USE OF THE COMMUNICATION CHECKLIST - SELF REPORT (CC-SR) IN SCHIZOPHRENIA: LANGUAGE IMPAIRMENTS CORRELATE WITH POOR PREMORBID SOCIAL ADJUSTMENT

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SUMMARY

Background: The present study reports preliminary results from the multicentre project on the approbation of the Russian language version of the "The Communication Checklist-Self Report" (RL-CC-SR) and its first use in schizophrenia (SZ), aiming to evaluate the contribution of language disturbances in the pathogenesis of this heterogeneous disorder.

Subjects and methods: The study evaluated patients' clinical state with the Diagnostic Interview for Psychoses (DIP), and assessed language and communication disturbances (LCD) with the RL-CC-SR in all participants (213 healthy controls (HC), 83 SZ patients, 31 SZ first-degree relatives). Data from the current sample of SZ (n=50), and HC (n=213) was analysed to calculate the relationships between LCD, social and clinical variables using descriptive statistics methods, T-test and Pearson's correlations (SPSS-26, 2019).

Results: The quotient scores (<6) and raw scores on all three CC-SR subscales demonstrated prominent LCD in SZ: (i) language structure (LS) (SZ:11.92±8.01, HC:7.54±5.91; p<0.001), (ii) pragmatic skills (PS) (SZ:11.30±10.07, HC:8.71±7.39; p=0.040), (iii) social engagement (SE) (SZ:31.94±11.76, HC:19.42±10.35; p<0.001). In SZ, Pearson correlations of LS scores were significant for the DIP-items Odd Speech (p=0.033), and Social Engagement - Blunted Affect (p=0.042). PS was related to early disease onset (p=0.027), poor premorbid work adjustment (p=0.003), along with LS (p=0.005), and was also linked to poor premorbid social adjustment (p=0.005).

Conclusions: SZ patients are aware of their LCD at all levels of language structure, pragmatics, and nonverbal communication, but are unable to compensate. Disturbances of LS and PS in SZ patients relate to their poor social adjustment and functioning, and may prove to be associated with the primary negative symptoms domain of the disorder and its generally poor outcome.

Key words: *communication - language disorder - self report - social functioning - schizophrenia*

Abbreviations: *DIP - The Diagnostic Interview for Psychoses;   CC-SR - The Communication Checklist - Self Report; LCD - Language and communication disturbances;   LS - language structure;   PS - pragmatic skills; RL - Russian language version;   SE - social engagement;   SZ - group of schizophrenia patients; HC - group of healthy controls*

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INTRODUCTION

The variety of language decline an deteriorations, that relate to the general thought and communication dysfunction of schizophrenia (SZ) and to the disorder's particular neurocognitive deficits, play a prominent role in clarifying endophenotypes of SZ, and have been recognised as the core SZ symptoms during more than a century of research (Bleuler 1911, Kraepelin 1919, Andreasen & Grove 1986, Jablensky 2006, Crow 2010, Kuperberg 2010). Communication disturbances and their underlying language impairments are of high prevalence in psychoses, and show heritability, being present among clinically unaffected first-degree relatives of SZ patients, as well as among the individuals at high risk of developing first psychotic episode. The pre-onset (at

risk), first-onset, and chronic mental states can be accurately differentiated and classified using linguistic methods, e.g. automatic speech analysis or machine learning approaches (Docherty et al. 1999, Elvevåg et al. 2010, Rosenstein et al. 2015). Language disturbances serve as the basis and also arise from the insufficient acquisition of verbal communication skills in early childhood, and are predisposing factors for persistent social communication difficulties, which respond poorly to treatment and worsen SZ functional outcomes (Linscott et al. 2005, Bosco et al. 2016). Primary language deterioration and subsequent problems in interpersonal communication, which are representative of the negative symptoms' domain, can lead to the social adjustment difficulties and social isolation. We suppose that during psychotic exacerbations, forms of internal speech transform into an internal dialogue, whereby the interior voice can start sound and acts like a pathological compensation for lacking social interactions. It is demonstrably the case that the key positive symptoms of SZ, including auditory verbal hallucinations, formal thought disorder, and delusions are inextricably linked together with the language system (Hinzen & Rosello 2015). 76% of SZ patients are unemployed and have serious difficulties in daily living, interpersonal relationships and social functioning, all of which problems are worsened by their language, thought, and communication anomalies (Jablensky et al. 2000, Morgan et al. 2014).

Communication is not merely a string of words, but is enriched and contextualised by the modalities of speech, notably the linguistic components of correct use of words and phrases. Other key aspects of communication include mimic and pantomimic, the ability to formulate thoughts and express ideas using appropriate words, a capacity for understanding figurative language and for grasping intonations, emotional reactions of the interlocutor, and appropriate context of the communication. Only when meeting these conditions can the speaker/ interlocutor extract meanings from the linguistic and extralinguistic components of social interactions (Bara 2010).

Previous studies found that communication in schizophrenia is distorted at all three levels, namely language structure, pragmatics, and nonverbal communication. (i) Language structure refers to linguistic aspects of language such as speech, syntax, and semantics, e.g. difficulties in lexical access, topic shifting, and paralogical word expressions (Marini et al. 2008). (ii) Pragmatics is the ability to account for context of the communication, and to understand figurative meanings, e.g. concretism, communication with strangers in inappropriate situations and places, inability to understand metaphors, idioms, humour (Corcoran 2003, Colle et al. 2013). (iii) Nonverbal aspects of communication concern the ability to understand the mental state of an interlocutor, and to understand his/her emotional reactions and the meanings of gestures. Nonverbal communication defects include, for example, flattened intonations, limited motor component, and incorrect interpretation of behaviour in

paranoid syndromes (Frith 2004, Bara 2010). Several studies demonstrated that LCD in SZ have a closer relation to pragmatics rather than syntax or semantics (Frith 2004, Langdon et al. 2002, Sass & Parnas 2003).

LCD in SZ have been studied using different approaches, such as social and clinical semi-structured interviews, rating scales (e.g. Scale for the assessment of thought, language and communication (Andreasen 1986), Thought and Language Index (TLD, Liddle et al. 2002), A rating scale for the assessment of objective and subjective formal Thought and Language Disorder (TALD, Kircher et al. 2014) and linguistic analysis of written narratives and oral speech of patients (Bambini et al. 2016, Bosco et al. 2016). Our present research question focuses on an unresolved issue in the linguistics of SZ: is it possible to use self-report questionnaires to diagnose LCD in SZ patients, or should such an approach take into account the lack of insight of his/her symptoms by the respondent (self-awareness in schizophrenia, Sass & Parnas 2003)? If such an approach is indeed possible, then how does LCD interrelate with impairments in a patient's social functioning and with clinical features that may have an inextricable relation to primary deficits in the language domain?

The Communication Checklist - Self Report (Bishop et al. 2009) was first elaborated and validated for patients with autism spectrum disorders to measure their communication difficulties and was subsequently recommended for use in other categories of patients, although never hitherto for application in SZ. As such, the present study employing the checklist represents part of a national research project to investigate LCD in SZ patients and their first-degree relatives, aiming first to evaluate the features of LCD using a clinical-linguistic approach to clarify the role of language disorder in SZ pathogenesis.

Our second main objective is to elaborate a new system of psychosocial interventions, including language remediation therapy, aiming to restore language structure, pragmatic skills and nonverbal communication in SZ patients, thus enabling a more normal socialisation through healthier patterns of language and communication.

SUBJECTS AND METHODS

The Independent Ethics Committee of the National Medical Research Centre of Psychiatry and Neurology n.a. V.M. Bekhterev approved the study protocol. All participants gave written, informed consent. The study group included patients aged 18-50 years, who were native speakers of Russian language and had been diagnosed with schizophrenia according to ICD-10 criteria (F20). Exclusion criteria were comorbid mental or neurological disorders and acute somatic decompensation. The present study analysed study subgroup consisting of SZ patients (n=50) with the mean (±SD) age 38.2±10.2 years and including 26 (52%) males. The healthy control (HC) group included 213 healthy individuals of mean age 31.9±10.2 years, among whom there were 78 (37%) males.

We evaluated the social characteristics and clinical features (mental state) of patients using the Diagnostic Interview for Psychoses (DIP) (Castle et al. 2006; for Russian validation, see Smirnova et al. 2018). We assessed LCD in the SZ and HC groups using the standardised self-report questionnaire (The Communication Checklist - Self Report (CC-SR, Bishop et al. 2009) with translation into Russian (RL) by Smirnova & Jablensky (2015), and back-translation from Russian by Rivkind (2015) (contract for translation and administration from Pearson Ltd., London, UK). This study represents the first use of the Russian language CC-SR in a comparison of SZ patients and HC.

The CC-SR consists of 70 multiple-choice "behavioural statement" items, presented in randomised order in relation to the three composite scales: (i) Language Structure, (ii) Pragmatic Skills, and (iii) Social Engagement. We utilised an algorithm to calculate raw scores, quotients and based our analysis on the normative values for an adult population, obtained from the HC data within the primary English language study of autism spectrum disorders (Bishop et al. 2009). The checklist takes from 5 to 15 minutes to complete, with self-scoring of each item as (a) less than once per week (or never), (b) about once a week, (c) once or twice a day, (d) several times a day (or all the time).

Statistical data analysis was performed using the SPSS-26 software (IBM 2019). All data were checked for normal distribution, and reported as mean and standard deviation (SD). We used T-tests for two independent samples to measure between-group differences, while the relationships between LCD and social and clinical features were estimated with the Pearson's correlation analysis. A threshold of $p<0.05$ was accepted as the level of statistical significance.

RESULTS

According to the DIP scores and social characteristics of the (n=50) SZ patients, 29 (58%) have been married or dating, while the remaining 21 (42%) have never been living with a partner for six months or more, or have ever had any stable romantic relationship in the adult life. 20 (40%) SZ patients were unemployed or had not had any regular job before they first became ill, 21 (42%) had poor social adjustment at their places of work, having been unable to keep any job for more than six months, or having had a history of frequent job changes, or were only able to sustain a job well below that expected by his/her educational level at the time of first psychiatric contact). 14 (28%) of the SZ patients had poor premorbid social adjustment, having found it difficult to maintain normal social relationships, along with persistent social isolation, withdrawal or having maintained solitary interests. 28 (56%) of the SZ patients did not have permanent employment at the time of the interview. 18 (36%) of SZ patients reported having a family history of mental disorders, including 4 (8%) cases of SZ among different generations of relatives.

The results of the RL-CC-SR test revealed more prominent LCD in the SZ group, compared to HC, according to all three composite scales, with the higher raw scores occurring in the SZ group. The LS composite scale demonstrated significantly higher raw scores for the SZ group (11.92±8.01) compared to HC (7.54±5.91; p<0.001). SZ patients marked more often such statements as: "I mix up" the personal pronouns he, she, it, and, they. For example, they might misspeak "he" when talking about a girl. They reported forgetting familiar words, i.e. "I forget words I know - for example, instead of "rhinoceros" I may say "that animal with a horn on its nose..."
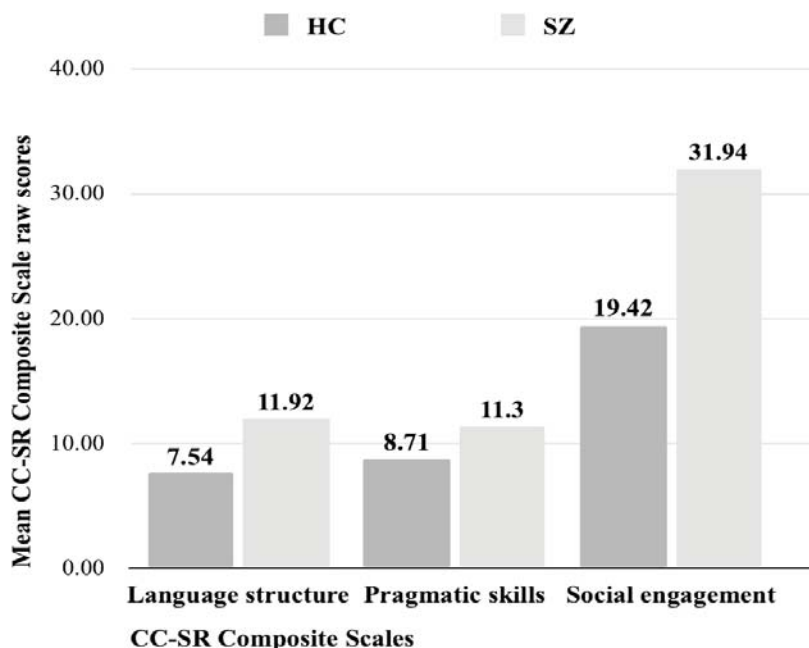

Figure 1. Language and communication disturbances, with self-reporting by schizophrenia patients and healthy controls

SZ patients often made statements such as "People find it hard to follow what I'm talking about". The PS scale also showed higher raw scores for the SZ group (11.30±10.07) compared to HC (8.71±7.39; p=0.040). The patients noted such items as, "I start talking to people I don't know, like people on the train on the train / bus or people in the shop", or "I get confused when a word is used with a different meaning; for example, if someone says "stick that down over there", I might think they want me to glue it down rather than just to put it down", or "People laugh at things I say when I don't mean to be funny". According to the SE scale, the raw scores were also significantly higher in the SZ group (31.94±11.76) compared to HC (19.42±10.35; p<0.001). In this scale, they noted statements such as, "I don't look at people when I'm talking to them"; "Other people leave me out of activities", or "I find it hard to know when people are upset or annoyed". Moreover, the z-scores of the SZ group calculated using the algorithm were less than six in all three domains of communication difficulties, whereas the HC group had scores in the normal range, i.e. above 7.5 (Figure 1).

Among the SZ patients, Pearson's correlation analysis showed significant relationships between higher LS raw scores and the DIP-items Odd Speech (r=0.333; p=0.033), and the SE raw scores for the DIP-item Blunted Affect (r=0.332; p=0.042). PS scores correlated significantly to the DIP-items Early Disease Onset (r=-0.346; p=0.027), and Poor Premorbid Work Adjustment (r=0.452; p=0.003), both along with the LS raw scores (r=0.448, p=0.005), and also with the DIP-item Poor Premorbid Social Adjustment (r=0.443; p=0.005).

DISCUSSION

The results are consistent with the previous research findings, which showed impairments in all the levels of communication in SZ patients (Tavano et al. 2008, Bara 2010, Colle et al. 2013). Pearson's correlation analysis confirmed that (i) the interviewer diagnoses the SZ disorder and LCD using DIP, and focusing on such DIP-items as Odd speech, Blunted affect, and items related to social difficulties during the premorbid and current state, and the patient is able to develop insight into his/her LCD when using the self-report type of questionnaire CC-SR (self-awareness, Sass & Parnas 2003), (ii) the RL-CC-SR demonstrates itself to be a sensitive tool to diagnose LCD in SZ, and (iii) the manifest deterioration in pragmatics and non-verbal communication of SZ patients could serve as a potential marker of poor social adjustment and functioning (Kuperberg 2010, Bambini et al. 2016, Bosco et al. 2016).

In this brief report we present the part of the results of a national research project, focusing for the present on an interim analysis of the selected study sample of SZ patients and HC. We are currently preparing an extensive report on the normative data on approbation and validation of the RL-CC-SR in HC, and shall consider in detail the SZ-typical scores.

To clarify the role of language and communication disorder in the SZ pathogenesis and its hereditary nature, as well as its impact on the course and outcome of the disorder and on social functioning of SZ patients, this shall entail inclusion in the greater analysis of a third group comprising clinically unaffected first-degree relatives from our collected data. We shall also evaluate such linguistic indicators as verbal fluency, action fluency (in relation to the interaction skills) along with making a precise semantic analysis of word use, as well as verbal memory and formal thought disorder measurements, which shall necessarily entail more advanced statistical approaches.

CONCLUSIONS

SZ patients retain the ability to obtain insight into their language deterioration and difficulties in communication when using a self-report, such as CC-SR. LCD in SZ present at the levels of language structure, pragmatics, and social engagement. Inability to cope with pragmatics and poor nonverbal communication skills are associated with low social functioning, which calls for targeted psychosocial interventions aiming to improve the long-term outcome in SZ patients.

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