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The weeks before 100 persecutory delusions: the presence of many potential contributory causal factors

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Background

The period before the formation of a persecutory delusion may provide causal insights. Patient accounts are invaluable in informing this understanding.

Aims

To inform the understanding of delusion formation, we asked patients about the occurrence of potential causal factors – identified from a cognitive model – before delusion onset.

Method

A total of 100 patients with persecutory delusions completed a checklist about their subjective experiences in the weeks before belief onset. The checklist included items concerning worry, images, low self-esteem, poor sleep, mood dysregulation, dissociation, manic-type symptoms, aberrant salience, hallucinations, substance use and stressors. Time to reach certainty in the delusion was also assessed.

Results

Most commonly it took patients several months to reach delusion certainty ($n = 30$), although other patients took a few weeks ($n = 24$), years ($n = 21$), knew instantly ($n = 17$) or took a few days ($n = 6$). The most frequent experiences occurring before delusion onset were: low self-confidence ($n = 84$); excessive worry ($n = 80$); not feeling like normal self ($n = 77$); difficulties concentrating ($n = 77$); going over problems again and again ($n = 75$); being very negative about the self ($n = 75$); images of bad things happening ($n = 75$); and sleep problems ($n = 75$). The average number of experiences occurring was high (mean 23.5, s.d. = 8.7). The experiences clustered into six main types, with patients reporting an average of 5.4 (s.d. = 1.0) different types.

Conclusions

Patients report numerous different experiences in the period before full persecutory delusion onset that could be contributory causal factors, consistent with a complex multifactorial view of delusion occurrence. This study, however, relied on retrospective self-report and could not determine causality.

Declaration of interest

None.

Keywords

Worry; self-esteem; aberrant salience; dissociation; sleep problems.

Many key insights into mental health disorders have been gained from patient accounts. Aaron Beck's intuition that 'there is more on the surface than meets the eye' helped him recognise that patients' conscious negative thoughts were central to the cause of depression.[1] Beck noted in his influential descriptive paper on depression that 'The thinking-disorder typology outlined is similar to that described in studies of schizophrenia'. Theorists seeking to pinpoint a central core dysfunction in schizophrenia often cite patient accounts. Kapur, in outlining the hypothesis that delusions arise from dopamine-driven abnormal salience, writes: 'patients report experiences such as, "'I developed a greater awareness of…My senses were sharpened. I became fascinated by the little insignificant things around me'"; "Sights and sounds possessed a keenness that he had never experienced before"; "'It was as if parts of my brain awoke, which had been dormant'"; or "'My senses seemed alive…. Things seemed clearcut, I noticed things I had never noticed before'"".[2] Patient subjective accounts can be an important part of the process of developing understanding of mental health difficulties. In this report we sought to gain potential causal insights by systematically assessing patient views about the period prior to the onset of their persecutory delusion.

The theoretical understanding of persecutory delusions

The questions asked of patients concerning the period before full delusion onset were informed by a multifactorial cognitive model that conceptualises persecutory delusions as unfounded threat beliefs.[3] The threat beliefs are hypothesised to explain subjectively anomalous (internal or external) experiences that occur at a time of stress. The types of anomalous internal experiences that can be misinterpreted are varied, including unexplained anxious arousal, dissociation, manic-type feelings and symptoms, aberrant salience and hallucinations. The anomalous experiences are appraised threateningly because of emotional processes (such as excessive worry, negative self-beliefs and images, and poor sleep) and reasoning biases (such as a failure to consider alternative explanations, jumping to conclusions). The causal mechanisms are clear in this theoretical account: worry brings implausible ideas to mind, keeps them there and elaborates the content; low self-esteem (negative self-beliefs) leads the person to feel inferior and vulnerable to harm from others; negative images (sometimes trauma-related) lead to overestimation of danger; subjectively anomalous internal states provoke fearful and unusual explanations; and disrupted sleep increases negative affect, mood dysregulation and the anomalous internal states. Cannabis, implicated in the occurrence of

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psychosis, has been shown to increase paranoia via producing negative affect and anomalous experiences.[4] Most of the causal mechanisms highlighted are trans-diagnostic: they will exacerbate any type of mental health problem. The importance of shared aetiological causes is consistent with the idea of a general factor that increases liability for all major psychiatric disorder.[5]

Early signs studies

There is, of course, an empirical literature on prodromal symptoms and early warning signs for the occurrence of psychotic episodes in general, although not persecutory delusions in particular. It is an area of obvious methodological challenge (for example difficulties in defining onset and relapse, establishing temporal sequences, allowing for individual variability) and typically the studies have been observational and not guided by theory. For instance, the Early Signs Scale (ESS) was developed from open-ended questions to family members about the period before their relative's relapse.[6] The most commonly reported signs preceding relapse using this scale are sleep problems, anxiety, irritability and withdrawal. It is likely, however, that this method of item generation will have missed many experiences. In a prospective study using the ESS, Jørgensen[7] found that sleep problems, feeling unable to cope and anxiety occurred before the re-emergence of delusions in general in a group of 131 patients with schizophrenia.

Patients generally identify a number of factors contributing to the development of their experiences.[8] A few studies are exceptions in that they have been theoretically guided. For example, Bechdolf and colleagues[9] in a study of 27 patients with schizophrenia found that all recollected experiencing 'basic symptoms' (typically subtle changes in thought and perception) before relapse. Gumley *et al*[10] in a study of 83 patients with schizophrenia found that fear of relapse (for example 'I have been worrying about my thoughts' 'I have been worrying about losing control') predicted new episodes of psychosis. Møller & Husby[11] argue that there are two core experiential dimensions of prodromes: 'disturbance of perception of self' (such as 'Painful emotional indifference and distance to myself') and 'extreme preoccupation by and withdrawal to overvalues ideas' (such as 'Occupied by, and scrutinising, my inner world'). An alternative approach to the study of the period before psychotic episodes has been the focus on a subgroup of people who are at 'ultra-high risk of psychosis'.[12] In this work, the assessment of factors such as sleep disturbance and recent level of functioning have been found to predict subsequent transition to psychotic disorders.[13] The occurrence of 'delusional mood' has also been highlighted by Jaspers and others.[14]

The current study

In this study we focused upon the period of onset of one specific psychotic experience – persecutory delusions – as factor analysis repeatedly finds the independence of psychotic experiences.[15,16] We used a specific theoretical model of persecutory delusions to guide the questions asked of patients.[3] Theoretical factors from the model for which self-report has validity were chosen. The questions were designed to ask about: worry, negative images, low self-esteem and depression, poor sleep, dissociation, mood dysregulation, manic-type symptoms, aberrant salience, hallucinations, substance use and stressors. We asked patients to recall the period before they were certain of their current persecutory beliefs. The objective was to systematically capture patient views on the occurrence of a wide range of putative causal factors in order to identify the most prevalent. We also sought to determine the main underlying dimensions present among these potentially overlapping factors.

Method

Participants

A total of 100 patients with persistent persecutory delusions in the context of non-affective psychosis took part in the study during the baseline assessment for the Feeling Safe Trial.[17] The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. All procedures involving human patients were approved by an NHS Research Ethics Committee (South Central – Oxford B Research Ethics Committee; ref 15/SC/0508). Written informed consent was obtained from all patients. The inclusion criteria were: aged 16 years or above; persistent (at least 3 months) persecutory delusion (as defined by Freeman & Garety[18]), currently held with at least 60% conviction; and a primary diagnosis of schizophrenia-spectrum psychosis (non-affective psychosis).

The exclusion criteria were: current receipt of another psychological therapy; insufficient comprehension of English; primary diagnosis of alcohol, drug or personality disorders; being treated in forensic services; diagnosis of organic syndrome; or a significant intellectual disability. Ten additional patients in the first cohort entering the trial said that they could not recall the period before delusion onset and therefore did not take part in this study; these individuals did not differ in age, $n = 110$, $t(108) = -0.761$, $P = 0.448$, or gender, $n = 110$, $\chi^2(1) = 0.303$, $P = 0.582$, from those who took part in the study.

Assessments

Basic demographic and clinical data were collected (for example age, gender, ethnicity, employment status, diagnosis from clinical records).

Psychotic Symptom Rating Scales – delusions (PSYRATS)

The PSYRATS – delusions scale[19] is a six-item multidimensional measure. It assesses the conviction, preoccupation, distress and disruption associated with a delusion. The delusion is rated over the last week. Higher scores indicate greater severity. The scale was also used to obtain a rating on a 0 (do not believe it) to 100 (absolutely convinced) percentage scale for how much the individual currently believed the persecutory belief.

Checklist

The 47-item checklist was developed for the study (the items can be seen in Table 1) to be used simply as a tool to capture patient descriptions. First, a list of categories was generated from the theoretical model. These were categories for which self-report would be possible: worry, negative images, low self-esteem and depression, poor sleep, dissociation, mood dysregulation, manic-type symptoms, aberrant salience, hallucinations, substance use and stressors. Second, item content for each category was produced drawing upon patient accounts, the published literature, the authors' clinical experience and existing scales measuring particular concepts (for example the Dunn Worry Questionnaire;[20] Aberrant Salience Inventory;[21] Cardiff Anomalous Perceptions Scale;[22] Cambridge Depersonalisation Scale[23]). Two items also assessed the absence of any difficulties (such as 'I was feeling perfectly fine'). At the top of the checklist, patients were informed that 'This questionnaire asks about the weeks before you knew for sure that other people were trying to harm you'. Participants were first asked the length of time that it had taken to reach certainty in the delusion (years/several months/a few weeks/a few days/instantly). Then participants

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Table 1 Endorsement of checklist items

Item	*n*
Length of delusion onset	
It took years to be certain what was occurring.	21
There was a build up over several months in trying to be sure what was going on.	30
There was a build up over a few weeks in trying to be sure what was going on.	24
There were a few days working out exactly what was happening to me.	6
I knew instantly that others were definitely trying to harm me, there was no build up at all. Things just changed in a day.	17
Missing data	2
Worry	
I'd been worrying a lot.	80
In my mind I had been going over problems again and again.	75
I'd been worrying about losing control.	59
I'd been worrying that I couldn't control my thoughts as well as I would like.	68
Any of these items.	94
Images	
I kept having images in my mind of bad things happening.	75
Low self-esteem and depression	
I felt very negative about myself.	75
I felt inferior to others.	66
My self-confidence got really low.	84
I just didn't feel like my normal self.	77
I felt like I would make a fool of myself in front of others.	59
I was tormented by something, though I didn't know what it was.	62
I became more passive and withdrawn.	58
Any of these items.	95
Poor sleep	
I was having problems getting or staying to sleep.	75
I was sleeping at all the wrong times.	37
I was having nightmares.	50
I did not feel that I needed any sleep at all.	21
Any of these items.	85
Dissociation	
I felt strange, as if I were not real or as if I were cut-off from the world.	62
My surroundings felt detached or unreal, as if there was a veil between me and the outside world.	54
I felt automatic and mechanical as if I were a robot.	25
I became preoccupied with my own world	65
Any of these items.	82
Mood dysregulation	
My mood was very up and down.	66
It was hard to control my emotions.	67
Any of these items.	80
Manic symptoms	
I was highly excitable.	25
I had difficulties concentrating.	77
My thoughts were jumping around too much.	76
I had so many thoughts that I couldn't keep track.	59
Any of these items.	87
Aberrant salience	
I was analysing everything in great detail.	72
I became interested in people, events, places, or ideas that normally would not make an impression on me.	33
My senses were sharpened. I became fascinated by the little insignificant things around me.	54
Sights and sounds possessed a keenness that I had never experienced before.	34
My senses seemed alive. Things seemed clear cut, I noticed things I had never noticed before.	46
Certain trivial things suddenly seemed especially important or significant to me.	70
Any of these items.	92
Hallucinations	
I heard noises or sounds when there was nothing about to explain them.	63
I saw shapes, lights or colours even though there was nothing really there.	33
I began to hear voices that were hard to explain.	56
Sounds were distorted in strange or unusual ways.	30
Any of these items.	78
Substance use	
I was smoking cannabis (or taking other drugs).	18
I was drinking quite a lot of alcohol.	23
Any of these items.	32
Stressors	
I was being bullied.	44
Someone close to me died.	18
I had left home.	17
My relationship had ended with my boyfriend/girlfriend.	19
There were lots of arguments occurring.	31
I left school or university or my job.	23

(*Continued*)

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Table 1 (*Continued*)

Item	*n*
There were lots of stresses in my life.	69
Any of these items.	83
Absence of changes	
There was nothing unusual at all in the period before.	7
I was feeling perfectly fine.	9
Any of these items.	13

simply ticked the checklist items that had occurred ('Please tick the box next to any statements below which describe experiences you had in the weeks before you were sure').

Analysis

The main reporting was descriptive, providing the frequency of endorsement of each item and category. This was carried out with SPSS Version 22.0.[24] To examine the presence of underlying dimensions connecting the checklist items, exploratory factor analysis (EFA) was conducted in R[25] using the package 'psych'.[26] Factor analysis was appropriate as Bartlett's test of sphericity was significant ($\chi^2 = 29\,763.2$, d.f. = 990, $P<0.001$) and the Kaiser–Meyer–Olkin (KMO) test of sampling adequacy was adequate (KMO = 0.67). The two items that assessed absence of any difficulties were not included in the factor analysis. As the item responses were binary (yes/no), EFA was conducted on the tetrachoric correlation matrix of the remaining 45 items with Oblimin rotation to allow for correlated factors. Parallel analysis and the scree plot were used to guide the number of factors to extract.[27,28]

Results

Participants

The average age of the participants was 42.1 years old (s.d. = 11.8). There were slightly more men ($n = 59$) than women ($n = 41$). The diagnoses from clinical records were schizophrenia ($n = 65$), schizoaffective disorder ($n = 16$), delusional disorder ($n = 3$), psychosis not otherwise specified ($n = 16$). The ethnicities were: White ($n = 83$), Black Caribbean ($n = 7$), Pakistani ($n = 3$), Black African ($n = 2$), Indian ($n = 2$), Black other ($n = 1$), Chinese ($n = 1$), and other ($n = 1$). Most participants were single ($n = 69$), with others married or in a civil partnership ($n = 20$), cohabiting ($n = 1$) or divorced ($n = 10$). The majority were unemployed ($n = 76$). Levels of the current persecutory delusions were high (mean PSYRATS total = 18.5, s.d. = 2.6), with the average degree of conviction with which the beliefs were now held being 87.7% (s.d. = 12.4). In total, 97 patients were currently prescribed antipsychotic medication.

Checklist endorsement

The endorsement of checklist items is shown in Table 1. The average number of checklist items endorsed (not including the two absence of changes items) was 23.46 (s.d. = 8.73) (minimum, 0, maximum, 40). The extent of endorsement did not vary by the five categories for the length of time of delusion onset (d.f. = 4.93, $F = 0.78$, $P = 0.542$). For example, those patients who reported instantly knowing that others were harming them still reported an average of 20.1 (s.d. = 10.9) checklist items, whereas those who took several months to reach certainty reported an average of 24.3 (s.d. = 8.4) checklist items. Only one patient did not endorse any of the checklist items (apart from the absence of changes items). The categories most endorsed were low self-esteem and depression ($n = 95$), worry ($n = 94$), aberrant salience ($n = 92$), manic symptoms ($n = 87$) and poor sleep ($n = 85$). All categories – apart from substance use and an absence of changes – were endorsed by a large majority of the patients.

Clustering of checklist items

The initial EFA identified that three items (bereavement, cannabis use and excessive alcohol drinking) did not cluster with the other items and were better explained as single items. The three items were removed and the EFA was repeated on the remaining 42 items. The EFA identified a six-factor structure that explained 58% of the variance. Items for each factor are shown in bold in Table 2 (items with cross-loadings over 0.3 are retained for descriptive purposes). The six factors represented 'worry and negative self-thoughts' (9 items), 'aberrant salience and mania' (9 items), 'disorganised thoughts and emotions' (8 items), 'stressful events' (6 items), 'perceptual anomalies and sleep problems' (5 items) and 'dissociation' (5 items). The correlations between the six factors were low (see Table 3), although there were cross-loadings above 0.3 for 14 out of 42 items, indicating overlap in the factors for a number of items. Patients endorsed items from an average of 5.41 (s.d. = 1.00, minimum, 0, maximum, 6) of the six different factors. A total of 62 patients endorsed items from all six factor types, 26 patients endorsed items from five factor types, 7 patients endorsed items from four factor types, 3 patients endorsed items from three factor types, 1 patient endorsed items from two factor types and 1 patient endorsed items from none of the factor types.

Discussion

Main findings

The study provides a unique snapshot from patients of the period before the onset of a current persecutory delusion. We consider that patient experiences, especially when systematically assessed, are an important part of the process of gaining understanding. For the majority of patients there was a lengthy period of figuring out what was occurring before they reached certainty in the delusional belief. And the period before delusion onset for all patients – apart from one – was clearly psychologically very charged. Most of the different types of potential causal factors identified from the theoretical model were occurring in most patients. Patients were dealing with low self-esteem, worry, poor sleep and stressors; a wide range of subjectively unusual experiences were also occurring, including dissociation, aberrant salience and hallucinations. The factor analysis indicated that there were six main clusters of experiences in the build up to the delusion, and each of these types occurred in the majority of the patients. Our view is that the snapshot captures a representation of the complex causal pattern involved in the occurrence of delusional beliefs.

The high rate of endorsement of the checklist items indicates that the theoretical model of persecutory delusions fits well with the experiences of patients. However, the potential causal effects on delusion formation of the factors reported by the patients

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Table 2 Item loadings from the factor analysis

	Worry and negative self-thoughts	Disorganised thoughts and emotions	Aberrant salience and mania	Dissociation	Stressors	Perceptual anomalies and sleep problems
1. I'd been worrying a lot.	**0.934**					
2. In my mind I had been going over problems again and again.	**0.482**					
9. I'd been worrying about losing control.	**0.458**	0.356				
16. I felt very negative about myself.	**0.546**	0.415				
17. My self-confidence got really low.	**0.800**					
18. I felt inferior to others.	**0.406**	0.365				
19. I just didn't feel like my normal self.	**0.336**			0.310		
21. I felt like I would make a fool of myself in front of others.	**0.383**					
43. I became more passive and withdrawn.	**0.418**					
3. I was analysing everything in great detail.			**0.324**			
4. I became interested in people, events, places, or ideas that normally would not make an impression on me.			**0.730**			
5. My senses were sharpened. I became fascinated by the little insignificant things around me.			**0.579**			
6. Sights and sounds possessed a keenness that I had never experienced before.	0.414		**0.677**			
7. My senses seemed alive. Things seemed clear cut, I noticed things I had never noticed before.			**0.708**			
8. Certain trivial things suddenly seemed especially important or significant to me.			**0.611**			
15. I did not feel that I needed any sleep at all.			**0.484**			
13. I was sleeping at all the wrong times.			**0.367**			
24. I was highly excitable.			**0.522**	0.336		
10. I'd been worrying that I couldn't control my thoughts as well as I would like.		**0.502**	0.307			0.379
20. I was tormented by something, though I didn't know what it was.		**0.437**				
22. My mood was very up and down.		**0.501**		0.373		
23. It was hard to control my emotions.	0.332	**0.500**			0.315	
28. I began to hear voices that were hard to explain.		**0.472**				0.319
33. I had difficulties concentrating.		**0.536**				
34. My thoughts were jumping around too much.		**0.843**				
35. I had so many thoughts that I couldn't keep track.		**0.630**				
12. I was having problems getting or staying to sleep.	0.378					**0.460**
14. I was having nightmares.						**0.568**
25. I heard noises or sounds when there was nothing about to explain them.						**0.879**
26. I saw shapes, lights or colours even though there was nothing really there.						**0.456**
27. Sounds were distorted in strange or unusual ways.						**0.404**
11. I kept having images in my mind of bad things happening.	0.315			**0.404**		
29. I felt strange, as if I were not real or as if I were cut-off from the world.				**0.859**		
30. My surroundings felt detached or unreal, as if there was a veil between me and the outside world.				**0.622**		
31. I felt automatic and mechanical as if I were a robot.				**0.664**		
32. I became preoccupied with my own world.				**0.470**		
36. I was being bullied.	0.374				**0.412**	
38. I had left home.					**0.892**	
39. My relationship had ended with my boyfriend/girlfriend.					**0.687**	
40. There were lots of arguments occurring.					**0.690**	
41. I left school or university or my job.					**0.555**	
42. There were lots of stresses in my life.	0.340		0.320		**0.354**	

Table 3 Factor correlations

	1	2	3	4	5
1. Worry and negative self-thoughts.	–				
2. Disorganised thoughts and emotions.	0.34				
3. Aberrant salience and mania.	0.15	0.10			
4. Dissociation.	0.18	0.27	0.13		
5. Stressful events.	0.21	0.13	0.25	0.11	
6. Perceptual anomalies and sleep problems.	0.16	0.27	0.09	0.27	0.03

cannot be determined in this study. Many of these factors may also have had reciprocal relationships with subthreshold psychotic experiences. There is also likely to be a degree of shared genetic propensity.[29] However it is notable that several of the factors identified as present before delusion formation are also established contributors to delusion maintenance. For example, there are data from randomised controlled trials that demonstrate that treating worry,[30] insomnia,[31] and low self-esteem[32] all lead to reductions in paranoia.[33] Furthermore, a recent cross-sectional study with 1800

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patients with psychosis show not only high rates of these difficulties but that patients would like them targeted in treatment.[34] It is likely that many of the factors that maintain delusions are also involved in the causal picture at delusion formation.

Limitations

There are clear limitations to the study. The most obvious is that the study relied on retrospective self-report, with a variable length of time having passed since delusion onset. Recall may have been biased by the study questions, current presentation, difficulties in recollection and variability in the extent to which each experience is likely to be noticed at the time. A lengthy checklist was used but it was still only a limited number of experiences that were assessed. It would have been beneficial to have had patient input into the design of the checklist. The checklist was designed as a tool to capture patient experience and was not a validated questionnaire. If there was a prospective study – which is a challenging research method to carry out on this topic – then it would be sensible to use validated questionnaires for each factor rather than such a checklist.

Whether any of the experiences are specific to the development of a delusion or are simply implicated in most mental health conditions remains to be determined. The study group is reasonably representative of individuals currently seen in treatment services in the UK but it is unlikely to be representative of all presentations of persecutory delusions. Nonetheless we believe that the study provides a novel insight from patients into the complex, difficult and often confusing subjective experience of the period before the full onset of a persecutory delusion. It both informs our theoretical understanding but also highlights potential targets for intervention.

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