Psychotic symptoms in adolescence index risk for suicidal behavior: findings from 2 population-based case-control clinical interview studies.

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Psychotic Symptoms in Adolescence Index Risk for Suicidal Behavior

Findings From 2 Population-Based Case-Control Clinical Interview Studies

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Context: Recent evidence from both clinical and population research has pointed to psychotic symptoms as potentially important markers of risk for suicidal behavior. However, to our knowledge, there have been no epidemiological studies to date that have reported data on psychotic symptoms and suicidality in individuals who have been clinically assessed for suicidal behavior.

Objectives: To explore associations between psychotic symptoms in nonpsychotic adolescents and risk for suicidal behavior in (1) the general population, (2) adolescents with psychiatric disorder, and (3) adolescents with suicidal ideation.

Design: Two independently conducted case-control clinical interview studies.

Setting: Population-based studies in Ireland.

Participants: Study 1 included 212 adolescents aged 11 to 13 years. Study 2 included 211 adolescents aged 13 to 15 years. Participants were recruited from schools.

Main Outcome Measures: Suicidal behavior and psychotic symptoms, assessed by semi-structured diagnostic clinical interview.

Results: Psychotic symptoms were associated with a 10-fold increased odds of any suicidal behavior (ideation, plans, or acts) in both the early and middle adolescence studies (odds ratio [OR], 10.23; 95% CI, 3.25-32.26; P < .001 and OR, 10.5; 95% CI, 3.14-35.17; P < .001, respectively). Adolescents with depressive disorders who also experienced psychotic symptoms were at a nearly 14-fold increased odds of more severe suicidal behavior (suicide plans and suicide acts) compared with adolescents with depressive disorders who did not experience psychotic symptoms (OR, 13.7; 95% CI, 2.1-89.6). Among all adolescents with suicidal ideation, those who also reported psychotic symptoms had a nearly 20-fold increased odds of suicide plans and suicide acts compared with adolescents with suicidal ideation who did not report psychotic symptoms (OR, 19.6; 95% CI, 1.8-216.1).

Conclusions: Psychotic symptoms are strongly associated with increased risk for suicidal behavior in the general adolescent population and in adolescents with (nonpsychotic) psychiatric disorder. In both studies, an absolute majority of adolescents with more severe suicidal behavior (suicide plans and acts) reported psychotic symptoms when directly questioned about this as part of a psychiatric interview. Assessment of psychotic symptoms should form a key part of suicide risk assessment.

toms are especially common in young people, with a meta-
analysis of general population studies demonstrating a median prevalence of 17% in children aged 9 to 12 years
and 7.5% in adolescents aged 13 to 17 years.13 Individuals
in the general population who report psychotic symp-
toms are considered to be part of an “extended psycho-
sis phenotype,” with patients with psychosis at the distal
end.14 As well as reporting hallucinations and delu-
sions, these individuals have been shown to share an ex-
tensive range of risk factors with patients15 and are at in-
creased risk of psychotic disorder.16,17 More recently,
however, these individuals have been shown to be at high
risk for a broad range of psychopathology, not limited
to psychosis.18-22

Recent evidence from both clinical and population re-
search has pointed to psychotic symptoms as poten-
tially important markers of risk for suicide. In an emer-
gency psychiatry patient sample, Penagali et al23 noted that
patients who reported subclinical hallucinations had
more severe suicidal ideation. Similarly, following a re-
view of medical records of patients with suicidal behav-
ior, which showed a high rate of hallucinations in par-
ticular in early adolescence, Hysinger et al24 stressed
the need for further research on the role of psychotic symp-
toms in suicidal behavior. In population-based re-
search, 2 recent questionnaire surveys have linked psy-
chotic symptoms and suicidal behavior. Nishida et al25
found that adolescents who endorsed a questionnaire item
about hallucinations were 3 times more likely to also en-
dorse an item related to suicidal ideation. Saha et al,20
on the other hand, found that individuals who endorsed
questionnaire items about delusions were 2 to 4 times
more likely to endorse questionnaire items on suicidal
behavior. One further study recently reported that moth-
ers of adolescents who reported psychotic symptoms were
3.7 times more likely to report that their child had made
a suicide attempt or engaged in self-harm.27 However, to
our knowledge, there have been no epidemiological stud-
ies to date that have reported data on psychotic symp-
toms and suicidality in individuals who have been clini-
cally assessed for suicidal behavior. Herein, we report
the relationship between psychotic symptoms and suicidal
behavior from 2 independent population-based studies
involving in-depth diagnostic psychiatric interviews of
adolescents aged 11 to 15 years and their parents.

METHODS

Two complementary but independently conducted Irish gen-
eral population studies provided the data for the current analy-
ses: the Adolescent Brain Development (ABD) study and the
Challenging Times (CT) study.

The ABD study was established to investigate the preva-
ence and clinical significance of psychotic symptoms in the
general adolescent population. The study was carried out in Dub-
lin, Ireland, and neighboring counties. A total of 1131 pupils
aged 11 to 13 years from 16 schools (32% of the total school
population) participated in a survey of psychopathology and
psychotic symptoms. Psychopathology was assessed using the
Strengths and Difficulties Questionnaire,28 which is a vali-
dated instrument that assesses for hallucinations and delusions. Written informed consent was obtained
from the parent or guardian of participants and from the par-
ticipants themselves. Participants were asked to indicate on the
consent form if they were interested in taking part in a clinical
interview study. Of the 1131 adolescents who took part in the
survey study, 656 (38%) expressed an interest in taking part
in the clinical interview study and a random sample of 212 of
these attended for interview. Adolescents who attended for in-
terview were no more likely to have an abnormal or borderline-
abnormal score on the Strengths and Difficulties Question-
naire ($\chi^2 = 1.22, P = .27$) and did not differ significantly in their
scores on the Adolescent Psychotic Symptom Screener com-
pared with the noninterviewed sample (interviewed group mean
$SE = 1.80 [0.12]$; noninterviewed group mean $SE = 1.90 [0.19]$;
$1_{1130}=0.26; P = .79$).

The CT study was established to investigate the prevalence
of psychiatric disorders and suicidal behavior among Irish ado-
lescents aged 13 to 15 years. The study was carried out in the
geographical catchment area of a Child and Adolescent Men-
tal Health team in Dublin with a population of 137 000. A total
of 743 pupils in 8 mainstream schools were screened for psy-
chopathology using the Strengths and Difficulties Question-
naire and the Children’s Depression Inventory,29 which as-
sesses cognitive, affective, and behavioral signs of depression.
Written informed consent was obtained from the parent
or guardian of participants and from the participants them-
selves. The participating schools were selected using a stratified
random sampling technique, stratified according to the approxi-
mate socioeconomic class of the school to approximate to the
geographical area population. One hundred forty adolescents
scored more than threshold on these instruments, indicating
high risk of having mental health problems, and all of these
adolescents were invited to interview, of whom 117 (83.6%)
agreed to attend for a full psychiatric interview. A comparison
group of 173 adolescents, matched for sex and school, were also
invited to attend, of whom 94 (54%) agreed.

EXPOSURE MEASURES

The interview instrument used in both studies was the Sched-
ule for Affective Disorders and Schizophrenia for School-aged
Children, Present and Lifetime versions (K-SADS).30 The
K-SADS is a well-validated semi-structured research diagnostic
interview for the assessment of all Axis 1 psychiatric disorders
in children and adolescents. Adolescents and parents were in-
terviewed separately, both answering the same questions about
the child. In the CT study, interviews were conducted by 1 psy-
chiatrist and 2 psychologists, and in the ABD study, inter-
views were conducted by 2 psychiatrists and 4 psychologists,
all trained in the use of the K-SADS.

INTERVIEW INSTRUMENT

The psychosis section of the K-SADS was used to assess the par-
ticipants’ psychotic symptoms, specifically hallucinations and
delusions. Table 1 includes sample questions from the psy-
chosis section of the K-SADS. All interviewers recorded ex-
tensive notes of potential psychotic phenomena in this section of
the interview. Once all interviews had been completed, a re-
search assistant collated all data on potential psychotic symp-
toms for all participants of the 2 studies. Information from all
other sections of the interview was excluded so that ratings of
psychotic symptoms were conducted blind to other informa-
tion, including details on suicidal behavior and diagnoses. These
clinical data were then examined by 2 raters with expertise in psychotic symptoms (M.C. and I.K.). Participants were rated as having ever experienced a psychotic symptom or not.

OUTCOME MEASURES

The outcome measure in the current study was suicidal behavior. Suicidal behavior refers to a continuum from suicidal ideation to suicidal plans to suicidal acts. Suicidal behavior was assessed as part of the K-SADS interview. Table 1 includes sample questions from this section of the K-SADS. The suicidal behavior section begins with the interviewer asking about whether the individual has ever experienced recurrent thoughts of death, before moving on to ask a series of questions to assess suicidal ideation, suicidal plans, and suicidal acts. Interviews were conducted with parents and children separately and parents’ and children’s reports of suicidal behavior were both used in the analyses. Participants were rated as having ever had suicidal behavior or not.

SOCIOECONOMIC STATUS

Socioeconomic status (SES) of each study participant was determined using parental occupation assessed according to the Irish Social Class Scale from the national Central Statistics Office. We divided the sample into 2 major groups according to social class: the first group contained SES groups 1 and 2 (professional/managerial) and the second group contained SES groups 3 to 7 (nonmanual skilled; skilled manual; semi-skilled manual; unskilled manual; and unemployed). The SES of participants in the ABD study approximated national figures: 34.6% of participants were categorized as SES groups 1 and 2 (compared with 32.1% of the national population) and 65.4%, as SES groups 3 to 7 (compared with 67.9% of the national population). ABD study: C.F. for the CT study) and participants were offered referrals to child and adolescent mental health services whenever appropriate. Parents and children were given contact details for the research teams, who were available to answer any questions or concerns that arose during or after participation in the studies.

STATISTICAL ANALYSES

Logistic regression analyses were used to examine the association between the outcome measure, suicidal behavior, and the exposure, psychotic symptoms. First, we report univariate associations in terms of odds ratios (ORs), along with 95% confidence intervals and $P$ values, for the association of psychotic symptoms with suicidal behavior in the general population. Second, to control for the effect of comorbid psychiatric illness, we report a regression analysis stratified by the presence of psychotic disorder. Third, to assess whether psychotic symptoms predict more severe forms of suicidal behavior (suicide plans and acts) in groups at higher risk of suicidal behavior, we report regression analyses stratified by the presence of (1) depressive disorders (specifically major depressive disorder and adjustment disorder with depressed mood), (2) behavioral disorders (attention-deficit/hyperactivity disorder, oppositional defiant disorder, and conduct disorder), and (3) suicidal ideation. All analyses were performed by one of us (I.K.) and were carried out using Stata version 11 (StataCorp).

Statistical analyses were conducted using the continuous version of the Recursive Dichotomy of Psychotic Symptom (RDP) score. The RDP score is based on the presence or absence of individual psychotic symptoms. The RDP score was calculated for each individual, and the individual was classified as having a psychotic symptom if the RDP score was greater than or equal to 1.

RESULTS

DEMOGRAPHICS, PSYCHOTIC SYMPTOMS, AND PSYCHIATRIC DIAGNOSES

Details of psychiatric diagnoses are included in Table 2. Interrater reliability was more than 90% for both studies ($k = 0.83$ [ABD study] and 0.85 [CT study]). Psychotic symptoms reported were principally hallucinations and, in particular, auditory hallucinations. Some degree of delusional ideation was common in association with hallucinations but rarely occurred in the absence of hallucinations. More boys than girls reported psychotic symptoms in the ABD study ($χ^2 = 7.03; P = .008$) and the CT study ($χ^2 = 3.62; P = .06$). Socioeconomic status, however, was not associated with psychotic symptoms in either study (ABD study: $χ^2 = 2.83; P = .73$; CT study: $χ^2 = 5.01; P = .17$).

Table 1. Sample Stem Questions Adapted From the K-SADS Interview, Used to Assess Hallucinations and Delusions and Suicidal Behavior

<table>
<thead>
<tr>
<th>Sample Stem Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hallucinations and delusions</td>
</tr>
<tr>
<td>Sometimes when people are alone hear things or see things and they’re not quite sure where they come from. Does that ever happen to you? Tell me about it.</td>
</tr>
<tr>
<td>Was there ever a time when you thought you heard voices when you were alone?</td>
</tr>
<tr>
<td>Was there ever a time when you saw things that were not there, like a person or a ghost?</td>
</tr>
<tr>
<td>Did you ever have any ideas about things that you didn’t tell anyone because you were afraid they might not understand?</td>
</tr>
<tr>
<td>Do you think that you believe in anything that other people don’t believe in?</td>
</tr>
<tr>
<td>Has there ever been a time when you felt someone was out to hurt you?</td>
</tr>
<tr>
<td>Did you ever think that the world was going to end?</td>
</tr>
</tbody>
</table>

Suicidal behavior

Sometimes when people get upset they think, “I wish I was dead” or “I’d be better off dead.” Have you ever thought that?

Sometime when people get upset they think about killing themselves. Have you ever thought this?

Was there ever a time that you thought up a plan to kill yourself?

How did you plan to do it?

Have you ever actually tried to kill yourself? What did you do?

Abbreviation: K-SADS, Schedule for Affective Disorders and Schizophrenia for School-aged Children, Present and Lifetime versions.

Findings on the association between psychotic symptoms and suicidal behavior are shown in Table 2. Twenty-
two percent of the ABD sample reported psychotic symptoms, mainly auditory hallucinations. While participants were asked about lifetime psychotic symptoms, in almost all cases adolescents who reported psychotic symptoms had experienced these symptoms within the past year (and most within the past 3 months). Only 3 participants from the entire sample who reported lifetime psychotic symptoms did not report experiencing these symptoms within the past year, indicating that a report of lifetime symptoms in reality almost always indicates recent (within previous 12 months) symptoms. A total of 7% of participants reported suicidal behavior. Specifically, 6.8% (n = 16) reported suicidal ideation, 3.7% (n = 5) reported specific suicide plans, and just 1 participant reported a suicidal act (0.4%). Adolescents who reported psychotic symptoms demonstrated a greater than 10-fold increased odds of suicidal behavior.

Seven percent (n = 14) of the CT sample, aged 13 to 15 years, reported psychotic symptoms, mainly auditory hallucinations, while 13% reported suicidal behavior. Specifically, 13.2% (n = 28) reported suicidal ideation, 5% (n = 11) reported specific suicidal plans, and 3.3% (n = 7) reported a suicidal act. Adolescents who reported psychotic symptoms demonstrated a greater than 10-fold increased odds of suicidal behavior.

### STRATIFICATION BY PSYCHIATRIC DISORDER

A diagnosable psychiatric disorder was also associated with increased risk for suicidal behavior (ABD study: OR, 3.09; 95% CI, 1.08-8.83; P < .05; CT study: OR, 7.6; 95% CI, 1.17-18.06; P < .001). Therefore, to examine the relationship between psychotic symptoms and suicidal behavior in this higher-risk group, and to allow extrapolation to clinical populations, we conducted secondary analyses limited to adolescents with a history of diagnosable psychiatric disorder. Results are shown in Table 2. In both the ABD and CT studies, adolescents with a diagnosable psychiatric disorder plus psychotic symptoms were at a greater than 5-fold increased odds of suicidal behavior compared with adolescents with a diagnosable psychiatric disorder but no psychotic symptoms.

### SUICIDE PLANS AND ACTS

Because suicidal behavior varies in severity, with ideation on one end and other forms—suicide plans and acts—further along the continuum of severity, we conducted a further set of analyses to assess the risk for more severe behavior—suicide plans and acts. Because the ABD study contained a younger age group (mean age, 11.5 years) and did not enrich for suicidal behavior, there were few cases of severe suicidal behavior; however, the CT data, with its older population and enrichment for suicidal behavior, facilitated this analysis. Adolescents with a diagnosis of a depressive disorder or a behavioral disorder and adolescents with suicidal ideation were all more likely to have suicide plans or acts (data available on request). To test whether psychotic symptoms helped to differentiate adolescents in these diagnostic groups who had suicide plans or acts from those who did not, we conducted a number of stratified analyses. Among adolescents with depressive disorders or behavioral disorders, those who reported psychotic symptoms were at greatly increased risk for suicidal plans and acts compared with adolescents with the same diagnoses who did not report psychotic symptoms (Table 3). Among adolescents with suicidal ideation, psychotic symptoms were associated with a 20-fold increased odds of suicide plans and acts. Strikingly, a majority of adolescents with suicidal plans or acts reported psychotic symptoms in both the ABD (60%) and CT (55%) studies.

#### Table 2. Psychotic Symptoms and Odds of Suicidal Behavior (Ideaion, Plans, and Acts) in 2 Population Samples Aged 11 to 13 Years (ABD study) and 13 to 15 Years (CT study)

<table>
<thead>
<tr>
<th></th>
<th>All Suicidal Behavior, Unadjusted for Sex, OR (95% CI)</th>
<th>P Value</th>
<th>All Suicidal Behavior, Adjusted for Sex, OR (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABD study population sample (n = 212)</td>
<td>9.01 (2.97-27.33)</td>
<td>&lt;.001</td>
<td>10.23 (3.25-32.26)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>CT study population sample (n = 211)</td>
<td>8.52 (2.21-32.91)</td>
<td>.002</td>
<td>10.50 (3.14-35.17)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>ABD study sample with diagnosable psychiatric disorder (n = 78)</td>
<td>5.27 (1.25-22.23)</td>
<td>.02</td>
<td>5.13 (1.15-22.81)</td>
<td>.03</td>
</tr>
<tr>
<td>CT study sample with a diagnosable psychiatric disorder (n = 72)</td>
<td>4.37 (1.14-16.79)</td>
<td>.03</td>
<td>5.31 (1.29-21.84)</td>
<td>.02</td>
</tr>
</tbody>
</table>

Abbreviations: ABD, Adolescent Brain Development; CT, Challenging Times; OR, odds ratio.

*aDiagnoses in the ABD and CT studies included depressive disorders, including major depressive disorder and adjustment disorder with depressed mood (ABD, n = 35; CT, n = 37); behavioral disorders, including attention-deficit/hyperactivity disorder, oppositional defiant disorder, and conduct disorder (ABD, n = 21; CT, n = 18); and anxiety disorders, including generalized anxiety disorder, social phobia, separation anxiety disorder, and obsessive-compulsive disorder (ABD, n = 33; CT, n = 23).
to be among the most predictive risk factors for completed suicide.\textsuperscript{33,34} Psychotic symptoms were more common in the early adolescence sample than in the middle adolescence sample, in keeping with existing research, which shows that psychotic symptoms tend to be reported more commonly by younger individuals.\textsuperscript{13} However, in both age ranges, suicidal behavior demonstrated the same strong association with psychotic symptoms, suggesting that, while psychotic symptoms in general decline with age, their relationship with suicidal behavior does not show the same decline.

There are a number of possible explanations as to the mechanisms underlying the strong relationship between psychotic symptoms and suicidal behavior. The most obvious is that hallucinations may direct the individual to harm or kill themselves. In fact, a post hoc analysis of the type of psychotic symptoms reported by adolescents with suicidal behavior demonstrated that all included auditory hallucinations. However, only 1 of the participants in either of the studies reported command hallucinations to harm or kill themselves. It is possible, however, that psychotic symptoms may impact suicidal behavior via indirect cognitive mechanisms. Changes in the subjective sense of self, for example, are among the earliest recognizable symptoms of psychosis,\textsuperscript{35,36} and a sense of disintegration and fragmentation of the self resulting from intrusive voices or thoughts have been linked to suicidal thinking.\textsuperscript{6,37} Similar effects may occur in the extended psychosis phenotype; Bleuler’s concept of the “suicidal drive” might not be just the most severe symptom of schizophrenia\textsuperscript{6} but the most severe symptom of a much broader psychosis phenotype made up of individuals in the general population who experience psychotic symptoms.

Common causes shared between psychotic symptoms and suicidal behavior may be part of the mechanism underlying the striking relationship between the 2 variables. Individuals with mental disorders who experience psychotic symptoms, for example, may be more unwell in general than individuals with mental disorders who do not experience psychotic symptoms.\textsuperscript{22} These symptoms, then, may be an important marker of deteriorating mental health in a way that indexes very high risk for suicidal behavior. The relationship between traumatic experiences and both suicidal behavior\textsuperscript{38} and psychotic symptoms\textsuperscript{39} may also play a role. Young people who have experienced severe adverse events, such as childhood physical or sexual abuse, have been shown to be at increased risk of psychotic symptoms.\textsuperscript{30-31} It is possible that, for some individuals, psychotic symptoms reflect severe psychological distress arising from such traumatic experiences that may place them at very high risk of suicidal behavior.

From a neurobiological perspective, psychotic symptoms appear to index subtle differences in brain structure\textsuperscript{42} and function,\textsuperscript{43,44} which may contribute to the increased risk for suicidal behavior. Jacobson et al\textsuperscript{45} recently showed volumetric differences in the cingulum and orbitofrontal cortex in a sample of adolescents with psychotic symptoms, 2 centers that are known to play important roles in emotion processing and stress regulation.\textsuperscript{46} Abnormalities in the orbitofrontal cortex have also recently been highlighted as an area of interest in magnetic resonance imaging studies of suicidal patients.\textsuperscript{46} Using functional magnetic resonance imaging, we have also demonstrated reduced activity within the right frontal and bilateral temporal cortices during response inhibition tasks in adolescents with psychotic symptoms and, using digital tractography imaging, overall reduced integrity of frontotemporal pathways,\textsuperscript{47} supporting a profile of a relative disinhibition/proimpulsivity phenotype. These neurobiological findings fit with clinical findings of increased symptoms of emotional and behavioral problems among adolescents with psychotic symptoms.\textsuperscript{22,27,48} In terms of suicidal behavior, this combination of depressive and impulsive traits poses a high-risk phenotype.

For clinicians, these findings highlight the importance of a thorough assessment for psychotic symptoms in patients presenting with suicidal behavior. From our clinical experience, young people will rarely volunteer information on psychotic symptoms unless questioned directly about such experiences (see Table 1 for question examples). Adolescents are usually willing to talk openly about their experiences, however, in response to direct but sensitive questioning. This is especially important in child mental health clinics, where psychosis can sometimes be seen as an “adult psychiatry” issue and therefore not fully explored. For researchers, these findings highlight a complex novel aspect in the study of the etiology of suicidal behavior. While the current report includes participants in early and middle adolescence, suicidal behavior in childhood and adolescence predicts suicidal behavior throughout the life course. Reinherz and colleagues,\textsuperscript{46} for example, showed that adolescents who reported suicidal ideation were, at age 30 years, 15 times more likely to report suicidal ideation and 12 times more likely to have attempted suicide. Therefore, the association between suicidal behavior and psychotic symptoms in adolescence is likely to continue into adulthood. Whether psychotic symptoms are as prevalent in individuals who demonstrate suicidal behavior in adulthood, however, remains to be investigated.

Strengths of the current work include that assessments involved in-depth clinical interview and that we were able to test interactions between psychotic symptoms and psychiatric disorders in predicting suicidal behavior. In addition, we were able to replicate our findings across 2 inde-
pended studies. The age ranges of participants were also complementary across the 2 studies and allowed us to demonstrate the relationship between psychotic symptoms and suicidal behavior from early through middle adolescence (ages 11-15 years). The use of 2 studies was also complementary in terms of balancing sensitivity with interviewer/information bias. The ABD study was set up specifically to study psychotic symptoms and associated psychopathology, and thus, interviewers may have expected increased prevalence of psychopathology in association with these symptoms. This would have improved sensitivity to detect a relationship but risk of information bias was also increased. On the other hand, the CT study was not designed specifically to test associations with psychotic symptoms, and while this may have resulted in reduced sensitivity in detecting the relationship between psychotic symptoms and suicidal behavior, being blind to hypotheses in this study minimized the risk of information bias. As with any in-depth clinical interview study, its strength is its weakness: it is not possible to conduct this type of research with very large numbers of participants in the same way as can be done with questionnaire or lay interview studies. As a result, subgroup analyses involved relatively small groups and, because of this, confidence intervals are wide. Both studies, however, showed the same strong relationship between psychotic symptoms and suicidal behavior, demonstrating that this is a robust finding. Nonetheless, further replication of our work in samples enriched for suicidal behavior will be valuable. Further work is also needed to investigate the relationship between psychotic symptoms and suicidal behavior in later adolescence and into adulthood. In addition, while we found that only 1 individual with psychotic symptoms and suicidal behavior reported command hallucinations to harm/kill themselves, further studies that explicitly explore potential relationships between the content of psychotic symptoms and suicidal behavior will be valuable. Because both studies reported in the current article were cross-sectional in nature, it is not possible to say when precisely psychotic symptoms arose in relation to suicidal behavior. Further research with more temporal information will help to address this point.

CONCLUSIONS

Suicidal behavior is a major cause of mortality across all countries and therefore represents an important public health concern. The results of 2 studies reported herein demonstrate that psychotic symptoms index greatly increased risk for suicidal behavior in adolescents in the general population and in adolescents with diagnosable psychiatric disorder. Furthermore, the presence of psychotic symptoms greatly increases the risk for more severe suicidal behavior among adolescents with suicidal ideation. The results of both studies showed that, when directly questioned, the majority of adolescents with suicidal plans and acts reported psychotic symptoms, in particular auditory hallucinations. The immediate clinical relevance of these findings is that all patients presenting at risk for suicidal behavior should receive a thorough assessment of psychotic symptoms and not just a screening to rule out psychotic disorder. Research has shown that the largest increase in suicide risk in the general population occurs after there has already been contact with mental health services and that approximately half of patients who complete suicide have contact with primary care providers in the month preceding their death. Thus, it is important that clinicians are aware of the significance of psychotic symptoms in nonpsychotic patients in terms of risk for suicidal behavior. Among patients presenting with mood or behavioral disorders or with suicidal ideation, our results suggest that disclosure of psychotic symptoms, particularly hallucinations (regardless of their phenomenological content), indicates a greatly increased risk for more severe suicidal behavior. Further epidemiologic and neuroscientific research is necessary to understand the mechanisms underlying the risk indexed by psychotic symptoms, which may involve a number of neurobiological, neurocognitive, and other factors, knowledge of which may help to inform public health strategies and lead to a reduction in future attempted and completed suicides.

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