

Impact of Resilience in Schizophrenia: A Qualitative Systematic Review.

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Introduction: resilience has been defined as the resistance to adverse psychosocial experiences. It has an important role in various mental disorders. For instance, it is correlated with severity in major depressive disorder and on quality of life in bipolar affective disorder. Schizophrenia is a severe mental disorder standing out for causing difficulties in multiple life domains and high morbidity/mortality. The objective of this review was to summarize the available evidence about importance of resilience in schizophrenia. **Methods:** a search was made in PubMed, LILACS and SciELO databases by selecting articles in English and Spanish, encompassing schizophrenic patients and focused on measuring resilience. Twenty-five articles met the inclusion criteria. **Results:** schizophrenic patients had a lower resilience than healthy subjects (9 studies). Resilience levels were inversely correlated with negative symptoms (3 studies), positive symptoms (1 study), depression (4 studies), hopelessness (3 studies), and suicide (1 study). On the other hand, resilience was positively associated with quality of life (5 studies), functionality (4 studies) and physical health (2 studies). In two studies, interventions aimed at enhancing resilience of schizophrenic patients were evaluated, showing inconclusive results. **Discussion:** there is a striking limited literature addressing resilience in schizophrenia. The findings of this review place resilience as a determining factor in the evolution and clinical expression of this disease.

Keywords: schizophrenia spectrum and other psychotic disorders; resilience, psychological; quality of life.

INTRODUCTION

Resilience” is a concept defined -in different manners- in literature. Its conceptualization is still heterogeneous. Among its definitions are: “relative resistance before psychosocial adverse events”⁽¹⁾, “internal strength, competence, optimism, flexibility and skills to effectively cope with adversity”⁽²⁾.

Recently, the concept of resilience has caught increasing attention in various mental diseases. In depressive disorders, resilience has been correlated with severity of the symptoms. Additionally, the scores in resilience scale are significantly higher in remission patients⁽³⁾. On its part in bipolar disorder, resilience level has been correlated with quality of life⁽⁴⁾. There is even a specific questionnaire for measuring re-

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silience in these patients⁽⁵⁾. In alcohol abuse disorder, resilience level has been correlated with lower incidence⁽⁶⁾ and lower risk of relapse⁽⁷⁾.

One of the pathologies where resilience has caught attention of most recent research is schizophrenia. This chronic psychiatric disease is the source of significant affective disturbances and cognitive deficits. Schizophrenic patients usually suffer impairment in various life domains, a stressed dysfunctionality and a high morbimortality⁽⁸⁾. There is evidence that personal resources -including resilience- could have a key role in modifying the natural course of the disease⁽⁹⁾. Some authors have defined resilience for this specific group of patients as the skill to cope with and gain introspection in the disease⁽¹⁰⁾. As far as we know, there are no specific questionnaires for measuring resilience in schizophrenic patients.

Due to the potential importance of resilience in schizophrenia, this review makes a summary of the evidence available on this topic.

OBJECTIVES

The general objective of this review is to summarize the evidence available on resilience impact in schizophrenic population. The specific objectives consist of summarizing data dealing with this group of patients 1) the absolute resilience level and its correlation with healthy population, 2) sociodemographic and cultural variables associated to resilience, 3) correlation between resilience and psychiatric symptomatology, 4) correlation between resilience and disease progression, 5) influence of resilience on quality of life and functionality, 6) correlation between resilience and physical health, 7) interventions aimed to empower resilience.

MATERIALS AND METHODS

A literature search was made in November, 2019 using MeSH terms (“resilien*”) AND (“schizophreni*”) OR (“schizoaffective”) OR (“psychosis”) OR (“psychotic”) (and their equivalents terms in Spanish: (“resilien*”) AND (“esquizofreni*”) OR (“schiyoaffective”) OR (“psychosis) OR (“psychotic”)), in PubMed, LILACS and SciELO data bases, obtaining 89, 5 and 4 results, respectively. This

review included papers in English and Spanish, about subjects with diagnosed schizophrenic spectrum disorder, where resilience level was objectively measured. The year the articles were published was not included as a limit. No systematic/narrative reviews were included. No current protocols and studies offering no results at the time of the search were included. From the 98 articles identified, 25 of them met the inclusion criteria^(9,11-34).

RESULTS

1. General Description

The 25 selected articles are original studies published between 2010 to 2019^(9, 11, 34). From these, 9 articles included patients and control subjects^(11, 14, 16, 17, 22, 24, 26, 30, 34) while 16 articles only included patients, with no control subjects^(9, 12, 13, 15, 18, 19, 21, 23, 25, 27, 28, 29, 31, 32, 33). Within the included diagnosis, 13 articles only included schizophrenic patients^(9, 12, 14, 17, 18, 20, 22, 23, 25, 26, 28, 32, 33), while 10 articles included schizophrenic patients and others psychotic disorders^(11, 13, 15, 19, 21, 27, 29, 30, 31, 34). Three studies included schizophrenic patients and bipolar disorder patients^(16,24,34). Table 1 summarizes the studies included, their main results and the most relevant measuring instruments.

7 different resilience scales were used among the studies included. These scales are described in Table 2.

2. General Results

2.1. Absolute resilience level and its comparison with healthy population.

In twenty-two articles basal resilience level was objectified by means of various scales. Nine articles compared resilience level of people with schizophrenia spectrum diagnosis against control subjects. All of them had a lower resilience level and statistically significant in the group of patients^(11, 14, 16, 17, 22, 24, 26, 30, 34).

2.2. Sociodemographic and Cultural variables associated to resilience

four studies researched the correlation between resilience level and sociodemographic variables^(11, 12, 17, 27).

Age was not correlated with resilience level in none of the articles reviewed. One study re-

ported that being a woman is correlated with a higher resilience level⁽¹¹⁾. This finding was not found in the other article that explored this correlation⁽²⁷⁾. The country of residence was significantly correlated with resilience level in three studies^(12, 17, 24). One of the articles did not report any differences when compared among the residents of a rural area and an urban area⁽²⁷⁾. In one study, resilience level was positively correlated with a degree of spiritual welfare, but not with a level of religiosity⁽²⁴⁾.

2.3. Resilience and Psychiatric Symptomatology

By using various instruments, ten articles addressed the correlation between resilience level and the presence/intensity of psychiatric symptoms in people suffering schizophrenia or other related disorders (See Table 1).

Hofer et. al.⁽¹⁷⁾ found one negative correlation between resilience level and schizophrenia severity (PANSS Scale) in the Austrian group, but not in the Japanese group. Yoshida et. al. study⁽²⁷⁾ did not find any significant correlation between the PANSS full score and resilience level.

Four studies described the correlation of positive/negative symptoms with resilience. One paper reported an inverse correlation between resilience and positive symptoms⁽¹¹⁾. Two other studies did not confirm such difference^(20, 29). Three studies reported a negative correlation between resilience level and negative symptoms^(13, 20, 29), while another one did not replicate this correlation⁽¹¹⁾.

Regarding affective symptomatology, four studies reported an inverse correlation between resilience and depression^(9, 11, 14, 23). One of the studies failed to prove a correlation between these two variables⁽²⁰⁾. Hopelessness and resilience are negatively correlated in three studies^(11, 17, 21). On the other hand, Johnson et. al. reported that higher resilience scores were correlated with lower suicidal levels. Additionally, resilience acted as a moderator of the correlation between hopelessness and suicidal ideation⁽²¹⁾.

Regarding general psychiatric psychopathology, in two studies it was inversely correlated with resilience score^(11, 29).

Three studies reported a positive correlation between resilience and mental health level (Sub item of “mental health” in BELP26 Scale; men-

tal health component of the questionnaire SF-36)^(14, 22).

2.4. Resilience and Progression of the Disease

Four studies addressed the correlation between resilience and other clinical picture characteristics (duration of the psychotic condition, number of hospitalizations and recovery level^(11, 20, 25, 27)).

Both, in Yoshida et. al. cross-sectional study⁽²⁷⁾, as well as in Torgalsbøen longitudinal study⁽²⁵⁾, a higher duration of the psychotic pathology was correlated with a higher resilience level. In contrast with these findings, two cross-sectional studies did not find any correlation between resilience and duration of the diagnosed psychosis^(11, 20). No correlation was found between the number of hospitalization and resilience level⁽²⁰⁾.

Torgalsbøen et. al. analyzed recovery percentage of the clinical picture. A higher resilience level was reported in patients who achieved full recovery against those who did not make it⁽²⁵⁾.

2.5. Resilience Influence on Quality of Life and Functionality

Five works directly correlated resilience level with quality of life. This was a positive correlation in all the studies^(16, 26, 27, 31, 33).

Two studies found positive correlations between resilience level and functionality degree^(11, 28). A third study only found a similar correlation with two RSA-33 subscales⁽²⁹⁾.

Chen et. al. found an inverse correlation between resilience levels and disability. It described that resilience -along with positive coping strategies- would moderate the correlation between negative symptomatology and disability⁽¹³⁾. In Torgalsbøen et. al. study, the bigger increase in functioning levels occurred during the first two years of treatment, following the same patterns than resilience progression⁽²⁵⁾.

2.6. Correlation between Resilience and Physical Health

Two articles found a positive correlation between resilience level and the score of the physical health subscale of the SF-36^(14, 22). Additionally, these articles objectified inverse/statistically significant correlations between re-

Table 1. Abstract of the studies included in the review

Author	Sample	Participants	Design	Instruments*	Main Results
Bozikas et. al., 2016 (11)	Salonica, Greece	n= 41 patients with schizophrenic spectrum disorders and 81 healthy controls.	Cross sectional	PANSS, CDSS, BHS, SOFAs and CD-RISC.	Average resilience level of schizophrenic patients was significantly lower than healthy controls (61.64 ± 20.99 v.s 71.22 ± 10.45 ; $p=0,004$). Women proved to have a higher resilience level than men ($p=0.04$). Resilience level was negatively correlated with positive symptomatology ($p<0.05$), general psychopathology ($p<0.01$), depressive symptoms ($p<0.05$) and hopelessness ($p<0.01$), but it was not significantly correlated with negative symptoms. Functionality reported a positive correlation with resilience level ($p<0,01$).
Caqueo-Urizar et. al., 2019 (12)	La Paz, Bolivia; Arica, Chile and Tacna, Peru	n= 253 schizophrenic patients (85 from Chile, 85 from Peru, 83 from Bolivia)	Cross sectional	SQol18, including Resilience Subscale (RE).	Average resilience levels were 68.0 ± 16.7 (Chile), 72.4 ± 18.1 (Peru) and 64.9 ± 17.0 (Bolivia). The population of Bolivian patients reported a higher resilience level compared with the population of Chilean and Peruvian patients ($p=0.020$).
Chen et. al., 2019 (13)	Heilongjiang, China	n= 407 patients with schizophrenic diagnosis or schizoaffective disorder	Cross sectional	CD-RISC, PANSS, WHO-DAS II	Average resilience level was 54.4 ± 22.5 . Resilience was negatively correlated with positive symptomatology ($p<0.01$), and positively with the functionality level ($p<0.001$). Resilience level would moderate the correlation between negative symptomatology and disability.
Deng et. al., 2018 (34)	Changsha, China	n=81 schizophrenic patients, 34 with bipolar affective disorder and 52 healthy controls	Cross sectional	CD-RISC	Average resilience level of schizophrenic patients was significantly lower than healthy controls (48.68 ± 17.22 v.s 69.83 ± 11.70 ; $p<0.001$).
Edmonds et. al., 2016 (14)	San Diego, California, USA	n= 135 people with chronic schizophrenia and 127 healthy controls	Cross sectional	CD-RISC, SF-36 (mental and physical), CDSS, HOMA-IR, IL-6 .	Average resilience level of patients was of 22.8 ± 8.4 . Presence of depressive symptoms was negatively correlated with resilience level ($p<0.001$), as well as with IL-6 levels and HOMA-IR. The grade of physical health and self-reported mental welfare was positively correlated with resilience.
Galderisi et. al., 2014 (28)	Italy (26 clinical)	n=921 schizophrenic patients	Cross sectional	RSA, SLOF.	The full level of resilience was not measured, but it was split into categories. Resilience level was positively correlated with functionality degree ($p<0.001$).
Gooding et. al., 2017 (15)	North West England, UK	n= 23 patients with schizophrenic spectrum disorders	Cross sectional	RAS	Average resilience level was of 44.76 ± 7.15 .

Hofer et. al., 2017 (16)	Innsbruck, Austria	n= 52 schizophrenic patients, 60 patients with bipolar disorder type I and 77 healthy controls	Cross sectional	HRQOL, RS-25, WHO-QOL-BREF	Average resilience level of schizophrenic patients was significantly lower than healthy controls (132.1 ± 21.6 v.s 150.4 ± 14.2 ; $p < 0.001$). Resilience was positively correlated with quality of life ($p < 0.001$).
Hofer et. al., 2016 (17)	Innsbruck, Austria and Tokyo, Japan.	n= 112 schizophrenic patients and 137 healthy subjects	Cross sectional	RS-25, RSES, PANSS and Hopelessness Scale.	Average resilience level of schizophrenic patients was significantly lower than healthy controls, both in Austrian population (132.1 ± 21.6 v. s 150.4 ± 14.2 ; $p < 0.01$) as well in Japanese population (109.7 ± 25.2 v. s 129.6 ± 17.7 ; $p < 0.01$). The Austrian population reported a higher resilience level than Japanese population ($p < 0,001$). A negative correlation between resilience level and severity of the symptomatology was reported, but only in the group of Austrian patients ($p = 0,028$). Hopelessness was negatively correlated as well with resilience level ($p < 0,001$)
Hofer et. al., 2019 (18)	Innsbruck, Austria	n= 54 schizophrenic patients	Cross sectional	RS-25	Average resilience level of the patients was 132.1 ± 21.6 .
Ikai et. al., 2014 (19)	Yamanashi, Japan	n= 50 schizophrenic patients or psychotic related disorders; 25 randomized to be under Hatha Yoga therapy and 25 under regular treatment	Longitudinal	RS-25	Average basal resilience level was 114.3 ± 29.7 for intervened patients and 109.2 ± 30.4 for the control group. No significant differences were found in the score changes of RS-25 after 8 weeks of follow up, between the intervened group with weekly Hatha Yoga and the group who was under regular treatment (1.6 ± 19.9 v.s $0,3 \pm 17.2$, $p = 0,83$).
Izydorczyk et. al., 2019 (20)	Poland	N= 201 schizophrenic patients	Cross sectional	RSA, PANSS, age of symptoms onset, years of first hospitalization, number of psychiatric hospitalizations and duration of psychosis.	Average resilience level was 63.01. No correlation was reported between resilience level and presence of positive symptoms, depressive symptoms, duration of psychosis or number of hospitalizations. Only negative symptomatology was inversely correlated with resilience level ($p < 0.05$).
Johnson et. al., 2010 (21)	North of England	n= 77 schizophrenic patients and related disorders.	Cross sectional	BHS, BSS and RAS	Average resilience level was 42.75 ± 9.80 . Resilience was negatively correlated with presence of hopelessness ($p < 0,01$) and suicidal ideation ($p < 0,01$). Resilience level would moderate the correlation between hopelessness and suicidal ideation.
Kim et. al., 2019 (33)	Seoul, South Korea	n=123 schizophrenic patients	Cross sectional	CD-RISC, SQLS-R4	Average resilience level was 58.97 ± 18.96 . Resilience level was positively correlated with quality of life ($p < 0.001$). (This was missing in the work, it had not been added)

Lee et. al., 2018 (22)	San Diego, California, USA	n= 114 schizophrenic patients and 101 healthy subjects	Cross sectional	CD-RISC, SF-36 (physical and mental), glycosylated hemoglobin and HO-MA-IR.	Average resilience level of schizophrenic patients was significantly lower than healthy controls (23.4 ± 8.2 v.s 33.1 ± 5.7 ; $p<0,001$). The level of glycosylated hemoglobin and HO-MA-IR is negatively correlated with resilience level, while self-report of physical health was positively made.
Liu et. al., 2019 (23)	China	n= 361 schizophrenic patients	Cross sectional	CDSS, CD-RISC.	Average resilience level was 39.09 ± 14.30 . Resilience level was negatively correlated with the presence of depressive symptomatology ($p<0,01$).
Meyer-Kalos et. al., 2018 (32)	Minnesota, USA	n=6 schizophrenic patients	Longitudinal	CD-RISC.	Basal resilience level of patients was 21.67 ± 6.28 . Subjects reported a positive change in the scores of the CD-RISC after an intervention based on positive psychology techniques and mindfulness, after the intervention (PT) and after 3 months of follow up (PS) (PT: $d=0.88 \pm 0,47$; PS: $d=0.58 \pm 0.37$).
Mizuno et. al., 2017 (24)	Austria (different cities) and Japan (different cities)	n= 112 schizophrenic paranoid patients, 120 patients with bipolar disorder type I and 137 healthy controls	Cross sectional	FACIT-Sp, RS-25	Average resilience level of schizophrenic patients was significantly lower than healthy controls (120.4 ± 2.2 v.s 137.7 ± 2.8 ; $p<0.01$). Patients living in Austria reported a higher resilience level, compared with those who lived in Japan ($p<0.001$). Spiritual welfare was positively correlated with resilience level ($p<0.001$), but not with religiosity level, determined by the subjective importance of religion and participation in religious activities.
Palmer et. al., 2014 (30)	San Diego, USA.	n= 72 schizophrenic patients, included 12 with t. schizoaffective, and 64 healthy controls.	Cross sectional	CD-RISC, HGRS.	Average resilience level of schizophrenic patients was significantly lower than healthy controls (22.9 ± 8.3 v.s 32.3 ± 0.9 ; $p<0,001$).
Poloni et. al., 2018 (29)	Lombardia, Italy	n= 94 schizophrenic patients and 28 patients with schizoaffective disorder	Longitudinal	RSA, BPRS-A, SANS, SAPS, LSP	Average resilience level was 110.49 ± 18.93 . The general psychopathology degree ($p<0.001$) and negative symptomatology ($p<0.05$) is negatively correlated with resilience level, but not with positive symptomatology. Resilience was positively correlated with functionality degree, but only with subscales of family cohesion (0.291 , $p<0.001$) and social resources ($p<0.031$).
Rossi et. al., 2017 (9)	Italy (Different cities)	n= 921 schizophrenic patients	Cross sectional	CDSS, RSA.	Absolute resilience level was not delivered, but rather a breakdown as per various components of the scale. Resilience level was negatively correlated with the presence of depressive symptomatology ($p<0.001$).
Torgalsbøen et. al., 2018 (25)	Oslo, Norway	n= 28 people with a first episode of schizophrenia	Longitudinal	PANSS, Global Functioning: Social, Global Functioning: Role, CD-RISC	Basal level of resilience in patients was not explained. A positive correlation was reported between resilience level and duration of the psychosis ($p = 0.001$), the degree of full recovery ($p=0.026$) and functionality.
Wartelsteiner et. al., 2016 (26)	Innsbruck, Austria	n= 52 schizophrenic patients and 77 healthy controls	Cross sectional	BELP, RS-25.	Average resilience level of schizophrenic patients was significantly lower than healthy controls (132.1 ± 21.6 v.s 150.4 ± 14.2 ; $p<0.001$). Resilience was positively correlated with mental welfare ($p<0,01$) and quality of life ($p<0,01$).

Yoshida et al., 2016 (27)	Isla Ohshima, Tokyo (Japan)	n= 80 schizophrenic patients or schizoaffective disorder	Cross sectional	RS-25, EQ-5D, GAF, PANSS.	Basal resilience level was 109.4 ± 22.3 . No correlations were found between resilience level and sex, age, use of social resources and place of residence (rural v.s urban). Severity of symptomatology was negatively correlated with resilience level, while duration of the psychosis ($p= 0.037$) and quality of life ($p= 0.016$) was positively correlated.
Zizolfi et al., 2019 (31)	Varese, Italy	n=34 with schizophrenia, 5 with schizoaffective disorder and 5 with other psychotic disorder	Longitudinal	RS 10 items, SQLS	Basal resilience level was 52.30 ± 9.68 . Quality of life was positively correlated with resilience level ($p<0.001$).

*The described instruments are only those from which relevant results were obtained, according to the objectives of the review. Abbreviations, such as BELP (SM): Life Quality Scale of Berliner Lebensqualitätsprofil, sub-item mental health; BHS: Beck's Scale of Hopelessness; BNSS: Brief Scale of Negative symptoms; BPRS: Brief Scale of Psychiatric Qualification; BSI-A: Brief Inventory of Symptoms, Subscale of Anxiety; BSS: Beck's Scale of Suicidal Ideation; CDSS: Calgary Scale of Depression for Schizophrenia; CD-RISC: Connor-Davidson's Scale of Resilience; CES-D: Scale of Depression of the Center for Epidemiological Studies; Mood Scale: Wojciszke and Baryła Mood Scale; FACIT-sp: Evaluation of Functional Therapy of Chronic Diseases and Spiritual Welfare; HAMD: Hamilton's Scale of Depression; HGRS: Hardy-Gill's Scale of Resilience, LSP: Profile of Life Skills; HOMA: Evaluation of the Homeostatic Model; MADRS: Montgomery-Asberg's Scale of Depression; PANSS: Scale of Positive and Negative Symptoms in Schizophrenia; PANSS-pg: Subscale of General Psychopathology; PANSS-sn: Subscale of Negative Symptoms; PANSS-sp: Subscale of Positive Symptoms; RAS: Scale of Resilience Valuation; RSA: Scale of Resilience for adults; RS-10: Scale of Resilience of 10 items; RS-25: Scale of Resilience of 25 items; SANS: Scale of Evaluation of Negative symptoms; SAPS: Scale of Evaluation of Positive Symptoms; SF-36 (SM): SF-36 Health Questionnaire, sub item of Mental Health; SLOF: Specific Functioning Levels; SOFAs: Scale of Evaluation of Social and Occupational Functioning; SQoL18: Questionnaire of Life Quality in Schizophrenia; WAIS-CR: Wechsler's Scale of Intelligence for Adults; WHO-DAS II: Questionnaire for Evaluation of Disability WHO 2.0; WHOQOL-BREF: Questionnaire of Life Quality, WHO.

silience and HOMA-IR^(14, 22), glycosylated hemoglobin⁽²²⁾ e IL-6⁽¹⁴⁾.

2.7. Interventions aimed to Empower Resilience

Two studies whose main objective was to evaluate interventions aimed to empower resilience were identified^(19, 32). Ikai et al.⁽¹⁹⁾ made an intervention, based on weekly sessions of Hatha Yoga, to a group of schizophrenic patients and compared them with another group of patients who received the standard treatment. No significant differences were found between both groups regarding resilience scores, after 8 weeks of follow up. On their part, Meyer-Kalos et al.⁽³²⁾ performed a non-controlled study where six schizophrenic patients were intervened by means of psychotherapy, based on "mindfulness" and positive psychology techniques. Both -at the end of the therapy, as well as during the third month of follow up- patients had a positive change in resilience scores.

DISCUSSION

1. Resilience in Schizophrenia

The concept of resilience in schizophrenia has become relevant during the last few years. Various articles have done research about importance of resilience in this pathology. This concept still has some varied definitions. Instruments used to evaluate this skill are diverse as well. In the reviewed studies, four formal resilience scales are included, 2 adaptations of the latter and one subscale. RS-25 and CD-RISC are the most used instruments.

Resilience scores in schizophrenic patients are diverse. Such situation is related with the various scales used. The fact that resilience level of patients diagnosed with schizophrenic spectrum is lower than healthy subjects is a significant finding^(11, 14, 16, 17, 22, 24, 26, 30, 34), as resilience has been deemed as a protecting factor of people's mental health⁽³⁵⁾. The aforementioned has been observed in the course and prognosis of various psychiatric

Table 2. Details of Resilience Scale used in the articles included

Scale	Number of studies that include it	Range of values	Observations
Connor-Davidson Resilience Scale (CD-RISC)	10 (11, 13, 14, 22, 23, 25, 30, 33-34)	0-100 (0-40 in the value of 10 items)	It has 25 items to be evaluated by means of 5-point Likert's Scale (0-4). The summarized scale of 10 items has a high correlation with the original one, and evaluates those items related with the skill to face changes and perseverance.
10-item Resilience Scale (RS-10)	1 (31)	Oct-70	In 10 items it covers 5 resilience factors: purpose, perseverance, self-trust, equanimity and loneliness. Each item is evaluated in a scale of 1 ("strongly disagree") to 7 ("strongly agree"). Scores lower than 48 are considered as low, between 49-59 are moderate; and above 59 are high.
25-item Resilience Scale (RS-25)	7 (16-19, 24, 26, 27)	25-175	In 25 items it covers 5 resilience factors: purpose, perseverance, self-trust, equanimity and loneliness. Each item is evaluated in a scale of 1 ("strongly disagree") to 7 ("strongly agree"). Scores lower than 125 are considered low, between 126-145 are moderate and above 146 are high.
Resilience Scale for Adults (RSA)	4 (9, 20, 28, 29)	33-231 (20-100 in the value of 20 items)	It contains 33 items (20 from the Polish adaptation using Izydorzyk) which evaluates 6 resilience factors, by means of a 7-point scale (5 from the Polish adaptation, using Izydorzyk): perception of oneself, perception of the future, structured style, social competence, family cohesion and social resources. The use of the concept "personal strength" including two first factors have been proposed. It is also divided into intrapersonal factors (perception of oneself, perception of the future, social competence and structured style) and interpersonal ones (family cohesion and social resources).
Resilience Appraisals Scale (RAS)	2 (15,21)	Oct-70	It consists of a 12-item scale made up of 3 subscales to evaluate: self-perception of the skill to cope with emotions, skill to cope with hard situations and skill for getting social support. The answers are scored in a 5-point scale from 1 ("Strongly Disagree") to 5 ("Strongly Agree").
Hardy-Gill Resilience Scale (HGRS)	1 (30)	0-18	It consists of 9 questions on how subject responded to their most stressing event during the last 5 years, with a score from 0 to 3, according to the answer. The score provides an idea of 0 (least resilient) to 18 (most resilient).
Schizophrenia Quality of Life Questionnaire (SQoL18)	1 12	0-100 (Average of the items)	It contains 18 items describing 8 dimensions: psychological welfare, resilience, physical welfare, autonomy and sentimental life. Dimensions and scores per index go from 0 to 100.

pathologies, among them major depressive disorders, bipolar disorder and alcohol abuse disorder^(6 - 10). The hypothesis that this finding in schizophrenic patients is a negative factor in the progression of the disease and of psychiatric comorbidities could be proposed.

2. Sociodemographic and Cultural Variables

The differences found in resilience level of patients living in different countries must be interpreted with precaution^(12, 17, 24), due to the potential influence of socio-economic, contextual and cultural variables, apart from the use of different scales. The question of how much of this difference is explained by means of measurement and interpretation and what is the real importance of the residence place in resilience level has an answer that requires more research. Regarding other cultural variables, the positive correlation between resilience and spiritual welfare found in a study is significant⁽²⁴⁾, as this finding could support the design of new evaluation tools and/or empower resilience in these patients.

3. Psychiatric Symptomatology

While in some studies is reported a negative correlation with the level of general/positive/negative symptoms^(11, 13, 17, 20, 29), other evaluations of these studies and other studies did not report any significant correlation with the symptomatology grade^(20, 27, 29).

This diversity could be explained by the use of different scales, different population and the by studies design. Additionally, potential differences among observers when applying the PANSS Scale, despite its reliability must be taken into account⁽³⁶⁾. Resilience seems to be related with schizophrenic symptomatology; however, more studies are needed to determine the nature of this correlation.

Most studies agree on stating the negative correlation that resilience level has with the depressive symptomatology^(9,11,14,23) and the hopelessness^(11,17,21). These findings suggest that resilience would be a relevant factor in mental health of the schizophrenic patients, being correlated with symptoms of the affective spectrum. However, it is important to reassert the impossibility to reckon a causative correlation of these findings. This higher incidence

of symptoms associated to depression may be a cause or a consequence of the lower resilience level in these patients.

Patients with a higher resilience level reported a better mental welfare^(14,22,26) and a lower level of general psychiatric symptomatology^(11,29). Even Lee et. al. study proposes a potential moderating role of resilience in the correlation of trauma in mental health of schizophrenic population⁽²²⁾. Possibly, resilience level is a protecting factor of psychopathology in these patients. More studies are necessary to devise a model aimed to explain these observations.

4. Quality of life and Functionality

The positive correlation that resilience level has with quality of life and functionality degree reported in all papers studying these variables^(11,13,16,25-29,31,33), matches the data reported in other psychiatric pathologies⁽³⁷⁻⁴⁰⁾. The role of resilience would be quite relevant on the disease onset, according to the findings made in Torgalsbøen study⁽²⁵⁾.

5. Physical Health

Two articles of this review reported a correlation between resilience and physical health, both for subjective perception as well as for laboratory parameters^(14,22). This finding is quite interesting, considering the high burden of medical disease and associated mortality that schizophrenic population has⁽⁴¹⁾.

6. Interventions aimed to improve Resilience

Ikai et. al. study failed to prove that weekly Hatha Yoga could cause a change in patients' resilience levels. The authors state the main constraints of the study were its short duration, its small sample, the impracticability to perform a double blind and the difficulty to generalize its results to other type of similar therapies⁽¹⁹⁾. The aforementioned is compared with the reports made in another study on healthy population. In this case, the participation in a 6-week yoga program was correlated with a higher score in the CD-RISC Scale, compared with the control subjects⁽⁴²⁾. Even though the study made by Meyer-Kalos et. al. reported a positive change in resilience, after the psychotherapeutic intervention, the study did not have a control group, the amount of patients was small, with a short fo-

llow up period. Therefore, it is hard to generalize such results⁽³²⁾. In non-clinical population, interventions based on mindfulness report mismatching results^(43,44,45).

Only two articles were found on resilience strengthening interventions in schizophrenic patients (they are not included in this review). One has to do with a current protocol, with no current results⁽⁴⁶⁾. The other one is a self-report analysis of the strengths found in 105 patients who had a first psychotic episode. The subjects participated in an early intervention program⁽⁴⁷⁾. This program found three virtues (humanity, justice and transcendence) that were correlated with a significant improvement in symptomatology, in psychological welfare and in interpersonal relationships, after 6 months⁽⁴⁸⁾. The low number of papers addressing this issue shows that importance of resilience in this disease is something new.

7. Correlation with other Indicators

Other studies have addressed the evaluation of other parameters, similar to resilience, such as self-stigma, resistance to stigma and coping styles. In literature there are many definitions on these concepts^(49, 50, 51). Two of the studies included reported that higher levels of resilience were correlated with lower self-stigma, higher resistance to stigma and use of more positive coping strategies^(13,18). These three variables have been correlated in people with schizophrenia with a clinical picture, progression, functionality and quality of life^(18, 52, 53). A relevant component of this disease could be related with the response to external demands, to be determined by a complex interaction of multiple variables.

8. Constraints

Our review is constrained by the few studies on this topic. Most articles have a cross sectional design, Therefore, it is impossible to extrapolate causative correlations between resilience and the rest of the variables. Seven different resilience scales were used in these studies; consequently, it is difficult to make a comparison among them. Additionally, the size of the samples was assorted. Twelve studies included fewer than 100 patients. It is also important to highlight that the population studied by the various groups tended to be concentrated on a

specific group of stable schizophrenic patients, who had no dual pathology^(11, 28, 30, 31, 34), who had an outpatient follow up^(14, 24, 29, 31), with a chronic disease^(20, 29), under treatment^(13, 29, 31), and not institutionalized^(13, 30): therefore, generalizations must be made with precaution. Some strengths of the review deal exclusively with articles including patients with schizophrenic diagnosis whose resilience level was measured by using a scale, as this favors generalization and standardization of results.

CONCLUSIONS

The summary of the evidence described in this article helps to enlarge the knowledge about how important resilience level is in schizophrenia. To our knowledge, this is the first review fully summarizing the evidence available about the correlation between resilience and psychiatric symptomatology, clinical evolution, functionality, quality of life, and physical health of schizophrenic patients, as well as interventions which could favor its promotion.

As a conclusion, schizophrenic patients have a lower resilience level than healthy population. This deficit could be correlated with a higher symptomatology, worse functionality, poor quality of life and higher medical morbidity. Currently there are no interventions aimed to promote resilience with a clear/proven benefit. We think it is important that future studies are focused on describing resilience role in schizophrenia by using a strict methodology and a longitudinal follow up of a large/representative sample of these patients.

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