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Methods for Measuring the Resilience of Adults

N. E. Zlatkina[1]

[5]FSSBI «N.A. Semashko National Research Institute of Public Health», 12-1 Vorontsovo Pole str., Moscow, Russian Federation

Corresponding author's

Abstract.

Resilience is defined in many ways and is seen as a process and a personality trait. Understanding and evaluating resilience is important so that people with low levels of this indicator can be identified, followed by adequate interventions to help them overcome the problems usually associated with aging. This article is an overview of methods for measuring the resilience of adults. Currently, many scales lack convincing evidence for their use, largely due to the lack of scientific research, their further validation is required, however, there are several well-founded and widely used scales that are also suitable, in our opinion, for the multicultural Russian context, these include: the Resilience Scale, The Connor-Davidson Resilience Scale, the Resilience Scale for Adults, the Brief Resilience Scale, the Child and Youth Resilience Measure, which is also suitable for adults. These scales better take into account the diversity of Russian communities in terms of rural-urban variation, cultural differences, socio-economic differences, and the diversity of problems that individuals and their communities face

1. Introduction.

Resilience is a bio-psycho-social phenomenon in people of older age groups, the main essence of which is the possibility of mobilizing resources of individual viability to maintain the functional ability of a geriatric patient under the influence of adverse factors of the internal or external environment [13, 17, 40].

Resilience is defined in many ways and is seen as a process and a personality trait. Understanding and evaluating age-related viability is important so that people with low levels of this indicator can be identified, followed by adequate interventions to help them overcome specific problems (such as the loss of a spouse) or daily problems (such as external changes, degenerative joint diseases) that usually arise in connection with aging.

The aim of the study: to determine the methods of measuring the resilience of adults based on the literature data.

2. Matherials and methods.

We studied the literature data on search words: resilience, resilience scale for 1989-2020 in the computer databases PubMed, Medical-Science, Elibrary, Ceeol, JSTOR, Web of Science, Scopus.

3. Results and discussion.

Determination of the levels of the resilience has been established with the following scalesof the resilience. We identified a number of problems in the process of studying the literature:

- different research approaches have led to inconsistencies in risk factors and protective processes associated with resilience, in the prevalence of resilience among older groups, and in the significance / value of this indicator;

- a number of researchers viewed the results as indirect evidence of resilience;

- some authors have highlighted general resilience in general compared to specific types of resilience, namely physical resilience (the ability to restore or optimize function in the face of age-related loss or disease, manifested in perseverance and determination to overcome physical difficulties, such as a hip fracture), emotional, economic, psychosocial (focused on the ability to maintain a positive affect, regardless of the situation).

The scale of the resilience is examined in accordance with the selected criteria [48]: content validity (the degree to which the scale reflects all aspects of the concept), internal consistency (the degree to which the elements in the (sub)scale interconnected), criterion validity (the degree to which scores on a particular questionnaire correlated with the gold standard), construct validity (the degree to which scores on a particular questionnaire correlates with other indicators), reproducibility agreement (degree, the degree to which the scores on repeated measurements are close to each other), reproducibility reliability (the degree to which patients can be different from each other despite measurement errors), responsiveness (the ability of the questionnaire to detect clinically significant changes over time), floor/ceiling effect (upper and lower indicators), interpretability (the degree to which a qualitative meaning can be prescribed to quantitative estimates).

Currently, there are about 70 questionnaires that measure various qualities that contribute to the formation and development of resilience. The scales that evaluate this characteristic can be divided into three groups: 1) for children and adolescents [19, 21, 25, 28]; 2) for adults [7, 8, 10, 25, 27, 37]; 3) for organizations [3, 23]. Let's focus on the second group of questionnaires, which includes the following scales:

- the Dispositional Resilience Scale (DRS);
- the Resilience Scale (RS);
- the Ego Resiliency Scale (ERS);
- the Baruth Protective Factors Inventory (BPFI);
- the Connor-Davidson Resilience Scale (CD-RISC);
- the Resilience Scale for Adults (RSA);
- the Hardy-Gill Resilience Scale;
- the Brief Resilient Coping Scale (BRCS);
- the Adult Resilience Indicator (ARI);
- the Brief Resilience Scale (BRS);
- the Psychological Resilience Scale;
- the Resilience in Midlife Scale (RIM Scale);
- the Resilience Appraisal Scale (RAS);
- the Child and Youth Resilience Measure (CYRM);
- the Physical Resilience Scale;
- the multidimensional individual and interpersonal resilience measure (MIIMR);
- human resilience test;
- the method of «Resilience of the individual»;
- test «Resilience of an adult».

The Dispositional Resilience Scale (DRS) is designed to measure psychological endurance, and pays more attention to resilience as a character trait [1, 33]. The original DRS has been modified to be

suitable for the elderly. Evidence of validity and internal consistency has been obtained [33], but of little use for identifying changes.

The Resilience Scale (RS) was originally developed in the United States [47] when interviewing older women, and then tested on undergraduate students. The authors consider resilience as a characteristic that includes inner strength, competence, optimism, and flexibility. This characteristic is related to the individual's ability to cope positively with stress, not to succumb to the negative effects of stress or to reduce their effect [46, 47]. This scale was developed as a general indicator of adult resilience throughout life. Initially, the scale included 25 points, reflecting 5 interrelated components of vitality – equanimity (the ability to overcome difficulties), self-confidence (the perception of oneself and one's position at a given age), existential loneliness or a sense of uniqueness, perseverance or determination, meaningfulness (the belief that life has meaning). The assessment was conducted on a 7-point Likert scale. Later, a shortened version (14 points) was developed with testing on middle-aged and older people [46], which also proved its construct validity as well as reproducibility reliability [6].

The full 25-point scale showed good internal consistency, reproducibility reliability and construct validity which were based on a significant correlation between resilience and life satisfaction, morale, and depression [48, 34, 35]. However, the original factor structure reproduces itself inconsistently [22, 28]. The disadvantage is the limited ability to identify changes.

The Ego-Resiliency Scale (ERS) was originally designed for young people [4] and consists of 14 questions that are evaluated on a 4-point Likert scale. The conceptualization of ego-resilience was the ability to adapt the level of emotional control to suit the circumstances. The scale showed good internal consistency.

The Baruth Protective Factors Inventory (BPFI) focuses on character traits / personality factors related to resilience [2]. The scale consists of 16 points, which are evaluated on a 5-point Likert scale. Four factors are considered, including an adaptive personality, a supportive environment, fewer stressors, and a compensating experience. This school was validated for adults aged 19-74, with the participation of mostly Latin American and Anglo-American women.

The Connor-Davidson Resilience Scale (CD-RISC) was developed on the young adult population in the United States [7]. Groups were identified in the study, which included a sample of the non-seeking population, primary care outpatient patients, general psychiatric outpatient patients, participants in the generalized anxiety disorder study, and participants in two clinical studies of post-traumatic stress disorder (PTSD). The authors understood resilience as a multidimensional characteristic of personal qualities that allow individuals to «thrive in the face of adversity» [7], that is, the scale focused on overcoming stress. Later it was also used for the elderly.

Since its inception in 2003, the CD-RISC has been tested in several contexts with different populations and modified into different versions. In the initial version, five areas or factors were identified (personal competence, high standards and perseverance; tolerance to negative effects and elimination of the consequences of stress; adaptability, control and spirituality), which were evaluated in 25 questions on a 5-point Likert scale. CD-RISC has been widely used, although the factor structure of the original 25-element scale does not always repeat itself [38]. The 25-point scale showed content validity, internal consistency, reproducibility reliability, responsiveness and interpretability, and good construct validity [17, 38, 48].

In order to reduce the time spent on conducting the survey, reduced versions were created based on the CD-RISC-25 scale. Thus, in 2005, a scale consisting of only two items – CD-RISC-2 was created [50], which demonstrated a "significant correlation" with both the CD-RISC scale as a whole and with individual elements of the full scale. [30, 50]. Later, a version of the 10-position scale CD-RISC-10 was approved. The authors established a strong correlation between the created simplified CD-RISC-10 scale and the original CD-RISC-25 scale [50]. In contrast to the full scale, the 10-point version had content validity, good internal consistency, and construct validity, but there was no evidence for any of the remaining criteria [17, 48].

Numerous studies have questioned the five-factor model of CD-RISC, but due to cultural differences in the interpretation of the results, as well as differences in test settings and analytical strategy, there is no agreement on the appropriate factor model [50].

The Resilience Scale for Adults (RSA) was developed on the adult population of Norway [8] and focuses on intrapersonal and interpersonal protective factors that contribute to adaptation to psychosocial adversity. The school aims to evaluate the overall sample without determining the use of the test for any age range. The authors define resilience as " protective factors, processes and mechanisms that, despite experience with stressors that carry a significant risk for the development of psychopathology, contribute to a good outcome" [12].

The original design identified six subscales that reflect personal strength, perception of the future (this subscale was later removed), social competence, family cohesion, social resources, and structured style. In addition to evaluating these qualities, the questionnaire helps to predict the effectiveness of treatment. With its help, you can get information about the strengths of the individual, the protective resources of a person who needs the help of loved ones. Excellent internal consistency of the scale, construct validity and reproducibility reliability, as well as adequate content validity were obtained [5, 11, 48].

The Hardy-Gill Resilience Scale consists of 14 positions that assess the degree of adaptation of elderly and senile people to the situations that they experienced in the recent past [9]. For testing on this scale, participants are asked to determine the most stressful event in their life that they have experienced over the past 5 years - the focus can be psychological, physical, economic or social. We recommend that you do not select an event that happened in the last month. Next, you need to answer a series of 9 questions about your reaction to this event.

There was evidence of internal consistency and reproducibility reliability. Validity was based on a significant correlation between resilience and the presence of multiple depressive symptoms, as well as good and excellent self-reported health [9].

The Brief Resilient Coping Scale (BRCS) was developed to measure outcomes after a stressful event [39]. This is a brief assessment aimed at identifying a person's ability to cope with stress. The questionnaire consists of only 4 items, the answers are determined on a 5-point Likert scale. The main focus of this school is on adaptive coping. The conducted studies prove the internal consistency and reproducibility reliability of the scale, convergent validity among older adults [39].

The Adult Resilience Indicator (ARI) is the only South African resilience questionnaire that measures this indicator in adults [44, 45]. It assesses the presence or absence of vulnerability and resilience factors (internal assets and external resources) that people can use in difficult times, which can also increase their potential.

The first version of the API consisted of 82 items, which were evaluated on a 5-point Likert scale. Later, the author excluded 45 points, so the final scale consisted of 37 points, including 8 factors: confidence and optimism, positive reinterpretation (the ability to rethink the current situation in a positive way), resistance to adversity, support (actively seeking the support of friends and/or family), determination (the intention to continue doing something despite resistance or obstacles), negative reflection and helplessness (this factor reduces the resilience of people and is a factor of vulnerability), religion (belief in a higher power and that a higher power will help in the future). difficult times), emotional regulation (the ability to regulate emotions, especially negative ones).

ARI is a multi-level scale with adequate psychometric properties that assesses multidimensional aspects of resilience [16]. Most importantly, the original ARI factor structure is stable when replicated in the validation (second) sample, but little research has been done to validate this scale.

The Brief Resilience Scale (BRS) was developed on the population of undergraduate students, as well as on the population of patients with cardiac and chronic pain in the United States [41]. This option of measuring resilience focuses on the ability to respond to stress, assesses the ability to recover from it. It consists of six questions, half of which are negative and half of which are positive, focused on the ability to recover from stressful experiences, each of which is rated on a 5-point Likert scale.

BRS has good internal consistency and construct validity, as well as reproducibility reliability and interpretability, content validity [48], and has a two-factor structure within six points [42]. A detailed study of this scale continues to be conducted, adding facts in favor of its predictive reliability [26, 33]. However, these studies seem to be limited to the adult population within the professional context.

Exploring what may underlie resilience from a psychological point of view provides a deeper understanding of why some people can remain positive in difficult circumstances, especially with certain aging-related issues. *The Psychological Resilience Scale* focuses on the ability to maintain a positive attitude regardless of the situation, that is, it focuses on psychological resilience (for example, self-esteem, personal competence, and interpersonal control) [49]. This scale was developed using secondary data analysis to provide a model of psychological resilience. On this scale, you can determine changes over time.

The Resilience in Midlife Scale (RIM Scale) is based on modern data on viability and age psychology. According to the authors of RIM Scale, resilience is a multi-level construct consisting of external and internal variables [36]. RIM Scale consists of 25 questions, which are evaluated on a 5-point Likert scale. The school consists of 6 concepts: self-efficacy, family/social networks, perseverance, internal locus of control, coping and adaptation. Thus, there is a focus on traits related to resilience, as well as overcoming difficulties. The conducted studies proved the reproducibility reliability and validity of the scale [27, 36].

The Resilience Appraisal Scale (RAS) focuses on psychological resilience. The scale consists of 12 points, and participants are asked to indicate the extent to which each statement relates to them, using a 5-point Likert scale. There are three subscales that reflect social support, emotional regulation skills, and problem-solving ability. Preliminary use established evidence of internal consistency for each of the subscales, as well as for the entire scale [15].

The Child and Youth Resilience Measure (CYRM) was developed using qualitative data obtained from a survey of young people on 14 sites around the world (in 11 countries) [21, 43]. This scale reflects the understanding that «in the context of exposure to significant adverse factors, resilience is both the ability of individuals to navigate the psychological, social, cultural, and physical resources that support their well-being, and their ability to individually navigate them, collectively negotiate for these resources to be provided and experienced in culturally meaningful ways».

CYRM evaluates the presence of socio-environmental components relevant to resilience processes among children and young people. The components of the scale include individual assets (personal skills, peer support, and social skills), relational resources (physical, emotional, and psychological support from the primary caregiver), and contextual resources (spiritual, educational, and cultural). The CYRM consists of 28 items rated on a 5-point Likert scale. It also developed a version of the scale consisting of 12 items (CYRM12) [20]. The full scale of 28 points was later adapted for the adult population (RRCARM) [17, 18].

The strong content validity of the 28-element scale and adequate internal consistency were noted, as well as the reproducibility reliability and the absence of a floor/ceiling effect [21]. Given the multicultural background and the growing importance for all age groups, CYRM is a relevant tool to use.

The Physical Resilience Scale focuses on aspects of resilience related to recovery from acute physical events/problems, such as a hip fracture or neurological event, or in response to exacerbations of chronic diseases, such as inflammatory arthritis or chronic obstructive pulmonary disease [29, 31].

The Physical Resilience Scale consists of 17 points. Respondents are asked to identify the most difficult aging-related physical problems they have encountered (e.g., vision changes, arthritis, hip fracture, pneumonia, stroke, etc.), and agree or disagree with each point. The school has confirmed its reproducibility reliability, and criterion validity, and the scale also records changes over time.

With the help of *the multidimensional individualand interpersonal resilience measure (MIIRM)*, which includes eight positions (self-efficacy, access to a support network, optimism, perceived economic and social resources, spirituality and religiosity, relational consent, emotional expression and communication, emotional regulation), it is possible to assess the relationship of an elderly person with society and his self-perception (that is, self-effectiveness) in this environment [13, 26, 30, 50].

MIIRM showed good reliability on the overall score of all factors, as evidenced by good internal consistency. There was also a high correlation between MIIRM and CDRISC for individual-level scales and a low correlation with interpersonal-level scales. The authors suggested that MIIRM provides a more reliable assessment of resilience compared to CDRISC, since MIIRM can also measure resilience at the interpersonal level [26].

The use of MIIRM in future research may allow researchers to begin to explain the relationship between a number of protective factors and / or processes that contribute to individual and interpersonal resilience, and other areas of successful aging, including cognitive health, psychological health, physical health, and self-assessment of successful aging [14, 26]. The ability to understand the multifaceted aspects of successful aging through a multidimensional view of

resilience can help researchers understand how and why some families age more successfully than others, as well as provide direction for the development of appropriate prevention programs.

In the Russian scientific literature, there is little data on the measurement of the phenomenon of resilience, mostly all of them are concentrated in the works of foreign researchers, and therefore, special attention should be paid to the attempts to create tests for assessing resilience in domestic science. So, in 2009, to measure the level of resilience, a *«Human resilience test»* was proposed [37], consisting of 106 questions grouped into 4 scales: adaptability, self-regulation, self-development and meaningfulness of life [25, 37]. The test is designed to assess the resilience of a person aged 30 to 60 years.

The method «Personal resilience» is designed to study the resilience of adults (18 years and older) [27]. The methodology includes 8 scales («activity and initiative», «self-motivation and achievements», «emotional control and self-regulation», «positive attitudes and flexibility», «self-esteem», «social competence and social support», «adaptive behavioral styles», «self-organization and future planning»), consisting of 96 questions. The methodology showed high reproducibility reliability and internal consistency, high indicators of discriminativeness of questions, passed the procedures of standardization and normalization.

A. V. Makhnach developed the *test «Resilience of an adult»*, to create which 120 questions were collected in 6 scales [25]: «Self-efficacy» (belief in one's ability and effectiveness, adequate self-esteem), «Perseverance» (self-discipline of a person and his desire to continue the struggle to restore balance), «Internal locus of control» (belief in one's initiative and responsibility), «Coping and adaptation» (confidence in successful coping with adversity, unfavorable conditions; using emotionally-oriented and problem-solving strategies), «Spirituality» (fortitude, belief in the existential meaning of life), «Family and social relationships» (the ability of an individual to use the family, social and any external support system to better cope with stress). The test is designed for an adult audience over the age of 18 (until late age). Further validation of the test is required.

4. Conclusions.

Although a review of studies on the assessment of resilience showed the absence of a gold standard scale, currently many of the above tests lack convincing evidence for their use, largely due to the lack of scientific research, their further validation is required. However, there are several well-founded and widely used scales that are also suitable, in our opinion, for the multicultural Russian context, these include:

- the Resilience Scale (RS);
- the Connor-Davidson Resilience Scale (CD-RISC);
- the Resilience Scale for Adults (RSA);
- the Brief Resilience Scale (BRS);
- the Child and Youth Resilience Measure (CYRM) that is also suitable for adults.

These scales better take into account the diversity of Russian communities in terms of rural-urban variation, cultural differences, socio-economic differences, and the diversity of problems faced by individuals and their communities. The scales of Russian scientists also deserve attention, but further research is required to prove their validity.

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About the authors:

Kolyago Natalia Mikhailovna - Candidate of Medical Sciences, Researcher of the Department of Clinical Gerontology, ANO "Gerontology Research Medical Center", 125371, Moscow, Volokolamsk highway, 116, p. 1, office 321; Associate Professor of the Department of Therapy, Geriatrics and Anti-Aging Medicine, Academy of Postgraduate Education of the Federal State Budgetary Institution "Federal Scientific and Clinical Center for Specialized Types of Medical Care and Medical Technologies of the Federal Medical and Biological Agency", 125371, Moscow, Volokolamsk Highway, 91, phone: 8 962 987-01-97, e-mail: pozdnyakova.tala@yandex.ru. ORCID https://orcid.org/0000-0001-8472-9744

Kuzmin Oleg Mikhailovich – candidate of medical Sciences, associate Professor, associate Professor of the Department of propaedeutics of internal diseases and information technology, Federal state Autonomous educational institution of higher education "Belgorod national research University" (NRU "BelSU"), 308015, Belgorod, Pobeda street, 85, phone: 8 910 360-49-38, e-mail: kuzminov@bsu.edu.ru, ORCID https://orcid.org/0000-0002-3994-4223

Bochko Olesya Viktorovna - Researcher of the Department of Clinical Gerontology, ANO "Gerontology Research Medical Center "(representative office) - 125371, Moscow, Volokolamsk highway, 116, p. 1, office 321; phone: 8 915 447-90-96, e-mail: doctorolesyabochko@gmail.com, ORCID https://orcid.org/0000-0002-6940-3495

Mudrakovskaya Eleonora Viktorovna - urologist, LLC "MEDSI", Moscow, Zubovsky Boulevard, 22/39, phone: 8 915 161-88-15, e-mail: elan1234@tut.by, ORCID https://orcid.org/0000-0001-6054-9749

Zlatkina Nana Elizarovna - candidate of medical Sciences, Researcher of FSSBI "N.A. Semashko National Research Institute of Public Health"; Address: 105064, 12-1 Vorontsovo Pole str., Moscow, Russian Federation, phone: +7 (495) 917-82-81, e-mail: 4991547489@mail.ru ORCID: https://orcid.org/ 0000-0001-9587-2335

Khokhlova Maria - Resident of the Department of Orthodontics, doctor of LLC "Vimstom", 15 125502, Petrozavodskaya Street, bldg. 5, Moscow, Russia, phone: 8 903 679 35 34, e-mail: kuzminov@bsu.edu.ru, ORCID https://orcid.org/0000-0002-3715-9715

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