

Clinical significance of psychotic-like experiences in children and adolescents

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Summary

Psychotic-like experiences (PLEs) are subtle, subclinical hallucinations and delusions which are quite common in general population. In children and youth prevalence rate is probably age-dependent with higher rate in younger population. PLEs are suggested to be a form of extended psychosis phenotype. Similar demographic, genetic and environmental risk factors observed for PLEs and schizophrenia support this hypothesis. Other mental health problems associated with PLEs include depression, suicidality, low functioning and psychiatric comorbidity. PLEs may be a risk factor for psychosis, but probably only for a minor subgroup of population. It is possible, however, that PLEs are a risk factor for different psychiatric disorders. In the majority of children and adolescents PLEs disappear over time. PLEs are supposed to be a heterogenic phenomenon with different subtypes: associated with psychosis risk, associated with other psychiatric disorders and being within the normal range of experiences. Due to lack of widely acknowledged PLEs definition and because of substantial diversity of research methodology interpretation of the previous research should be made with caution.

Key words: psychotic-like experiences, child and adolescent psychiatry, schizophrenia

Psychotic-like experiences

Psychopathological symptoms traditionally has been divided into two main groups: qualitative and quantitative abnormalities. Hallucinations and delusions were considered examples of sensations qualitatively different from the range of healthy people's experiences. Modern classification systems ICD-10 and DSM-5 based on atheoretical, descriptive, operationalized diagnostic criteria did away with the classic psychopathology paradigm [1, 2]. In these classifications the differentiation between normal and pathological mental state is not based on the type of symptoms, but on the

threshold of symptoms' severity, caused distress and functional impairment. In line with this concept is research focusing on the psychosis continuum. Subtle, subclinical symptoms described as psychotic-like experiences (PLEs) seem to be quite common in general population. One of the interpretations of this phenomenon is the concept of extended psychosis phenotype.

Van Os et al. [3] reviewed 47 articles including mainly adult samples. The authors of the meta-analysis conclude that the prevalence of subclinical psychotic symptoms in general population is about 8% and the prevalence of clinically significant psychotic symptoms is about 4%. Despite distress caused by psychotic symptoms, diagnosis of any full-blown psychotic disorder may be established only in the subgroup of these subjects. Prevalence observed in the previous studies depended on used methodology. Prevalence rate is higher if the assessment is based on symptoms reported by study participants and lower when assessment of PLEs is interviewer-based.

To my best knowledge there are no data concerning PLEs prevalence in the Polish general population. However, in the Polish adult samples subclinical hallucinations and delusions were studied by Gawęda et al. [4, 5].

Research tools

In the assessment of so subtle and subjective experiences in so vulnerable and suggestive subjects like children the study design and methodology of the assessment process may have significant impact on the obtained results. Systematic review of the PLEs studies was performed by Lee et al. [6]. In the 76 analyzed articles, 41 psychometric tools were used. Most common were the Magical Ideation Scale (MIS), the Community Assessment of Psychic Experiences (CAPE) and the Launay–Slade Hallucination Scale (LSHS). All three tools are self-assessment questionnaires. In some of the reviewed papers PLEs criteria were predefined, in most of the articles (67%), however, no threshold criteria were used. Eight (10%) papers were more detailed and assessed specific subtypes of PLEs like auditory experiences or thought disorder. The authors of the review conclude that the diversity of used methodology is associated with lack of the gold standard in the PLEs definition and assessment. The main factor contributing in this situation is incomplete understanding of this complex phenomenon.

It is also possible that the research methodology diversity represents the diversity in the research projects. Some studies are explorative and assess prevalence, course or correlates of PLEs [e.g., 7, 8]. Other studies are focused on the verification or falsification of psychosis continuum hypothesis [e.g., 9]. Another area of research is based on the assumption that PLEs are the part of extended psychosis phenotype. In these research studying subjects with PLEs is aimed to improve our understanding of schizophrenia and other psychotic disorders [e.g., 10].

Psychotic-like experiences as an extended psychosis phenotype

If PLEs are a part of extended psychosis phenotype, risk factors associated with PLEs should be similar to that associated with schizophrenia. According to van Os et al. [3] it indeed seems to be so. Confirmed risk factors include demographic (young age, lower educational level, unemployment, minority status, lower income, being single, male sex) and environmental (psychoactive substances abuse, stress, urbanity) components. Similarly as in the full-blown psychoses there was familial coincidence of PLEs, higher rate of PLEs in relatives of schizophrenic subjects and association between PLEs and cognitive dysfunctions. Another way of confirming the schizophrenia-like nature of PLEs is comparison of prevalence of both analyzed disorders. If in some population the prevalence of psychotic disorders is higher it may be expected that symptoms associated with extended phenotype in this population will also be more common. If in the defined area psychoses are less prevalent, extended phenotype symptoms should be also less common. In the population study NEMESIS data from five areas with different level of urbanization were analyzed. Indeed, in the areas with higher urbanization level in the dose-dependent manner both psychoses and PLEs were more prevalent [3, 9].

Next question is how whether the occurrence of PLEs is associated with a greater risk of developing a full-blown psychosis. It is suggested that psychotic-like experiences are persistent in about 20–30% of subjects. Conversion rate is assessed to be about 0.6% each year [11].

In this area of research psychotic-like experiences are usually described as a part of “extended psychosis phenotype”. Nevertheless most of the studies are actually focused on the extended schizophrenia phenotype. In the current article I would like to focus on children and adolescents experiencing PLEs because of specific difficulties in the diagnostic process in this age group and because of specificity of early-onset psychoses which are, by the way, not limited to schizophrenia.

Studies including child and adolescent samples

Prevalence

A meta-analysis of nineteen studies focusing on children and youth published up to 2011 was conducted by Kelleher et al. [12] and. In the analyzed studies the prevalence of PLEs ranged from 4.7% to 35.5% with the median 17% in the age group 9–12 years and 7% in the age group 13–17 years. The prevalence, however, is only one of the issues important in this area of research.

PLEs as an extended psychosis phenotype

Factors associated with PLEs were assessed in a cohort study by Polanczyk et al. [13]. A representative sample of twins was interviewed at the age of 5, 7, 10 and 12 years. During the last interview the presence of psychotic symptoms was assessed. 14% of the sample reported possible psychotic symptoms while certain psychotic symptoms were observed in 6% of subjects. One child was treated due to schizophrenia at the time of the study. The results are in line with extended psychosis phenotype hypothesis. Monozygotic twins were concordant for PLEs more often than dizygotic; this confirms genetic component in the PLEs etiology. Moreover, schizophrenia spectrum disorders, suicides and psychiatric hospitalizations were more common in families of children with PLEs. Known environmental and individual schizophrenia risk factors: urban residence, dysfunctional family, lower birth weight, lower IQ, cognitive impairment and theory of mind deficits were also more common in children with PLEs. Subjects who at age 12 had PLEs, at the age 5 have had more internalization and probably externalization problems along with social isolation and educational difficulties. They also reported more behavioral disorders, anxiety, and depressive symptoms. The PLEs group had also more self-harm behaviors.

Risk factors associated with PLEs similar to that linked with schizophrenia were also observed in the random sample of 5,427 Chinese adolescents [14] who completed the CAPE questionnaire. PLEs were associated with urban residence, family history of psychiatric disorders and traumatic experiences. In 18,000 Japanese adolescents PLEs were studied by Tochigi et al. [15]. The study was focused on the schizophrenia-like symptoms: delusions of broadcasting, persecution and reference as well as voices and cenesthetic hallucinations. This type of PLEs was associated with birth seasonality.

Longitudinal study confirming association between PLEs and follow-up schizophrenia spectrum diagnosis was presented by Poulton et al. [16]. In the cohort study presence of PLEs at age 11 was associated with schizophrenia or schizophreniform disorder diagnosis 15 years later. The psychosis developed in 2% of subjects who at age 11 did not have PLEs, in 9.5% of subjects who had mild PLEs and in 25% of children who had severe PLEs at age 11. Moreover, more than a half of patients who at age 26 had schizophrenia spectrum diagnosis, at age 11 had already subclinical psychotic symptoms.

Also cohort studied by Wigman et al. [17] had been assessed at age 11. Self-assessment questionnaire was completed by subjects at baseline and after approximately 2.5 and 5 years. Four types of PLEs course were observed. First type – more than 80% of subjects – both at the baseline and at the follow-up had low level of PLEs. In the second subgroup high level of PLEs decreased over time. Third subgroup had

increasing level of PLEs. Fourth subgroup (2% of the sample) had high PLEs level at the baseline which yet increased at follow-up. This subgroup consisted of more mental health services users than the other three. Increasing level of PLEs was associated with other psychosis risk factors (cannabis abuse, traumatic experiences, minority status and developmental problems).

PLEs as a non-specific risk factor. Cross-sectional studies

Another area of research analyzes the association between PLEs and other non-psychotic symptoms or disorders. It is suggested that PLEs may be linked to depressive symptoms. The study by Asher et al. [18] supports this hypothesis. In 6,455 12-years old children PLEs were associated with poor social functioning. This link, however, may be explained by concurrent emotional and behavioral problems. In the representative sample of almost 800 Spanish teenagers from Barcelona schools, link between depressive symptoms and different types of PLEs was explored [7]. Subclinical hallucinations and persecution ideation were associated with depressive symptomatology, while no correlation was observed for reference ideation and inverse correlation for grandiosity. Among negative symptoms apathy and avolition but not flat affect were associated with depression. Similarly, Jang et al. [19] in more than 8,000 Korean adolescents observed association between PLEs and depressive and suicidal ideation. The link between PLEs and suicidality might be mediated by depressive symptoms.

Scott et al. [20] observed association between PLEs and numerous factors. In 1,261 Australian teenagers from general population subclinical hallucinations were associated with single parent or reconstructed family, depressive symptoms or diagnosed depression, marijuana abuse and higher score in the Child Behavior Checklist which is a caregiver-rated scale focusing on emotional and behavioral problems. PLEs were also assessed in the representative sample of 5,910 Irish adolescents [8]. Numerous demographic and social factors correlated with PLEs level: ethnicity other than Caucasian, parents problems like: unemployment, lower education level and psychiatric disorders, and at the individual level: stressful live events, emotional problem, psychoactive substances abuse and a number of intrapsychic factors associated with low self-esteem and coping with difficulties. Among demographic factors female sex and younger age were associated with PLEs.

Kinoshita et al. [21] observed a correlation between aggressive behavior and PLEs in 18,000 Japanese adolescents. In the same population association between PLEs and self-harm behavior was also confirmed [22].

Wigman et al. [23] analyzed factorial structure of PLEs. The authors assessed representative sample of 5,422 Dutch adolescents. In this group 95% of teenagers

declared that they experienced PLEs at least once in their life and 43% informed that they experienced PLEs frequently. The authors defined 5 factors, which they named: “paranoia” (persecutive and referential ideation), “grandiosity”, “paranormal beliefs”, “delusions”, “hallucinations”. Factors “hallucinations”, “delusions” and “paranoia” correlated with general psychopathology. The analysis regarding the relation between sex, age and symptoms severity showed more frequent occurrence of PLEs in girls and increased severity with age (what is interesting because in many studies younger age was associated with higher PLEs level). These results were confirmed in another study ($n = 2,230$) which included a sample of adolescents from general population.

Kelleher et al. [24] presented interesting results regarding the link between clinical significance of PLEs and age. Two groups of adolescents: 11–13 and 13–16 years were included to the study. 21% of the younger and 7% of the older sample reported PLEs. Presence of PLEs was associated with emotional and behavioral problems. Clinical significance of PLEs increased with the sample age. Among subjects who reported PLEs in the younger group 49% of children had emotional or behavioral problems with severity which required clinical attention, while in the older group it was 65% of subjects.

PLEs as a non-specific risk factor. Longitudinal studies

Rubio et al. [25] presented a systematic review focusing on hallucination course in children and youth. Eleven papers covering age range 7–18 were analyzed. Prevalence of hallucinations in the studied populations was in the range 4.9–9.0%. Discontinuity rate was from 3.4 to 40.7% per year. Transition to psychosis was assessed only in three studies: psychotic disorders occurred in 1.3%, 0.6% and 0% respectively.

Higher risk of symptoms persistence was associated with higher intensity of PLEs, presence of voices and other concurrent psychopathological symptoms. Low intensity of symptoms and confirmed trigger were associated with discontinuation of PLEs.

Among studies published later than the above-mentioned meta-analysis, it is worth to mention a study by Fisher et al. [26]. An analysis of a cohort of 789 children at age 11 showed that 10% of children had subtle psychotic experiences while 1.7% had more severe psychotic symptoms. Subsequently, the participants were subject to further evaluations at several intervals. The last one described in this paper was made at age 38. The occurrence of PLEs in childhood was associated with schizophrenia diagnosis at follow up, but also with higher risk of post-traumatic stress disorder and suicidality. Out of 13 children with severe psychotic experiences in childhood only 2 did not have any psychiatric diagnosis at age 38. Summing up, PLEs during childhood were associated with higher risk of psychiatric disorders, but the risk was not specific for schizophrenia.

Laurens et al. [27] presented results from longitudinal study on a children cohort from general population who were 9–11 years old at the baseline (questionnaire). The study group included other risk factors in addition to the PLEs: delay in speech development and psychomotor development, and emotional or behavioral problems. This group represented 9.4% of the respondents. During 6 years of follow-up a number of additional difficulties had been observed in this subgroup: cognitive impairment, social withdrawal, more negative life events and higher sensitivity to these events. These difficulties, however, had not – at least by now – been linked to any mental illness. In the subgroup of 547 children from this sample Downs et al. [28] reported persistence of PLEs in two years follow-up in 39% of participants. Persistence of PLEs was associated with higher risk of internalization and externalization problems.

It is worth mentioning that despite confirmed association between PLEs and psychiatric symptoms or disorders, unfavorable PLEs course and outcome usually affects a minority of persons experiencing these symptoms. According to the research published so far in most children and youth from general population PLEs do not have any disadvantageous sequels.

PLEs in clinical population

Simon et al. [29] studied 84 adolescent outpatients. Almost $\frac{2}{3}$ declared subclinical hallucinations. After one year follow-up in 53% of the sample hallucinations stopped and in 14% they decreased. Lower level of global functioning at baseline was associated with persistence of PLEs. The association between diagnosis and persistence of hallucinations unfortunately was not discussed. Psychotic-like experiences in the inpatient sample were assessed by Kelleher et al. [30]. Subgroup with PLEs was compared to inpatients without PLEs. Presence of PLEs was associated with lower psychosocial functioning, suicidality and psychiatric comorbidity. The results of two studies described above suggest that PLEs are a risk factor of more severe course of psychiatric disorders without obvious link to the conversion to psychosis.

Discussion

Psychopathology

It is worth recalling here the traditionally understood basis of psychopathology. In the main Polish psychiatry textbook [31] hallucinations are defined as follows: “perception of actually non-existing object, accompanied by incorrect acknowledgment of the objects as real” (p.343). Following the same textbook, delusions are: “1. False. 2. Associated with illness. 3. Associated with extreme feeling of obviousness.

4. Uncorrectable” and also “5. With a socially alienating content” (not culturally-determined, p. 351) [translation BR].

Of course the term “psychotic-like experiences” implies that PLEs and psychotic symptoms are not equivalent. It is not clear, however, what exactly PLEs are. Most common questionnaires neither assess acknowledgement of the hallucinated objects as real or illusory, nor is focused on the correctability of delusions. In some studies PLEs assessment was based not only on subject’s report but was also verified by researcher. It is, however, not explained whether among the verification criteria was incorrect attribution of abnormal perceptions. Significance of this part of diagnosis is confirmed by the study of Bartels-Velthuis et al. [32] where external attribution of experienced subclinical auditory hallucinations was one of the factors associated with persistence of PLEs.

A conclusion [33] that PLEs are heterogenic complex concept with differentiated course and antecedents seems to be justified. Yung et al. [34] believe that three domains of PLEs may be described: (1) PLEs associated with neurodevelopmental component and psychosis risk; (2) “clinical noise” associated with non-psychotic disorders; and (3) experiences being within normal range and not associated with any psychiatric complaint.

Specificity of child and adolescent diagnosis

Mental state examination in children and youth is associated with some difficulties which are specific for this age group. One of them is cognitive and emotional immaturity, another – partially associated with the immaturity – limited insight into intrapsychic processes. These difficulties, which are common in clinical practice, were also observed in research on PLEs. In the study by Thapar et al. [35] at age eleven 18% of children declared that they had had experienced PLEs at least once in their life. Five years later, at age 16, only 8% of the same sample declared experiencing PLEs anytime (among others before the previous examination). Another important issue is methodology. In some of the studies assessment of PLEs was based on the self-rating questionnaire. Completing any questionnaire requires reading with comprehension ability. In the international PISA study 10.6% of Polish pupils had absolutely inadequate reading and interpretation skills, moreover, in many European countries this rate was between 15 and 20% or even higher [36]. Consequently, both specificity of child and adolescent age group and limitations of psychometric tools contribute to difficulties in univocal interpretation of the previous research results.

Recapitulation

1. Psychotic-like experiences seem to be common in children and youth in general population and in majority of the samples spontaneously remit.
2. PLEs may be associated with other psychopathological symptoms including depressive and suicidal ideation. A subtype of PLEs is probably associated with a risk of transition to psychotic disorder, especially schizophrenia spectrum disorder. In general, PLEs seem to be a risk factor for different psychiatric disorders.
3. Higher level of PLEs is associated with higher risk of symptoms persistence and psychotic conversion (practical significance of this observation seems to be limited; the principle that higher level of symptoms is associated with more severe illness course is quite universal in medicine).
4. The absence of explicit, widely accepted PLEs definition and different PLEs conceptions affecting research methodology make the interpretation of results published so far difficult.
5. In general, studies focusing on PLEs being a part of extended psychosis phenotype confirm this hypothesis.
6. Previous studies focusing on PLEs as a part of normal development or a non-specific risk factor of non-psychotic disorders have been mainly exploratory. Further studies undoubtedly are warranted. In deepening, however, our understanding of PLEs phenomenon conceptualization of PLEs construct and research focused on verification or falsification of specific hypotheses would be valuable.

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