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ORIGINAL ARTICLE

The relationship between public health system resilience and psychological resilience: multilevel regression study

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Abstract

Objective: This study aims to explore the effect of Public Health System Resilience (PHSR) on the psychological resilience of individuals. To demonstrate this interaction, the study investigated psychological resilience levels of individuals negatively affected by the recently experienced COVID-19 pandemic as a disaster period in the province of Çanakkale.

Method: This study was conducted in two stages in April and September 2022. In the first stage, the PHSR Scorecard prepared by the United Nations Office for Disaster Risk Reduction was used to obtain the scores from the Merkez province of Çanakkale and the Bayramiç and Ayvacık districts. In the second stage, a questionnaire for demographic data and the Psychological Resistance Scale was administered to 510 people, including those over 65 years, small business owners, and students (high-school grades 2 and 3). The results were analyzed at two levels and with three different models using the Multilevel Regression analysis.

Results: Based on the multilevel regression model formulated for the factors affecting Psychological Resilience, it was found that PHSR was an explanatory or predictor variable for psychological resilience, and a high public health system resilience was associated with a high psychological resilience (Model 1 ß:0,29, p<0,05), (Model 2 ß:0,26, p<0,01) (Model 3 ß:1,05, p<0,01). It was also found that in PHSR interactions, small business owner groups (β = -0,77, t=-2,35, p<0,05) and student groups (β = -1,56, t=4,72, p<0,01) were affected more negatively than the group aged over 65 years.

Conclusion: Our study has demonstrated that PHSR effectively enhances individuals' psychological resilience.

Keywords: COVID-19, Psychological Resilience, Health Systems, community, Resilience, Regression analysis, Risk groups

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INTRODUCTION

The word resilience denotes a person's positive adaptation to the difficulties experienced and maintaining and reclaiming their mental health[1]. Community resilience is defined as the presence, development, and participation of community members and resources that enable the community to flourish in an environment characterized by change, uncertainty, unpredictability, and surprises[2]. The UNDRR (United Nations Office for Disaster Risk Reduction) describes social resilience as "*the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner*"[3]. Disasters, pandemics, wars, and other public health-threatening catastrophes burden the public health system with significant needs and can affect social resilience. For this reason, past tragedies enhance the learning capacity for future protection and improvement of risk reduction measures.

As stated on the data page published and daily updated by the Republic of Turkey Ministry of Health, the first COVID-19 case in Turkey was discovered on March 11, 2020. From the discovery of the first case until November 27, 2022, there were 17,042,722 cases in total, and 101,492 people have died due to the COVID-19 disease[4]. In the COVID-19 pandemic, both the characteristics of the virus and the measures taken by the authorities to prevent its spread affected some groups in several ways. In Turkey, those over 65 years of age were banned from going out of their homes on March 22, 2020, with the circular "Curfew for Those Aged 65 and Over and Those with Chronic Disease"[5]. On March 16, 2020, just after the emergence of the first cases, schools were shut down for a week and then closed to face-to-face education from March 23, 2020, to September 21, 2020, and a transition was made to an online education system[6]. A complete lockdown was imposed between April 29 and May 19, 2020, and freelance small business owners were banned from going out[7]. While the measures taken to prevent the spread of the disease affected the whole society, older people aged over 65, freelance small business owners, and young people of school age were affected most[8-10].

The older population was the most vulnerable group to the disease in the COVID-19 pandemic. Not only the disease itself but also the isolation measures taken could lead to the aggravation of some disorders already present in the older population, such as phobia, anxiety problems, and obsessive-compulsive disorder[11]. In addition to older adults, the COVID-19 pandemic was also reported to have had alarming effects on mental health in student groups[12]. Suspending face-to-face education and adopting online education to prevent the spread of the pandemic had a psychological impact such as anxiety, fear, and worries[13]. The imposition of curfews and people's avoidance of physical contact during the fast-spreading period of COVID-19 forced people to shop on the Internet instead of buying goods from shops[14]. This caused small businesses such as barbers, restaurants, and other local small business owners to incur significant losses. A qualitative study of the challenges experienced by small business owners during the COVID-19 pandemic has stressed that small business owners experienced both economic and psychological adversities[10].

This study aims to examine the impact of Public Health System Resilience (PHSR) on psychological resilience at the individual level. Using multilevel regression analysis, we explore how PHSR scores influence psychological resilience among high-risk groups (elderly, small business owners, and students) during the COVID-19 pandemic in Çanakkale. The study seeks to provide empirical evidence on the role of public health resilience in mitigating psychological distress in crisis situations.

METHODS

Population; Over 65, small business owner and students, who are thought to be more negatively affected due to the measures taken during the pandemic process

Exsposure; Correlation between public health systems resilience and the individual resilience of some individuals.

Comparison; With vs. without the correlates

Outcome PHSR effectively increases individuals' psychological resilience

This research that tries to predict the variability of psychological resilience with data from different level variables (e.g. level 1 district, level 2 occupation, age).

The field data of the study were collected in the Merkez, Ayvacık and Bayramiç districts between March and August 2022. small business owners were included through small business owner's union, elderly people were included through municipality officers, and students were included from permitted schools. Focus group interviews were held in September 2022.The characteristics of the districts chosen are summarized in Table 1.

Table 1. Characteristics of chosen districts

Town	Population	F/M	Healthcare Institution	Characteristic
Merkez	197,841	49.6% M 50.4% F	University Hospital State Hospital Oral Health Center Private Hospital	University campus and students are present
Bayramiç	28,952	49.5% M 50.5% F	State Hospital	In a mountainous area away from the center, Agricultural region
Ayvacık	34,549	50.8% M 49.2% F	State Hospital	Touristic region

Model;

Multilevel regression performs multiple modeling to combine variables from different levels. It is expected that the total explanatory power in the initial model will be low and the intercepts or slopes will overlap. While the total explanatoryness is low in the initial model, increases as different level variables are added to the model. This was exactly the case in the multilevel regression performed in this research.

The study model using a Hierarchical Linear Model (Multilevel Regression) analysis is summarized in Figure 1. The characteristics, effects are intended to be explored in the study, have been individually analyzed using the hierarchical linear model. In Model 1, only the impact of the public health system resilience score was considered to explain psychological

resilience. Model 2 considered the effect of being an older person over 65,being a small business owner, or being a student. In Model 3, the impact of being in different groups was considered as an interaction with the public health system resilience score. In group interactions, as the COVID-19 disease primarily affected individuals in the older population, the most urgent and rigid measures were taken for this group. For this reason, the group of people over 65 was taken as a reference when assessing intergroup differences in the model.

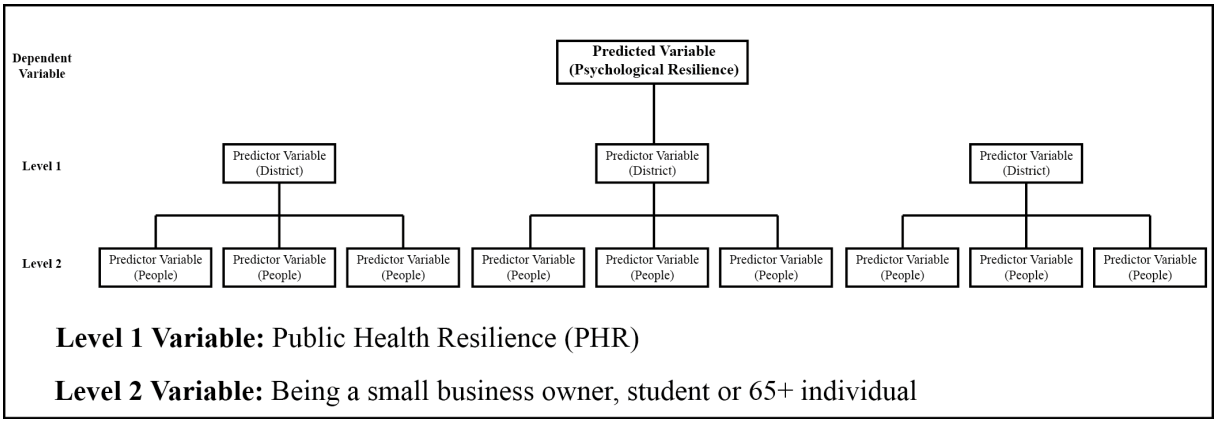

Figure 1. The HLM model, where the effect of public health system resilience and the effect of being in different district groups on psychological resilience were explored

Stages;

To apply these models, data were collected in several stages. For the levels specified in the modeling, the 1st stage involved focal group interviews held with the representatives of the Governor's Office of Çanakkale, Central Municipality of Çanakkale, Provincial Health Directorate of Çanakkale, Public Health Directorate of Çanakkale, and Provincial Disaster and First Aid Directorate of Çanakkale to find the PHR scores. Expert opinion was obtained based on the information and documents from the interviews with the agency representatives, from an independent academic group based on the information and documents from the interviews with the agency representatives. The points on the scorecard corresponding to each question were marked, and the scores obtained from these interviews were used as the Public Health System Resilience Score. In the second stage, a questionnaire and the Connor-Davidson Resilience Scale (CD-RISC) were administered to the small business owners, individuals over 65 years of age, and students in the districts from which Public Health System Resilience scores were obtained (Merkez, Ayvacık, and Yenice-Bayramiç) to assess psychological resilience.

Tools;

For Public Health System Resilience, the Disaster Resilience Report Card for Urban Areas was used in this study along and the Public Health System Resilience Addendum Scorecard Essentials, which was developed by UNDRR. The scorecard has ten essentials for assessing public health resilience[15] (Table 2).

The scorecard has a total of 23 items. Each item is scored between 0 and 5. The maximum

score obtainable is 115, and the minimum is 0. Since each of the ten essentials on the scorecard has a different number of questions, the minimum and maximum scores obtainable from each essential can be different[15]. None of the districts obtained a "0" from any essential. The scoring was made by getting opinions of the stakeholders attending the expert view meetings.

Table 2. Public Health System Resilience Addendum Scorecard Essentials

Items	Score card Essentials	Min-Max
1	Integration of public health and governance (Essential 1)	0-5
2	Integration of public health and disaster scenarios (Essential 2)	0-15
3	Integration of public health and finances (Essential 3)	0-5
4	Integration of public health and land use/building codes (Essential 4)	0-5
5	Management of ecosystem services that affect public health (Essential 5)	0-5
6	Integration of public health and institutional capacity (Essential 6)	0-20
7	Integration of public health and societal capacity (Essential 7)	0-15
8	Integration of public health and infrastructure resilience (Essential 8)	0-15
9	Integration of public health and disaster response (Essential 9)	0-20
10	Integration of public health and recovery/building back better (Essential 10)	0-10

Developed by Connor and Davidson (2003), the Connor-Davidson Resilience Scale/ CD-RISC was used to determine the psychological resilience levels of adult individuals[16]. The investigators made the payment required for the use of the scale and subsequently, the permission for use was obtained. Consisting of 25 items in total, the scale has a 5-point Likert-type scoring. The scale is scored using (0) for 'not true at all, (1) for 'rarely true,' (2) for 'sometimes true,' (3) for 'often true', and (4) for 'true all the time.' The lowest score obtainable from the scale is 0, and the highest is 100. It is stated that the 25 items of the scale can be taken as a whole, and a single total score obtained from the whole ranking can be used for analysis. Higher scores obtained from the scale show higher psychological resilience. The scale's Cronbach Alpha coefficient was 0.91 [16]. Its Turkish validity and reliability study was performed by Karaırmak (2010). The scale's Cronbach's Alpha internal consistency coefficient is 0.92[17].

Sampling;

It is stated inIn Mass and Hox regression, it is stated that to calculate the sample size, the independent variables intended to be used to calculate the sample size need more than 50 people for each group[18]. Accordingly, it was planned to contact up to a total of 180 people through the improbable (non-probabilistic) sampling method up to a total of 180 people for the Merkez province, 180 for the Ayvacık district, and 180 for the Bayramiç and Yenice districts. This sampling is composed of 60 people, with a 20% excess for each group (students, older people over 65, and small business owners). The number of people to be included in the study was planned to bewas to be 540. A total of 510 people could be contacted in the survey. Non-random participation consistent with the sample was achieved from all districts and groups. There was no missing data.

Variable and Statistical analysis;

The variables of our study are the Public Health System Resilience Score, which was developed by UNDRR, and the psychological resilience levels obtained with the Connor-Davidson Resilience Scale/CD-RISC.

In statistical analysis, numbers and

percentages were used to present definitional data. Multilevel regression modelling was used to study the factors affecting individual psychological resilience on the Jamovi 2.3 application.

Permission was obtained for the study from Çanakkale University Clinical Trials Ethics Committee with their decision numbered 2022-05 and dated 22/03/2022.

RESULTS

For this study, 510 people were interviewed in the Merkez province of Çanakkale and Bayramiç and Ayvacık districts.

After the structured meetings to obtain public health system resilience scores, the Merkez province received 96 points, Bayramiç 85 points, and Ayvacık 86 points. These scores were included as public health resilience scores in the multilevel regression models used to explain psychological resilience. The genders and samples included in the study are shown in Table 3.

Table 3. Genders and COVID Knowledge of Participants by their Groups, Çanakkale 2022

	Groups							
Characteristic	**Older People over 65**		**Small Business Owners**		**Students**		**Total**	
	n	**(%)**	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**
Gender n=510								
Female	85	(51.8)	60	(35.1)	117	(66.9)	262	(51.4)
Male	79	(48.2)	111	(64.9)	58	(33.1)	248	(48.6)
Region								
Merkez	60	(36.6)	61	(35.7)	59	(33.7)	180	(35.3)
Bayramiç	53	(32.3)	50	(29.2)	57	(32.6)	160	(31.4)
Ayvacık	51	(31.1)	60	(35.1)	59	(33.7)	170	(33.3)

n: number %: column percentage

It was seen in Model 1 that the Public Health System Resilience Score was a significant explanatory or predictor variable in explaining psychological resilience (F:4,07 p<0,05). As the PHR score increased, the Psychological resilience score also increased (β=0.29, t=2,02, p<0,05). The explanatoriness of the PHR score in explaining psychological resilience alone was 0.7% (Table 4). In Model 2, the model set up with the group variable to explain psychological resilience was found to fit (F:32,18 p<0.01). The general explanatoriness of Model 2, which was set up with the group variable, was found to be 11.9%. The explanatoriness (explanatory or predictor variable) of being over 65 years of age in psychological resilience was found statistically significant compared to being a small business owner (β= 0,25, t=0,148, p>0,05). Being in the student group was associated with a lower psychological resilience score than being in the over 65 years of age group (β= -11,53, t=-6,80, p<0.01) (Table 4).

In Model 3, the effect of the Public Health System Resilience score and group interactions on the psychological resilience scores of individuals were analyzed. The goodness of fit tests of Model 3 showed that the model was appropriate (F:11,18, p<0,01). The explanatoriness of Model 3 in the

psychological resilience of individuals went up to 15.6%. As Public Health System Resilience score increased, the Psychological resilience score also increased (β=1.05, t=4,48, p<0,01). Students had a lower psychological resilience score than those in the over 65 years of age group (β= -11,54, t=-6,94, p<0,01). There was no significant difference between the psychological resilience scores of small business owners and those of the over 65 (β=0,37, t=0,22, p=0,82) (Table 4).

In the interaction of the Public Health System Resilience score, the psychological resilience score of small business owners was lower than that of the older people over 65 (β= -0,77, t=-2,35, p<0,05). Similarly, in the interaction of the PHR score, students had a lower psychological resilience score than those over 65 (β= -1,56, t=4,72, p<0,01). The level of students' being affected negatively seemed to decrease in Public Health System Resilience interaction (β= -11,54, β =-1,56) (Table 4).

Table 4. Multilevel Regression Analysis in Explaining Psychological Resilience, Çanakkale*, 2022

Predictor variable	Model 1	Model 2	Model 3
Public Health Resilience Score (PHR) β	0.29	0.26	1.05
Group 1 (65 +[1]-Small Business Owners) β		0.25	0.37
Group 2 (65 +[1]-Students) β		-11.53**	-11.54**
PHRS*Group-1 (65 +[1]-Small Business Owners)			-0.77*
PHRS*Group 2 (65 +[1]-Students)			-1.56**
R^2	0.007	0.119	0.156
ANOVA values (F) for model fit for the models set up	4.07*	32.18**	11.18**

**p<0.05; *** p<0.01 [1]: reference group

* Table 4 presents the results of the multilevel regression analysis. In Model 1, only the Public Health System Resilience Score is included as a predictor of psychological resilience, revealing a significant positive effect. Model 2 introduces the group membership variable, showing that students and small business owners exhibit lower psychological resilience scores compared to the reference group (65+ individuals). Model 3 incorporates interaction effects, demonstrating that the negative impact on psychological resilience is more pronounced for students and small business owners when public health system resilience is considered. These findings suggest that different risk groups respond differently to public health system resilience, highlighting the need for targeted intervention

DISCUSSION

There is no definite evidence in the literature regarding what type of interaction exists between the Public Health System Resilience Essentials and psychological resilience. The data suggest that psychological strength increases community resilience[19,20]. The psychological resilience of individuals is evaluated within the framework of social capital, which is a part of social resilience. However, no studies demonstrate the effect of social resilience on the psychological resilience of individuals. This represents a novel aspect of the study we have conducted.

The Public Health System Resilience score is evaluated with some essential questions. How these evaluation principles reflect on society has not been evaluated in this study. The Public Health System Resilience score of the city was obtained with the opinions of representatives of institutions that are influential in the provincial administration, and the relationship between this score and the resilience of individuals was examined.

The Public Health System Resilience score positively affected psychological resilience in the Multilevel Regression analysis model, which included all the data (Table 4). In their meta-analysis in 2013 on the factors affecting psychological resilience, Lee et al. concluded that the factors affecting psychological resilience most were self-sufficiency, self-

confidence, positive mood, optimism, and social support[21]. The CD-RISC 25 Psychological Resilience Scale used in our study consists of items measuring various aspects of psychological resilience, namely, hardiness, adaptability/flexibility, meaningfulness/purpose, optimism, regulation of emotions and cognition, and self-efficacy.

Community resources that will reduce the impact of disasters are dependent on individual resources[22,23]. According to the protection of resources theory[23], threats to or loss of important objects (e.g., home, property), energies (e.g., income, access to economic resources), personal resources (e.g., security, hope, meaning), and social resources (e.g., friends, family, non-governmental organizations) are the most robust precursors of psychosocial difficulties[24,25]. It is thought that a portion of the above-mentioned social resources has been significantly affected during the COVID-19 pandemic.

Abramson et al. described the components affecting the activation of resilience and its conceptual framework in their 2015 study [22]. The proposed conceptual framework is based on the ability to activate better the resilience aspects of social resources, which is essential for sustaining psychological vitality, stability, cognitive health, as well as satisfactory physical health and well-being. Under the definition of urban resilience of communities a high level of Public Health System Resilience contributes to the communities in cities by having more resources, incurring less damage, and achieving faster recovery in chaotic circumstances caused by disasters or pandemics.

According to the multilevel regression analysis results, small business owners and students were affected more negatively than those older than 65 years (Table 3, Model 2). In Model 3, being older than 65 years was associated with a higher Psychological Resilience score in PHR interaction compared to the student and small business owner groups (Table 4, Model 3). A complete lockdown was imposed in Turkey between April 29 and May 19 as part of COVID-19 pandemic measures, and going out was forbidden except for the personnel who carried out essential work[11]. Isolation measures are known to considerably increase the risk of general psychological disorders, anxiety, and low morale[26]. Again, due to the actions taken for the pandemic, schools stopped face-to-face education between March 16 and September 21 and adopted a distance education system. The closure of schools to moderate the effects of the pandemic resulted in the loss of a large portion of daily living activities for the students. Restrictions on going out alongside school closures may explain why students had a lower Psychological Resilience score than the other groups.

Although some of the effects reflected on people's public health resilience during the COVID-19 pandemic, presented in the evaluation on the essentials, were decisions made countrywide, they are felt in society as the strength and resilience of the central administration.

CONCLUSION

Unlike the existing studies showing that psychological resilience increases social resilience, this study demonstrated that public health system resilience was effective in Psychological Resilience using the example of the COVID-19 pandemic that was experienced recently. However, it does not explain how Public

Health System Resilience reflects on society and how it increases psychological resilience. Since the study was planned to demonstrate the relationship between social and individual resilience, a representative sample of the society was not targeted. The results of this study cannot be generalized due to fact that the sample is not representative of the society. There is a need for detailed and in-depth studies on this subject.

It can be said in our study that both the measures taken and the process itself went favorably for individuals aged over 65. However, the psychological resilience of the student and small business owner groups was affected more negatively than that of those over 65. Since both the suspension of education and impairment of the social atmosphere may have produced these results for the students and economic interactions for the small business owners, it will be appropriate to consider these points when taking measures in possible future pandemics.

The results obtained will serve as a guideline for decision-makers by defining the role of public health resilience in improving the psychological resilience of individuals in groups susceptible to potential problems in future disaster.

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REFERENCES

1. Herrman H, Stewart DE, Diaz-Granados N, Berger EL, Jackson B, Yuen T. What is Resilience? The Canadian Journal of Psychiatry. 2011;56(5):258-265. doi:10.1177/070674371105600504
2. Berkes E, Ross H. Community Resilience: Toward an Integrated Approach, Society & Natural Resources. 2021; 26:1, 5-20, DOI:10.1080/08941920.2012.736605
3. United Nations Office for Disaster Risk Reduction (UNDRR). Resilience. Available online: https://www.preventionweb.net/terminology/view/501
4. T.C. Sağlık Bakanlığı. Covid-19 Bilgilendirme Platformu. (https://covid19.saglik.gov.tr/) Erişim Tari-hi: 03.10.2023. (In Turkish)
5. T.C. İçişleri Bakanlığı. 65 Yaş ve Üstü ile Kronik Rahatsızlığı Olanlara Sokağa Çıkma Yasağı Ek Genel-gesi. 2020. (https://www.icisleri.gov.tr/65-yas-ve-ustu-ile-kronik-rahatsizligi-olanlara-sokaga-cikma-yasagi-ek-genelgesi) Erişim Tarihi: 08.10.2023 (In Turkish)
6. Çiftçi, S. Covid-19 Pandemi Dönemi Milli Eğitim Bakanlığı'nın İlkokullara İlişkin Politika ve Uygulamalarının Değerlendirilmesi, Yüksek Lisans Tezi, Alanya Alaaddin Keykubat Üniversitesi, 2022 (In Turkish)
7. T.C. İçişleri Bakanlığı. (2020). https://www.icisleri.gov.tr/81-il-valiligine-tam-kapanma-tedbirleri-genelgesi-gonderildi (Access date:24 September 2023). (In Turkish)
8. UNICEF. Preventing a lost decade. Urgent action to reverse the devastating impact of COVID-19 on children and young people. December 2021. https://www.unicef.org/reports/unicef-75-preventing-a-lost-decade
9. Yildirim H, Işik K, Aylaz R, The effect of anxiety levels of elderly people in quarantine on depression during covid-19 pandemic, Social Work in Public Health 2021; 36:2, 194-204, DOI: 10.1080/19371918.2020.1868372
10. İnce, C. Küresel Afetin Yerel Yansımaları: Covıd-19'un Bitlis Esnafı Üzerindeki Etkileri. Avrasya Sos-yal ve Ekonomi Araştırmaları Dergisi 2020, 7 (8) , 130-145. (In Turkish)
11. Girdhar, R., Srivastava, V., & Sethi, S. (2020). Managing mental health issues among elderly

during COVID-19 pandemic. Journal of geriatric care and research, 7(1), 32-35.

12. Wang X, Hegde S, Son C, Keller B, Smith A, Sasangohar F Investigating Mental Health of US College Students During the COVID-19 Pandemic: Cross-Sectional Survey Study J Med Internet Res 2020;22(9):e22817

13. Lischer, S. Safi, N. Dickson, C. Remote learning and students' mental health during the Covid-19 pandemic: A mixed-method enquiry. Prospects 2022;51, 589–599 .

14. Güven H. Covid-19 pandemik krizi sürecinde e-ticarette meydana gelen değişimler. Avrasya Sosyal ve Ekonomi Araştırmaları Dergisi. 2020 May 5;7(5):251-68. (In Turkish)

15. Dısaster Resılıence Scorecard For Cıtıes. Publıc Health System Resılıence Addendum. 2020. (https://mcr2030.undrr.org/sites/default/files/2021-06/UNDRR_Public%20Health%20Scorecard%20Addendum%20v2.0_English-Jan2021.pdf). Erişim Tarihi: 07.10.2023

16. Connor, KM. Davidson, JR. Development of a new resilience scale: the Connor–Davidson resilience scale (CD-RISC). Depress Anxiety. 2003;18(2):76–82.

17. Karaırmak, Ö. (2010). Establishing the psychometric qualities of the Connor–Davidson Resilience Scale (CD-RISC) using exploratory and confirmatory factor analysis in a trauma survivor sample. Psychiatry research, 179(3), 350-356. doi:10.1016/j.psychres.2009.09.012

18. Maas C. J. M. Hox J. J. Sufficient Sample Sizes for Multilevel Modeling. Methodology: European Journal of Research Methods for the Behavioral and Social Sciences 2005; 1(3), 86–92

19. Courtney CA, Ahmed AK, Jackson R, McKinnie D, Rubinoff P, Stein A, et al. Coastal community resi-lience in the indian ocean region: a unifying framework, assessment, and lessons learned.2008.

20. Bisri, M. Pangandaran Village Resiliency Level Due to Earthquake and Tsunami Risk 2011;. 293 - 298. 10.1109/ISPAW.2011.64.

21. Lee JH, Nam SK, Kim AR, Kim B, Lee MY, Lee SM. Resilience: a meta-analytic approach. Journal of counseling & development. 2013 Jul;91(3):269-79.

22. Abramson DM, Grattan LM, Mayer B, Colten CE, Arosemena FA, Bedimo-Rung A, Lichtveld M. The resilience activation framework: a conceptual model of how access to social resources promotes adaptation and rapid recovery in post-disaster settings. J Behav Health Serv Res. 2015 Jan;42(1):42-57.

23. Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. Ame-rican Psychologist, 44, 513-524.

24. Norris FH, Stevens SP, Pfefferbaum B, Wyche KF, Pfefferbaum RL. Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. American Journal of Community Psychology. 2008;41(1–2):127–150.

25. Gil-Rivas, V., & Kilmer, R. P. (2016). Building Community Capacity and Fostering Disaster Resilience. Journal of clinical psychology, 72(12), 1318–1332. https://doi.org/10.1002/jclp.22281

26. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, Rubin GJ. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. The lancet. 2020 Mar 14;395(10227):912-20.