigated the relationship between causal explanations and other outcomes relevant to treatment, such as remission, disability and symptomatology, as part of their analysis (Burns et al., 2011; Johnson et al., 2012; Johnson et al., 2014; Watson et al., 2006). One longitudinal study (Johnson et al., 2012) with a relatively large sample (n=92), explored the relationship between explanatory models and a number of treatment-related outcomes including, remission (pre-defined PANSS scores), psychopathology, disability and insight. They reported a relationship between causal beliefs and remission. Participants who preferred a disease model of illness were significantly more likely to be in remission ($r = 46.67$, $p = 0.001$) than participants endorsing a specific non-medical model ($r = 0.02$, $p = 0.001$). However, participants who subscribed simultaneously to the disease models and at least one non-medical model reported significantly better outcomes than those subscribing to the disease-model alone ($r = 25.41$, $p = 0.001$). They also reported negatively correlated relationships between individuals holding non-medical explanatory models and psychopathology ($r = -0.36$, $p = 0.001$), and disability ($r = -0.30$, $p = 0.003$) at the 5 year follow-up, and positively associated with insight ($r = 0.37$, $p < .001$). They suggest that whilst explanatory models are not associated with outcome, they are used as a way of coping with the 'devastating impact' of the condition.

An association between attributions and emotional dysfunction was found by Watson et al (2006). Participants who attributed cause to 'state of mind' were significantly more likely to report anxiety ($p < 0.01$), whilst interpreting a stress related attribution was associated with lower self-esteem ($p < 0.01$). Burns et al. (2011) looked at the relationship between causal attributions and symptomatology and found that those believing in spiritual causes reported a higher number of negative symptoms than those ascribing cause to natural/scientific attributions, although this did not reach significance (Burns et al, 2011). There was no difference between beliefs and experience of positive symptoms.

Help-seeking

Three studies looked at variables associated with help-seeking behaviour and explanatory models (Broadbent et al., 2008; Burns et al., 2011; Johnson et al., 2012). An association between causal attributions and duration of untreated psychosis was found by Burns et al. (2011). Participants who attributed cause to spiritual factors reported a significantly longer period of untreated psychosis ($p < 0.001$). They suggest that those who endorse spiritual interpretations are more likely to seek help from traditional sources initially, therefore delaying help from formal mental health services. In their longitudinal study Johnson et al. (2012) failed to find a relationship between non-medical explanatory models and the number of hospital visits or the number of missed appointments. A relationship between causal explanations and help-seeking was identified by Broadbent et al. (2008). They found that participants who made behavioural attributions (e.g. drug use, poor diet) were significantly less likely to visit their G.P than those who endorsed psychosocial attributions (e.g. childhood abuse, stress; $p < .001$).

Causal beliefs and stigma in people experiencing psychosis

Only four studies explored the relationship between explanatory models and stigma in people with psychosis (Charles et al., 2007; Mak & Wu, 2006; Rusch et al., 2010; Van Dorn et al., 2005). The following measures were used to assess for the experience of stigma; Consumers Experience of Stigma Questionnaire (CESQ; Wahl, 1999), the Attribution Questionnaire (Corrigan, Markowitz, Watson, Rowan, & Kubiak, 2003); Brief Implicit Association Test (BIAT; Sriram & Greenwald, 2009); the Social Distance Scale (Link, Phelan, Bresnahan, Stueve, & Pescosolido, 1999), and the Self-Stigma Questionnaire (Mak & Wu, 2006). These captured various dimensions of stigma including, perceived responsibility, fear, social distance, implicit guilt, negative attitudes of others, fears related to disclosure and negative reports seen or heard about mental illness, obtaining a job, pursuing volunteer activities, and inferiority. One study adopted a slightly different approach (Van Dorn et al., 2005). They measured social stigma by asking specific questions about a vignette which detailed a hypothetical individual with schizophrenia, e.g. ‘how likely is it that Mr Smith would do something violent toward other people?’.

All of the studies reported data on the relationship between causal attributions and stigma with one exception (Van Dorn et al., 2005). These all reported a significant relationship between explanatory models and stigma. One study investigated the association between genetic and neurobiological causal beliefs and aspects of stigma, including implicit and explicit manifestations of these reactions (Rusch et al., 2010). They found that endorsement of a genetic model, compared to a neurological model, was associated with higher levels of implicit stigma ($r=0.22$, $p=0.05$) and higher self-reported fear towards other people with mental illness ($r=0.28$, $p=0.01$). They also comment on the surprising finding that consumers do not necessarily have more positive attitudes toward their own group, given that previous research has identified contact with consumers as a powerful anti-stigma tool (Corrigan & Penn, 1999). Charles et al. (2007) reported a significant positive relationship between individual stigma scores and a belief in the disease model of mental illness and/or beliefs in karma or evil spirits. A further study explored how feelings of personal responsibility were related to self-reported experience of stigma (Mak & Wu, 2006). They found that consumers who assume a greater level of personal responsibility for their experiences experienced higher levels of stigma. Finally, Van Dorn et al. (2005) found that 63% of their sample of consumers believed that it was likely that ‘Mr Smith’, a hypothetical person with schizophrenia, would be violent toward another person. They suggest that they make this assumption based on their own experience, and associate him with situations where violent behaviour is not uncommon. A lesser number expressed desire for social distance from Mr Smith (33%).

Discussion

Due to the scarcity of data on this topic area, any conclusions reported in this review are made with caution and more research is clearly required before any firm assumptions can be made. However, the results clearly indicate that people experiencing psychosis construct their own belief systems about the aetiology of their experiences, and allow a tentative suggestion that these beliefs are potentially associated with aspects of treatment outcome and stigma in this client group.

Summary of findings

In papers that have reported data on the causal models of people with psychosis, there was a clear preference for psychosocial or spiritual interpretations over biological beliefs. This supports the findings of population studies, which have consistently reported a preference for

environmental over genetic causes of mental health problems in the general population (Angermeyer & Dietrich, 2006). Moreover, there was considerable evidence to suggest that individuals experiencing psychosis hold multiple, and sometimes competing/contradictory explanatory models, which do not always remain stable. It has been consistently shown that individuals experiencing psychosis prefer psychosocial or spiritual interpretations of their problems, a finding that is consistent with studies conducted about psychosis and depression with carers and the general public (Angermeyer & Dietrich, 2006), as well as people who experience depression and other mental health problems (Elliott, Maitoza, & Schwinger, 2011). It is important to note that the average age of individuals in the studies included in this review (36 years of age), is considerably higher than the average age of onset which is predominantly during adolescence. Furthermore, based on the information provided, it appears that these studies have not investigated the causal beliefs of individuals experiencing their first episode of psychosis. Previous research that has explored the explanatory models of a first-episode sample, report drug use and adulthood trauma as the most favoured explanations (Dudley et al., 2009). However, unlike the studies reviewed in this paper, participants did not endorse a biological perspective. Indeed the two longitudinal studies indicate that there is an increased preference for biological based interpretations over time. This is in line with previous findings that have reported a similar trend in people experiencing mental health problems (Geekie, 2013). It is suggested that an individual's subjective beliefs are not viewed as static cognitions, rather they are understood as active beliefs that are subject to constant revision based on social, personal and cultural experiences (McCabe & Priebe, 2004a). Research indicates that clinicians tend to place more value on biological factors than service-users and the general public (Angermeyer & Matschinger, 1996), therefore it is likely that contact with mental service influences a client's causal model in this direction. The papers included in this review do not report how long their sample have been utilising mental health services, and therefore it is difficult to make any firm conclusions, however the two longitudinal studies indicate that this relationship does exist. Furthermore, the apparent complexity of causal models contributes to a disagreement between authors about how these beliefs should be measured, with an argument that quantitative approaches are not able to fully capture an individual's understanding. This makes comparisons between the studies difficult, further complicated by samples recruited from non-industrialised countries and studies that measure only discrete beliefs (e.g. spiritual, biogenetic) rather than measuring the whole spectrum of models.

In the papers looking directly at treatment outcomes, there was an indication that an individual's causal beliefs are associated with both attitudes and behaviour. The findings suggest that those who endorse a biological causal model may be more likely to adhere to medication than those with a psychosocial model. One study also found that biological models were associated with better relationships with keyworkers, which may be reflective of the prevailing model within psychiatric teams. Conversely, there is also an indication that individuals who attribute their experiences to psychosocial causes are more likely to engage in therapy. Individuals who endorse a biological framework are more likely to accept medication as a treatment option than those who endorse alternative explanations as it fits with their belief system. Similarly individuals with a psychosocial understanding may be more able to consider the possibility that they can assert some control over their experiences, and are therefore more willing to engage with a therapeutic approach. These findings are consistent with previous research that suggests patient satisfaction with mental health services is best when there is agreement between the patient and clinician's explanatory model (Callan & Littlewood, 1998). These findings can be interpreted within a model of health behaviour as an individual's own understanding of their experiences appears to be influencing their subsequent attitudes and behaviour.

Causal beliefs were also found to be related to other outcomes (help-seeking, symptoms and disability) that although are not specifically treatment related, represent additional aspects of an individual's experience of psychosis and their recovery. Recently researchers have explored the concept of recovery as defined by service-users (Pitt et al., 2007). This has provided a more complex account of the recovery process, with individuals identifying outcomes such as purpose, hope and quality of life, as more important to them than their actual 'symptoms'. Although, the papers reported in this review do not cover many of these outcomes, the findings highlight a potential relationship between an individual's explanatory model and recovery-related outcomes that is worthy of further investigation.

Finally, there also appears to be an association between causal beliefs and the experience of stigma in people with psychosis. The findings suggest that those endorsing a biogenetic model may experience higher levels of implicit stigma as well as hold more stigmatizing attitudes toward others with schizophrenia. Due to the limited research, it is unknown if alternative explanations reduce the experience of stigma however, it is important to note that whilst the majority of studies included in this review do not explore the relationship between explanatory models of illness and stigma formally, they do comment on the potential role that causal beliefs play in managing self-stigma (Charles et al., 2007; Johnson et al., 2012; Napo et al., 2012; Sayre, 2000). They suggest that individuals adopt alternative explanatory models (e.g. stress, spiritual) to avoid the stigma associated with the traditional disease-based explanations. Previous findings within the general public have suggested that a biomedical framework increases essentialist thinking (Kvaale, Haslam, & Gottdiener, 2013). Essentialist thinking occurs when a group of people are defined by a set of deep-seated and fixed attributes, an 'essence' that results in certain behaviours. When this is applied to a negative stereotype, such as people with psychological difficulties, essentialist thinking can perpetuate these beliefs and deepen divides between social groups (Kvaale et al., 2013). As stereotypes of people who experience mental health difficulties often have negative connotations, such as a perception of dangerousness and unpredictability, essentialist thinking can reinforce these beliefs. These attributes are then considered to be intrinsic to this group (Angermeyer, Holzinger, Carta, & Schomerus, 2011) resulting in an increased desire for social distance. It may be that individuals with psychosis reject the medical model to avoid being associated with having a mental illness and therefore report lower levels of internalised stigma when they endorse an alternative framework.

Overall, the findings suggest that different explanatory models are beneficial to the individual in different ways. Whilst biological causal beliefs positively influence attitudes and adherence to medication, and may improve relationships with keyworkers, psychosocial beliefs improve engagement with psychotherapeutic approaches and reduce the experience of stigma. Finally, spiritual explanations are associated with better coping as well as the acceptance of multiple treatment options. Authors of these papers proposed that these perspectives may have a different function to psychosocial and biological causal models, in that rather than informing treatment satisfaction or behaviour, they act as a way of coping with the personal and social impact of experiencing psychosis. Importantly, this review highlights the need for a consistent and structured approach to the measurement of causal beliefs.

Limitations

We identified a number of methodological issues in the literature. Firstly, the majority of the studies were cross-sectional which renders it difficult to make any firm conclusions about

causality. There does not appear to be any longitudinal studies based in industrialised countries that capture the beliefs of individuals with psychosis and how this relates to treatment or stigma. Second, the measures used to assess causal beliefs are varied in both technique and purpose. Whilst some intended to assess the range of attributions, other studies focused on just one specific belief, which made comparisons between studies problematic. A related problem was the range of outcome measures used to capture variables such as adherence and engagement, as well as the limited research investigating the impact of causal beliefs on user-defined outcomes. Finally, there is no research into the development of causal beliefs and what factors contribute to their changeability and complexity. Furthermore studies would benefit from using prospective techniques and a systematic way of assessing causal beliefs should be established.

In this current review, there is a risk that some papers may have been missed due to the search terms used as causal beliefs are referred to using a variety of terms in the literature. Furthermore heterogeneity was high, and it could be that the review aims were too broad or the literature is too dissimilar to combine. Further research is needed that uses both experimental and prospective approaches.

Future research

Future research is needed to fully comprehend the role of causal beliefs in treatment outcome and stigma in this client group. Firstly, a structured method of assessing causal beliefs is required to allow for research to be comparable. Secondly, more research is needed to assess the impact of causal beliefs on treatment engagement and adherence, in relation to medication and psychological interventions as well as the relationship between explanatory models and other aspects of recovery. Furthermore, a comparison of service-user and clinician causal models would also be informative to explore the impact of dissonance on the therapeutic relationship, as would specific explorations into the causal models of individuals who are just coming into contact with services, and the potential impact of these on engagement. Finally, the relationship between causal models and internalised stigma needs to be further explored as to-date there is not one study that has assessed a range of causal beliefs and the impact of this on internalised stigma in this client group.

Clinical Implications

The studies reviewed above are extremely heterogeneous, in terms of focus, outcome measurement, and assessment of causal beliefs; this limits the extent to which clinical implications can be indicated. However this review does suggest that clinicians should elicit an individual's causal beliefs, using this process as a way to inform treatment, and develop the therapeutic relationship. If individuals are offered this opportunity and provided with alternatives to medication, this may improve engagement and satisfaction with services, as well as improving other clinical outcomes. It is possible that by assessing an individual's causal model, treatment options could be offered in a way that takes into account an individual's own beliefs. Furthermore, the potential impact of different causal models on the experience of stigma should also be considered during the therapeutic process. Clinicians providing a causal framework should be aware of the possibility that a disease-based interpretation could potentially increase internalised stigma in this client group.

References

- American Psychiatric Association. (2000a). *Diagnostic and Statistical Manual of Mental Disorders*. Washington, DC.: APA.
- American Psychiatric Association. (2000b). *Diagnostic and statistical manual of mental disorders, text revision (DSM-IV-TR)*: American Psychiatric Association.
- Angermeyer, M. C., & Dietrich, S. (2006). Public beliefs about and attitudes towards people with mental illness: A review of population studies. [Review]. *Acta Psychiatrica Scandinavica*, *113*(3), 163-179.
- Angermeyer, M. C., Holzinger, A., Carta, M. G., & Schomerus, G. (2011). Biogenetic explanations and public acceptance of mental illness: Systematic review of population studies. [Review]. *British Journal of Psychiatry*, *199*(5), 367-372.
- Angermeyer, M. C., Holzinger, A., & Matschinger, H. (2009). Mental health literacy and attitude towards people with mental illness: A trend analysis based on population surveys in the eastern part of Germany. *European Psychiatry*, *24*(4), 225-232.
- Angermeyer, M. C., & Klusmann, D. (1988). The Causes of functional psychoses as seen by patients and their relatives. *European archives of psychiatry and neurological sciences*, *238*(1), 47-54. doi: 10.1007/bf00381080
- Angermeyer, M. C., & Matschinger, H. (1996). Relatives' beliefs about the causes of schizophrenia. *Acta Psychiatrica Scandinavica*, *93*(3), 199-204.
- Angermeyer, M. C., & Matschinger, H. (1997). Social distance towards the mentally ill: results of representative surveys in the Federal Republic of Germany. *Psychological Medicine*, *27*(1), 131-141.
- Baines, T., & Wittkowski, A. (2013). A systematic review of the literature exploring illness perceptions in mental health utilizing the self-regulation model. *Journal of Clinical psychology in Medical Settings*, *20*(3), 263-274.
- Barker, D. A., Shergill, S. S., Higginson, I., & Orrell, M. W. (1996). Patients' views towards care received from psychiatrists. *The British Journal of Psychiatry*, *168*(5), 641-646.
- Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: psychometric properties. *Journal of Consulting and Clinical Psychology*, *56*(6), 893.
- Beck, A. T., Steer, R. A., & Brown, G. K. (1996). Beck depression inventory-II manual
- Bennett, L., Thirlaway, K., & Murray, A. J. (2008). The stigmatising implications of presenting schizophrenia as a genetic disease. *Journal of Genetic Counseling*, *17*(6), 550-559.
- Broadbent, E., Kydd, R., Sanders, D., & Vanderpyl, J. (2008). Unmet needs and treatment seeking in high users of mental health services: Role of illness perceptions. *Australian and New Zealand Journal of Psychiatry*, *42*(2), 147-153.
- Burns, J. K., Jhazbhay, K., & Emsley, R. (2011). Causal attributions, pathway to care and clinical features of first-episode psychosis: A South African perspective. *International Journal of Social Psychiatry*, *57*(5), 538-544.
- Callan, A., & Littlewood, R. (1998). Patient satisfaction: ethnic origin or explanatory model? *International Journal of Social Psychiatry*, *44*(1), 1-11.
- Charles, H., Manoranjitham, S. D., & Jacob, K. S. (2007). Stigma and explanatory models among people with schizophrenia and their relatives in Vellore, South India. *International Journal of Social Psychiatry*, *53*(4), 325-332.
- Charmaz. (1987). *Struggling for a self: Identity levels of the chronically ill*. London: JAI Press Inc.
- Conrad, R., Geiser, F., Schilling, G., Sharif, M., Najjar, D., & Liedtke, R. (2007). Cross-cultural comparison of explanatory models of illness in schizophrenic patients in Jordan and Germany. *Psychological Reports*, *101*(2), 531-546.
- Corrigan, P. W., Markowitz, F. E., Watson, A., Rowan, D., & Kubiak, M. A. (2003). An attribution model of public discrimination towards persons with mental illness. *Journal of Health and Social Behavior*, *44*, 162-179.

- Corrigan, P. W., & Penn, D. L. (1999). Lessons from social psychology on discrediting psychiatric stigma. *American Psychologist*, *54*(9), 765.
- Corrigan, P. W., Rafacz, J., & Rüsçh, N. (2011). Examining a progressive model of self-stigma and its impact on people with serious mental illness. *Psychiatry Research*, *189*(3), 339-343.
- Danks, D. (2009). *The psychology of causal perception and reasoning*. Oxford: Oxford University Press.
- Diefenbach, M. A., & Leventhal, H. (1996). The common-sense model of illness representation: theoretical and practical considerations. *Journal of Social Distress and the Homeless*, *5*(1), 11-38.
- Dudley, R., Siitarinen, J., James, I., & Dodgson, G. (2009). What do people with psychosis think caused their psychosis? A Q methodology study. *Behavioural and Cognitive Psychotherapy*, *37*(1), 11-24.
- Elliott, M., Maitoza, R., & Schwinger, E. (2011). Subjective accounts of the causes of mental illness in the USA. *International Journal of Social Psychiatry*, *58*(6), 562-567.
- Freeman, D., Dunn, G., Garety, P., Weinman, J., Kuipers, E., Fowler, D., . . . Bebbington, P. (2013). Patients' beliefs about the causes, persistence and control of psychotic experiences predict take-up of effective cognitive behaviour therapy for psychosis. *Psychological Medicine*, *43*(2), 269-277.
- Geekie, J. (2013). *Listening to the voices we hear: Clients' understandings of psychotic experiences*. New York: Routledge.
- Greenberg, L. W., Jewett, L. S., Cluck, R. S., Champion, L. A. A., Leikin, S. F., Altieri, M. F., & Lipnick, R. N. (1984). Giving information for a life-threatening diagnosis: parents' and oncologists' perceptions. *American Journal of Diabetes Care*, *138*, 649-653.
- Holzinger, A., Loffer, W., Muller, P., Priebe, S., & Angermeyer, M. (2002). Subjective Illness Theory and Antipsychotic Medication Compliance by Patients with Schizophrenia. [Article]. *The Journal of nervous and mental disease*, *190*(9), 597-603.
- Horne, R., Weinman, J., & Hankins, M. (1999). The beliefs about medicines questionnaire: The development and evaluation of a new method for assessing the cognitive representation of medication. *Psychology & Health*, *14*(1), 1-24. doi: 10.1080/08870449908407311
- Huguelet, P., Mohr, S., Gillieron, C., Brandt, P. Y., & Borrás, L. (2010). Religious explanatory models in patients with psychosis: A three-year follow-up study. *Psychopathology*, *43*(4), 230-239.
- Johnson, S., Sathyaseelan, M., Charles, H., Jeyaseelan, V., & Jacob, K. S. (2012). Insight, psychopathology, explanatory models and outcome of schizophrenia in India: A prospective 5-year cohort study. *BMC Psychiatry*, *12*, 159.
- Johnson, S., Sathyaseelan, M., Charles, H., Jeyaseelan, V., & Jacob, K. S. (2014). Predictors of insight in first-episode schizophrenia: A 5-year cohort study from India. *International Journal of Social Psychiatry*, *60*(6), 566-574.
- Jorm, A. F., & Wright, A. (2008). Influences on young people's stigmatising attitudes towards peers with mental disorders: national survey of young Australians and their parents. *The British Journal of Psychiatry*, *192*(2), 144-149.
- Judge, A. M., Estroff, S. E., Perkins, D. O., & Penn, D. L. (2008). Recognizing and responding to early psychosis: A qualitative analysis of individual narratives. *Psychiatric Services*, *59*(1), 96-99.
- Kay, S. R., Fiszbein, A., & Opfer, L. A. (1987). The positive and negative syndrome scale (PANSS) for schizophrenia. *Schizophrenia Bulletin*, *13*(2), 261-276.
- Kemp, R., & David, A. (1997). *Treatment compliance and the therapeutic alliance*. Amsterdam, Netherlands: Harwood Academic Publishers.
- Kleinman, A. (1978). Concepts and a model for the comparison of medical systems as cultural systems. *Social Science & Medicine. Part B: Medical Anthropology*, *12*(0), 85-93. doi: [http://dx.doi.org/10.1016/0160-7987\(78\)90014-5](http://dx.doi.org/10.1016/0160-7987(78)90014-5)

- Kreyenbuhl, J., Nossel, I. R., & Dixon, L. B. (2009). Disengagement From Mental Health Treatment Among Individuals With Schizophrenia and Strategies for Facilitating Connections to Care: A Review of the Literature. *Schizophrenia Bulletin*, *35*(4), 696-703. doi: 10.1093/schbul/sbp046
- Kulhara, P., Avasthi, A., & Sharma, A. (2000). Magico-religious beliefs in schizophrenia: A study from North India. *Psychopathology*, *33*(2), 62-68.
- Kvaale, E. P., Haslam, N., & Gottdiener, W. H. (2013). The 'side effects' of medicalization: A meta-analytic review of how biogenetic explanations affect stigma. *Clinical Psychology Review*, *33*(6), 782-794.
- Lan, C. M., Shiau, S. J., & Lin, L. C. (2003). Knowledge, Beliefs, Attitudes, and Drug Compliance in Schizophrenic Patients. [Review]. *Tzu Chi Medical Journal*, *15*(6), 369-375.
- Lebowitz, M. S. (2014). Biological conceptualizations of mental disorders among affected individuals: A review of correlates and consequences. *Clinical Psychology: Science and Practice*, *21*(1), 67-83.
- Leventhal, H., Nerenz, D., & Steel, D. J. (1984). *Illness representations and coping with health threats*. NJ: Erlbaum, Hillsdale.
- Linden, M., Nather, J., & Wilms, H. U. (1988). Definition, significance and measurement of disease concepts of patients. The Disease Concept Scale for schizophrenic patients. *Europe PubMed Central*, *56*(2), 35-43.
- Link, B. G., Phelan, J. C., Bresnahan, M., Stueve, A., & Pescosolido, B. A. (1999). Public conceptions of mental illness: Labels, causes, dangerousness, and social distance. *American Journal of Public Health*, *89*(9), 1328-1333.
- Lloyd, K. R., Jacob, K. S., Patel, V., St. Louis, L., Bhugra, D., & Mann, A. H. (1998). The development of the Short Explanatory Model Interview (SEMI) and its use among primary-care attenders with common mental disorders. *Psychological Medicine*, *28*(05), 1231-1237. doi: doi:null
- Lobban, F., Barrowclough, C., & Jones, S. (2004). The impact of beliefs about mental health problems and coping on outcome in schizophrenia. *Psychological Medicine*, *34*(7), 1165-1176.
- Lobban, F., Barrowclough, C., & Jones, S. (2005). Assessing cognitive representations of mental health problems. I. The illness perception questionnaire for schizophrenia. *British Journal of Clinical Psychology*, *44*(2), 147-162.
- Lund, C., & Swartz, L. (1998). Xhosa-speaking schizophrenic patients' experience of their condition: Psychosis and amafufunyana. *South African Journal of Psychology*, *28*(2), 62-70.
- Mak, W. W. S., & Wu, C. F. M. (2006). Cognitive insight and causal attribution in the development of self-stigma among individuals with schizophrenia. *Psychiatric Services*, *57*(12), 1800-1802.
- Marcus, E., Garety, P., Weinman, J., Emsley, R., Dunn, G., Bebbington, P., . . . Jolley, S. (2014). A pilot validation of a modified Illness Perception Questionnaire designed to predict response to cognitive therapy for psychosis. [Journal]. *Journal of Behavior Therapy and Experimental Psychiatry*, *45*(4), 459-466. doi: 10.1016/j.jbtep.2014.06.003
- McAuley, E., Duncan, T. E., & Russell, D. W. (1992). Measuring causal attributions: the revised causal dimension scale (CDSSII). *Personality and Social Psychology Bulletin*, *18*, 566-573.
- McCabe, R., & Priebe, S. (2004a). Assessing the stability of schizophrenia patients' explanatory models of illness over time. *Journal of Mental Health*, *13*(2), 163-169.
- McCabe, R., & Priebe, S. (2004b). Explanatory models of illness in schizophrenia: Comparison of four ethnic groups. *British Journal of Psychiatry*, *185*(JULY), 25-30.
- Morisky, D. E., Green, L. W., & Levine, D. M. (1986). Concurrent and predictive validity of a self-reported measure of medication adherence. *Medical care*, *24*(1), 67-74.
- Napo, F., Heinz, A., & Auckenthaler, A. (2012). Explanatory models and concepts of West African Malian patients with psychotic symptoms. *European Psychiatry*, *27*(SUPPL.2), S44-S49.
- National Institute of Mental Health. (1976). *CGI: Clinical Global Impression*. Bethesda.
- Overall, J. E., & Gorham, D. R. (1962). THE BRIEF PSYCHIATRIC RATING SCALE. *Psychological Reports*, *10*(3), 799-812. doi: 10.2466/pr0.1962.10.3.799

- Petrie, K. J., Broadbent, E., & Kydd, R. (2008). Illness perceptions in mental illness: Issues and potential applications. *Journal of Mental Health, 16*(6), 559-564.
- Petrie, K. J., Cameron, L. D., Ellis, C. J., Buick, D., & Weinman, J. (2002). Changing Illness Perceptions After Myocardial Infarction: An Early Intervention Randomized Controlled Trial. *Psychosomatic Medicine, 64*(4), 580-586.
- Petrie, K. J., & Weinman, J. (2006). Why illness perceptions matter. *Clinical Medicine, 6*(6), 536-539.
- Pitt, L., Kilbride, M., Nothard, S., Welford, M., & Morrison, A. P. (2007). *Researching recovery from psychosis: a user-led project* (Vol. 31).
- Priebe, S., & Gruyters, T. (1993). The role of the helping alliance in psychiatric community care: A prospective study. *The Journal of nervous and mental disease, 181*(9), 552-557.
- Priebe, S., Huxley, P., Knight, S., & Evans, S. (1999). Application and results of the Manchester Short Assessment of Quality of Life (MANSA). *International Journal of Social Psychiatry, 45*(1), 7-12.
- Read, J., Haslam, N., Sayce, L., & Davies, E. (2006). Prejudice and schizophrenia: A review of the 'mental illness is an illness like any other' approach. [Review]. *Acta Psychiatrica Scandinavica, 114*(5), 303-318.
- Rosenberg, M. (1965). *Society and the adolescent self-image*: Princeton University Press Princeton, NJ.
- Rusch, N., Todd, A. R., Bodenhausen, G. V., & Corrigan, P. W. (2010). Biogenetic models of psychopathology, implicit guilt, and mental illness stigma. *Psychiatry Research, 179*(3), 328-332.
- Sartorius, N. (2007). Stigma and mental health. *The Lancet, 370*(9590), 810-811. doi: 10.1016/s0140-6736(07)61245-8
- Sayre, J. (2000). The patient's diagnosis: Explanatory models of mental illness. *Qualitative Health Research, 10*(1), 71-83.
- Schomerus, G., Schwahn, C., Holzinger, A., Corrigan, P. W., Grabe, H. J., Carta, M. G., & Angermeyer, M. C. (2012). Evolution of public attitudes about mental illness: a systematic review and meta-analysis. *Acta Psychiatrica Scandinavica, 125*(6), 440-452. doi: 10.1111/j.1600-0447.2012.01826.x
- Slade, M., Thornicroft, G., Loftus, L., Phelan, M., & Wykes, T. (1999). *Camberwell Assessment of Need*. London: Gaskell.
- Spitzer, R. L., Williams, J. B. W., Gibbon, M., & First, M. B. (1990). *User's guide for the structured clinical interview for DSM-III-R: SCID*. Arlington, VA. US: American Psychiatric Association.
- Sriram, N., & Greenwald, A. G. (2009). The brief implicit association test. *Experimental Psychology, 56*, 283-294.
- The Schizophrenia Commission. (2012). *The Abandoned Illness: A report by the schizophrenia Commission*. England.
- The WHOQOL Group. (1998). Development of the World Health Organisation WHOQOL-BREF quality of life assessment. *Psychological Medicine, 28*(03), 551-558.
- Thompson, K., Kulkarni, J., & Sergejew, A. A. (2000). Reliability and validity of a new Medication Adherence Rating Scale (MARS) for the psychoses. *Schizophrenia Research, 42*(3), 241-247.
- Van Dorn, R. A., Swanson, J., Elbogen, E., & Swartz, M. S. (2005). A comparison of stigmatizing attitudes toward persons with schizophrenia in four stakeholder groups: perceived likelihood of violence and desire for social distance. *PSYCHIATRY, 68*(2), 152-163. doi: 10.1521
- Wahl, O. F. (1999). Mental health consumers' experience of stigma. *Schizophrenia Bulletin, 25*(3), 467.
- Walker, I., & Read, J. (2002). The differential effectiveness of psychosocial and biogenetic causal explanations in reducing negative attitudes toward "mental illness". *Psychiatry, 65*(4), 313-325.

- Wallston, B. S., Wallston, K. A., Kaplan, G. D., & Maides, S. A. (1976). Development and validation of the health locus of control (HLC) scale. *Journal of Consulting and Clinical Psychology, 44*(4), 580.
- Watson, P. W. B., Garety, P. A., Weinman, J., Dunn, G., Bebbington, P. E., Fowler, D., . . . Kuipers, E. (2006). Emotional dysfunction in schizophrenia spectrum psychosis: The role of illness perceptions. *Psychological Medicine, 36*(6), 761-770.
- Weinman, J., Petrie, K., Moss-Morris, R., & Horne, R. (1996). The illness perception questionnaire: a new method for assessing the cognitive representation of illness. *Psychology and Health, 11*(3), 431-445.
- Wiesjahn, M., Jung, E., Lamster, F., Rief, W., & Lincoln, T. M. (2014). Explaining attitudes and adherence to antipsychotic medication: The development of a process model. *Schizophrenia Research and Treatment, (341545)*.
- Williams, K., & Steer, H. (2011). Illness perceptions: are beliefs about mental health problems associated with self-perceptions of engagement in people with psychosis? *Behavioural and Cognitive Psychotherapy, 39*(2), 151-163.
- Wing, J. K., Cooper, J., & Satorius, N. (1974). *Measurement and Classification of Psychiatric Symptoms*. London: Oxford University Press.
- Witteman, C., Bolks, L., & Hutschemaekers, G. (2011). Development of the illness perception questionnaire mental health. *Journal of Mental Health, 20*(2), 115-125. doi:10.3109/09638237.2010.507685
- World Health Organisation. (2001). *WHODAS II Disability Assessment Schedule: 12-item interviewer administered version*. Geneva: WHO.
- World Health Organization. (1994). Schedule for Clinical Assessment in Neuropsychiatry. *World Health Organization, Geneva, Switzerland*.
- World Health Organization. (2004). *International statistical classification of diseases and health related problems (The) ICD-10*. World Health Organization.

Table 1. Studies included in the analysis

Location	N	Mean Age	Design	Causal belief measure	Outcome	Measure of outcome	Key findings (preferred causal model)	
Lund et al. (1998)	Cape Town	10	35.8	Qualitative	Semi-structured Interview	Treatment attitudes	Interview	Anomaly between explanatory models and preferred mode of treatment (S).

Kulhara et al. (2000)	India	40	32.4	Cross-sectional	SAQ	Treatment-seeking behaviour	PSE-9	Did not comment on relationship between patient beliefs and treatment seeking behaviour.
Sayre (2000)	New York	35	41	Qualitative	Semi-structured interview	Treatment attitudes	Interview	Categories of attribution shape subsequent attitudes toward treatment (P).
Holzinger et al. (2002)	Germany	77		Cross-sectional	Interview on subjective illness theory	Adherence to medication	Self-report compliance	A belief in a biological causal model did not result in less adherence to medication (P).
Lan et al. (2003)	Taiwan	70	35.3	Cross-sectional	The responsible causes of disease	Treatment compliance	Self-reported compliance	Patient's perception of the cause of their illness did not influence drug compliance.
McCabe et al. (2004)	UK	119	34.1	Cross-sectional	SEMI	Psychopathology, Insight, Therapeutic relationship, Treatment satisfaction	BPRS SAI-E MANSA HAS PCSQ HLC	Cause of illness was significantly associated with treatment satisfaction, therapeutic relationship and acceptance of treatment (P).
Van Dorn et al (2005)	USA	104	43.94	Cross-sectional	6 closed questions listing possible reasons	Stigma – perception of dangerousness and desire for social distance	Related questions	Consumers of mental health service report high levels of stigma toward people experiencing psychosis (B).
Mak et al. (2006)	China	162	36	Cross-sectional	Causal dimension scale	Stigma	Self-stigma scale	Consumers who assume a greater level of personal responsibility for their illness

								reported a higher level of self-stigma.
Watson et al. (2006)	UK	100	39.1	Cross-sectional	IPQ	Emotional dysfunction, Treatment adherence	RSE BDI BAI MARS	External causal attributions were negatively associated with self-reported medication adherence. Specific causal attributions related to emotional variables.
Charles et al. (2007)	India	100	32.95	Cross-sectional	SEMI	Stigma and treatment attitudes	CESQ PANSS Clinical details	Belief in disease model of mental illness associated with increased stigma. Belief in spiritual causes was not associated with less trust in treatment with medication (E).
Conrad et al (2007)	Jordan Germany	47	38.2	Cross-sectional	Semi-structured interview CBQ	Treatment attitudes	Illness concept scale for schizophrenia patients	Endorsement of non-biological causal models was not associated with less trust in medication (P).
Broadbent et al. (2008)	New Zealand	203	40.86	Cross-sectional	IPQ	Help-seeking	Visits to GP	Causal models were associated with subsequent help-seeking behaviour (P).
Huguelet et al. (2010)	Geneva	115	37	Cross-sectional	Semi-structured Interview	Clinical outcome, adherence,	PANSS CGI GAF WHOQOL	Religious explanatory models were not associated with clinical or social outcome or adhesion to treatment.

Burns et al. (2011)	South Africa	54	25.9	Cross-sectional	Semi-structured Interview	DUP, AO, positive and negative symptoms.	DUP	Causal attributions were associated with subsequent DUP and number of negative symptoms (S).
Rusch et al. (2010)	Chicago	85	44.8	Cross-sectional	Semi-structured	Stigma	Social Distance Scale Attribution Questionnaire BIAT	Endorsement of genetic explanatory models associated with implicit and explicit aspects of stigma.
Johnson et al. (2012)	India	131	29.5	Cross-sectional	SEMI	Remission, global functioning, psychopathology, insight	PANSS BPRS WHODAS Clinical details SAI-	Non-medical explanatory models were negatively correlated with outcome at 5 year follow up. Disease models were associated with remission at 5 year follow-up (S).
Napo et al. (2012)	Mali	15	NS	Qualitative	Semi-structured Interview	Treatment attitudes	Interview	Explanatory models influenced patients' symptom presentation, social interactions and expectations toward therapy (S).
Freeman et al. (2013)	UK	92	39.1	Cross-sectional	IPQ	Take-up of therapy	R-CTPAS	Indications that beliefs about cause of illness contributes to take-up of CBT (P).
Johnson et al. (2014)	India	131	29.5	Cross-sectional	SEMI	Global functioning	PANSS WHODAS Clinical details	Patient's beliefs about their illness were associated with disability at 5 year follow up.

Marcus et al. (2014)	UK	56	42.4	Cross-sectional	M-IPQ	Engagement and response to therapy	Clinical outcome Higher levels of conviction and belief inflexibility	Causal attributions were not associated with clinical outcome/response to CBT.
Wiesjahn et al. (2014)	Germany	84	38.3	Cross-sectional	IPQS	Attitude and adherence to medication	MAQ BMQ	More endorsement of biological model and less approval of psychosocial causes were associated with more positive attitudes toward medication.

NS = not stated; BAI = Beck Anxiety Inventory; BDI = Beck Depression Inventory; BPRS = Brief Psychiatric Rating Scale; BMQ = Beliefs about Medicine Questionnaire; CESQ = Consumers Experience of Stigma Questionnaire; CGI – Clinical Global Impression Scale; DUP = Duration of Untreated Psychosis; GAF = Global Assessment of Functioning; HAS = Helping Alliance Scale; HLC = Health Locus of Control; IPQ = Illness Perception Questionnaire; MANSA = Manchester Short Assessment of Quality of Life; MARS = Medication Adherence Rating Scale; MAQ = Medication Adherence Questionnaire; PCSQ = Patient Care Satisfaction Questionnaire; PANSS = Positive and Negative Syndrome Scale; PSE-9 = Present State Examination; R-CTPAS = Revised Cognitive Therapy for Psychosis Adherence Scale; RSE = Rosenberg Self-Esteem Scale; SAI = Schedule for Assessment of Insight into Psychosis; SAQ = Spiritual Attitude Questionnaire; SEMI = Short Explanatory Model Interview; WHODAS = World Health Organisation Disability Assessment Schedule; WHOQOL = World Health Organisation Quality of Life.