Evaluation of the Resilience of Students in Golestan and Kermanshah Provinces, Iran, against Natural Hazards

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Date of submission: 23 Oct. 2018, *Date of acceptance:* 15 Feb. 2019

Original Article

Abstract

INTRODUCTION: Measure of resilience as an objective concept in recent years has been interested to researchers. Therefore, this study was designed to assess the level of resilience of students in vulnerable areas based on the LM-CRID-31 Q.

METHODS: This was a descriptive cross-sectional study. The tool used was LM-CRID-31Q, which includes Cronbach's alpha 0.86 and the internal consistency is ICC = 0.91 CI (95%), 849-948. This questionnaire was surveyed among 599 students aged 13 to 18 years in hazardous areas of Golestan province and the earthquake hazards in Kermanshah province at the end of 2017.

FINDINGS: The results showed that girls had more resilience than boys. Age, sex, level of education, and living area were among the most influential factors in the resilience of children in disasters. Resilience of Kermanshah teenagers was more than Golestan. The most resilience of students was in the area of trust in God and the lowest resilience in the area of accepting social responsibility. The lowest percentage of resilience was in the acceptance of social responsibility (22.2%) and adaptability (57.0%). The highest percentage of resilience in the elements of trust in God and learning thrill (91.0%) and other components were creativity and dynamism (83.7%), happiness (80.3), and hope (74.8%) of moderate resilience.

CONCLUSION: The LM-CRID-31Q instrument with eight components could be the beginning of advanced studies by researchers in the field of child in disasters. This questionnaire is applicable to measuring the resilience before and after accidents and disasters.

Keywords: Instrumentation; Resilience; Disasters; Students; LM-CRID

How to cite this article: Mohammadinia L, Ebadi A, Malekafzali H. **Evaluation of the Resilience of Students in Golestan and Kermanshah Provinces, Iran, against Natural Hazards.** Sci J Rescue Relief 2019; 11(1): 36-41.

Introduction

Incidents and disasters cause the deaths and injuries of many students and children annually (1) as over 100 million children and adolescents have been affected by these devastating effects over the past two decades (2). According to the World Health Organization (WHO) in 2011, children under the age of 18 accounted for 30-50% of deaths from natural disasters the majority of whom were students. These groups are vulnerable, hence disaster risk reduction policies, including enhancing resilience among them, can be helpful to minimize the risk of disasters in these groups (3,4).

As an abstract concept, resilience has been introduced in various science fields in recent years (5-7). This concept has gained popularity due to its dynamic and flexible nature on the one hand, and because of its acquisition in individual issues including individual resilience on the other hand (8,9). In the field of manpower, resilience has been considered with a positive psychological

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[DOI: 10.52547/jorar.11.1.36]

perspective for people in the community, especially children. The manpower of every society is national capital, and today's children are the future human resources of any society that require to be given special attention in decision-making in all areas, particularly in disasters. With a destructive nature and causing chaotic conditions, disasters can affect the vulnerability of children more than ever (10). Therefore, preparing children and promoting their resilience to deal with disasters and reducing their vulnerability (11) is a concern of the today's societies. Understanding the level of resilience and identifying the areas affecting it can provide a clear perspective to the education and training programs. Thus, appropriate tools are required to measure and evaluate this concept. However, researchers, especially psychologists and sociologists, have used various tools, including the Connor-Davidson Resilience Scale (CD-RISC) (6), Child and Youth Resilience Measure (CYRM-28) with 28 items (12), and the short 12-item version of CYRM (CYRM-12) (13) considering individual, social, family, and friends domains (14,15) of the child for normal living conditions and the adversities emerged, in addition to the Adolescent Resilience Questionnaire (ARQ) (16), which is not specific to the disaster situations. However, in order to assess the resilience of children and students to natural hazards, such as floods and earthquakes, a tool is needed to identify the hazardous circumstances and assess their resilience taking into account these conditions. Therefore, the LM-CRID-31Q native tool, which is specific to children (students) in the event of disasters, was utilized in the present study. To assess the level of resilience, the student participants who had an experience of flood or earthquake hazards were employed.

Methods

The present study was a cross-sectional descriptive-analytical study conducted in winter 2018. The study population consisted of the first and secondary high school students, both males and females. In Golestan province, Iran, three cities of Galikesh, Minudasht, and Kalaleh were selected as the three most risky cities in terms of flood in recent years. Moreover, due to the earthquake in Kermanshah province, Iran, Sarpol Zahab City as the most populated affected area of Kermanshah which was also in the acute phase of the incidence entered the study. The subjects were selected from the schools of each region using the random sampling method. The sample size was estimated to be at least 300 as 3 to 10 per each item of the questionnaire (17), however according to the experts, 650 questionnaires were distributed to allow for the inter-group comparisons as well as classification of 50 students in each gender group. Then, according to the statistics of the region, three cities of Galikesh, Kalaleh, and Minudasht were identified as the high risk areas in terms of flood in Golestan province. In each city, with the permission from the district education department, four first and secondary girls' and boys' high schools were randomly selected. For each high school, 50 students were selected by the clustering method from different groups and the questionnaire was explained to them in person, then the students completed the questionnaire in 30 minutes and submitted it to the researcher. 599 questionnaires were fully completed and entered the study.

The areas in the Golestan province were all in the post-disaster phase, thus considering the coincidence of the present cross-sectional study with the Kermanshah earthquake in the fall of 2016, the researcher collected 60 data from the earthquake affected students to assess the during-incident phase referring to the available data under the adverse earthquake conditions. The inclusion criteria were the willingness to participate in the study, coming from flood or earthquake-hit areas, male and female students aged 13 years and higher, and completion of all questionnaire items. The incomplete questionnaires or the ones in which only one option was chosen for all items were excluded from the study.

The LM-CRID-31Q questionnaire was exploited for data collection, which was a self-declaring questionnaire with a 5-point Likert scale design. This questionnaire was evaluated among the 13-18 year-old students in the affected areas with an experience of natural flood hazard in Golestan Province and the earthquake hazard in Kermanshah Province. The students were in the seventh to twelfth grades and the sampling was performed among them using the random cluster sampling method from the schools with respect to the gender proportionality. The questionnaire was completed at the school hours with the consent of the student and the teacher concerned.

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Table 1. Comparison of resilience among boys and girls in disaster resilience domains by educational level in selected areas, 2016

Gender	Girl		Boy		P
Education level	First high school	Secondary high school	First high school	Secondary high school	
Help	80.65 (16.24)	72.88 (16.63)	76.24 (15.01)	74.23 (16.11)	0.015
Creativity and dynamism	81.24 (18.11)	79.49 (14.83)	77.53(16.06)	75.26 (14.35)	0.014
Trust in God	89.94 (16.66)	90.46 (14.89)	84.40 (17.44)	87.17 (15.69)	0.003
Enthusiasm to learn	88.46 (14.40)	87.27 (14.5)	84.74 (16.18)	82.31 (19.46)	0.007
Adaptability	68.09 (22.53)	66.21 (19.19)	63.34 (21.42)	61.44 (18.38)	0.034
Acceptance of social responsibility	38.65 (26.37)	39.12 (23.82)	44.76 (24.67)	43.91 (26.10)	0.069
Hope	77.16 (21.84)	72.25 (20.52)	73.98 (19.41)	70.94 (23.42)	0.066
Self-confidence	84.27 (15.28)	80.63 (15.63)	76.91 (19.58)	80.14 (16.72)	0.002
Total resilience	79.33 (11.75)	75.92 (11.23)	74.62 (11.17)	73.69 (11.45)	0.015

The questionnaires were anonymously distributed to the students in order to adhere to the ethical standards, and the students were assured of confidentiality of their information.

The reliability was assessed by a re-test. For this purpose, the questionnaire was distributed to 60 students in two stages with an interval of 14 days, and the correlation obtained from the two tests was estimated. The Cronbach's alpha and the internal consistency (ICC) were calculated to be as 0.86 and 0.91, respectively. This study was approved by the research ethics committee of the University of Medical Sciences with the ethical code of IR.TUMS.SPH.REC.1395.1542.

Findings

Of the 650 questionnaires distributed, 599 completed questionnaires were received and entered the statistical analysis. From Golestan province, 200 (33.3%), 193 (32.2%), and 153 (25.5%) students from the three cities of Kalaleh, Minudasht, Galikesh entered the study, respectively. Besides, 53 (8.8%) students from Sarpol Zahab, Kermanshah Province, were studied. Of the 599 students, 309 (51.5%) were girls and the rest were boys.

The results of the cross-sectional study on 599 students in Golestan and Kermanshah regions on the students in the age range of 13 to 18 years in the eight domains of resilience indicated that the girls were more resilient compared to the boys. Table 1 presents the level of resilience in the domains by sex (Table 1). The overall resilience of the first and second high school students was significantly different in both sexes. Furthermore, there were significant differences in the components of help, creativity and dynamism, trust in God, enthusiasm to learn, adaptability, and self-confidence. The overall resilience and resilience in areas of help, creativity and dynamism, enthusiasm to learn, adaptability, and self-confidence were higher in the second high school girl group compared to the second high school girl group. However, the component of trust in God was higher in the second high school girl group in comparison to the other groups. In general, the girls' resilience was higher than that of boys (Table 2).

Although there was no significant difference in the overall resilience between the children in Kermanshah and cities of Golestan province, resilience was higher and more significant in areas of hope and acceptance of social responsibility among the Kermanshah children (Table 3).

Table 2. Descriptive values and comparison of resilience and areas in risk-attached cities of Golestan and Kermanshah provinces, Iran, in 2016

Area	Minudasht	Galikesh	Kalaleh	Kermanshah	P
Help	75.17 (16.52)	76.02 (17.46)	77.17 (14.71)	76.41 (17.74)	0.68
Creativity and dynamism	78.62 (15.38)	78.20 (16.76)	79.40 (15.05)	77.64 (20.74)	0.86
Trust in God	87.78 (16.86)	86.87 (18.32)	90.33 (13.11)	85.37 (18.84)	0.10
Enthusiasm to learn	85.62 (16.20)	86.60 (16.34)	86.95 (15.68)	82.38 (16.31)	0.29
Adaptability	66.58 (19.13)	64.59 (22.28)	63.87 (21.18)	66.03 (19.73)	0.59
Acceptance of social responsibility	40.80 (25.83)	40.35 (25.20)	39.79 (25.04)	51.57 (22.82)	0.02
Hope	72.92 (20.58)	72.49 (20.92)	73.29 (22.56)	82.86 (18.22)	0.01
Self-confidence	79.74 (16.87)	80.28 (16.93)	81.83 (16.25)	80.50 (20.14)	0.66
Total resilience	75.81 (11.79)	75.82 (12.34)	76.89 (10.64)	75.36 (12.12)	0.71

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Table 3. Comparison of mean resilience by gender

Area	Mean (SD)		Independent t-test
	Male (n = 289)	Female (n = 309)	
Help	75.57 (15.26)	76.67 (17.20)	t = 0.820 P = 0.400
Creativity and dynamism	77.04 (15.33)	80.21 (16.76)	t = 2.407 P = 0.010
Trust in God	85.89 (16.48)	90.39 (15.93)	t = -3.393 P = 0.001
Enthusiasm to learn	83.59 (17.54)	88.26 (14.26)	t = -3.561 P < 0.001
Adaptability	62.45 (20.36)	67.58 (20.75)	t = -3.046 P = 0.002
Acceptance of social responsibility	54.75 (25.17)	62.48 (24.85)	t = -3.770 P < 0.001
Hope	73.96 (21.23)	73.67 (21.43)	t = 0.162 P = 0.870
Self-confidence	78.60 (18.51)	82.57 (15.22)	t = -2.857 P = 0.004
Total resilience	74.43 (11.13)	77.72 (11.80)	t =- 3.496 P = 0.001

SD: Standard deviation

The paired t-test revealed that there was a significant difference (P = 0.001) in terms of the total resilience and resilience domains in both sexes.

Except for the areas of help and hope, the other six domains showed a significant difference in the resilience among the girls and boys. The resilience level in the girls in these areas was higher in comparison to that in the boys (Table 4).

The majority of 599 students had good and very good resilience (90.0%). However, regarding the resilience domains, the lowest resilience levels were obtained in the components of acceptance of social responsibility (22.2%) and adaptability (57.0%). In contrast, the highest rate of resilience was achieved in the components of trust in God and enthusiasm to learn (91.0%), followed by the components of creativity and dynamism, help, and hope as 83.7%, 80.3%, and 74.8%, respectively.

Conclusion

The measurement of resilience of 599 first and second high school students in Golestan and Kermanshah provinces using the CRDT tool with a questionnaire with 31 items was performed. The resilience percentages were obtained as 83.7%, 83.7%, 91%, 91%, 57%, 22.2%, 74.8%, 87.2%, and 90% for the areas of help, creativity and dynamism, trust in God, enthusiasm to learn, adaptability, acceptance of social responsibility, hope, self-confidence, and overall resilience, respectively, which were in good and very good condition. Based on triage principles, the research group considered the cases below 20% to be requiring serious emergency treatment. Scores of 20 to 40%, 40 to 60%, and above 60% required delayed treatment, required to be monitored, and were considered to be in good condition requiring no action, respectively. Given the current state of investing in social responsibility skills, the adaptation mood in the emergency phase was aimed at enhancing the resilience of students at risk, which is hoped to be on the planner's agenda.

Table 4. Comparison of the frequency of resilience levels in each of the disaster resilience domains, 2016

Resilience	n (%)				
Domains	Very low	Low	Medium	Good	Very good
Help	3 (0.5)	4 (0.7)	110 (18.3)	203 (33.8)	279 (46.5)
Creativity and dynamism	4 (0.7)	9 (1.5)	84 (14.0)	211 (35.2)	291 (48.5)
Trust in God	1 (0.2)	10 (1.7)	42 (7.0)	74 (12.3)	472 (78.7)
Enthusiasm to learn	2 (0.3)	5 (0.8)	46 (7.7)	116 (19.3)	430 (71.7)
Adaptability	16 (2.7)	36 (6.0)	205 (34.2)	180 (30.0)	162 (27.0)
Acceptance of social responsibility	137 (22.8)	148 (24.7)	181 (30.2)	85 (14.2)	48 (8.0)
Hope	14 (2.3)	30 (5.0)	106 (17.7)	162 (27.0)	287 (47.8)
Self-confidence	3 (0.5)	10 (1.7)	63 (10.5)	162 (27.0)	361(60.2)
Total resilience	-	2 (0.3)	54 (9.0)	306 (51.0)	237 (39.5)

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The higher resilience of girls (52.75%) compared to boys (47.25%) indicates the role of gender as a social component in resilience. In this study, resilience of girls in the six areas of creativity and dynamism, trust in God, enthusiasm to learn, adaptation, acceptance of social responsibility, and self-confidence were higher than in boys. It seems that giving responsibility to girls from an early age makes them more prepared to deal with difficulties. According to the results, it seems that resilience and hope in Iranian society are similar between boys and girls and there is no significant difference between these two components. However, the higher resilience in the areas of creativity and dynamism, enthusiasm to learn, adaptability, self-confidence, social responsibility, and trust in God in girls reflects the resilience of the individual, social, and psychological domains of girls in Iranian society. This level of resilience can reduce the vulnerability of girls more than in boys in the face of disasters. Planning for the development of individual and social skills of male children in the community seems to be paid less attention and needs attention and promotion. In fact, gender can have an impact on different components of resilience, depending on the culture of the community. As it was reported in the Study by Grotberg on child resilience in 22 countries, although boys and girls are similar in terms of the resilience frequency, the nature of resilience is different. For example, girls are more resilient in interpersonal components; however, boys have a higher level of resilience in the problem-solving component (18). This confirms the relative nature of resilience and, as stated earlier, each individual has a degree of resilience, whether intended or unintended (19).

In addition to gender, age is one of the other demographic factors that influence the resilience of children. Although aging seems to promote resilience in children, the results of this study do not confirm it. According to the comparisons in the table, the rate of resilience in the first and second high school groups (Table 4) showed that the rate of resilience in the 13-15 age group was significantly different from that of the 16-18 age group ($P = 0.022$).

The components of help, creativity and dynamism, trust in God, enthusiasm to learn, adaptability, and self-confidence in girls were more than in boys, indicating the skill-based resilience of this group, especially in the first high school level. Although the total resilience and resilience in areas of help, creativity and dynamism, enthusiasm to learn, adaptability, and self-confidence were higher in the first high school girls compared to the ones in the second high school, the component of trust in God was higher in the second high school girls. This can reflect a deeper understanding of the older ages of the spiritual matters. The low resilience of boys in the two high schools relative to girls depends on their gender, requiring attention and planning. This group was similar to the girls in terms of resilience and the second high school boys had higher level of resilience in the aforementioned components compared to the first high school and the second high school was higher only in the trust in God component. This shows that spiritual growth is directly related to age and education, and provides a better understanding of God and religious practices for children.

In addition to the total resilience, in the areas of help, creativity and dynamism, and hope, the resilience of the first group was higher, suggesting that although age promotes resilience in children, it does not have an increasing trend during adolescence and may have a decreasing slope. Of course, it seems that responsibility was higher in the age range of 13 to 15 years than the children aged 16 to 18 years, which has led to the higher accuracy when answering the questionnaires. The 16 to 18 year period, as faced by the researcher in the class, considered these issues as a joke and did not show serious interest in the study collaboration. Similar to the results of this study, de Mililani considered age as a factor of resilience in children and adolescents in addition to the risk experience (20). The study by Grotberg, which is one of the basic applied studies in the area of child resilience, has highlighted the effect of age (18). Comparison of the resilience rate of the children in three cities of Golestan Province with Kermanshah Province, which suffered from the earthquake risk at the time of the study, revealed that the resilience rate was different in the components of accepting social responsibility and hope. The high level of these two components in Kermanshah can be due to the impact of the hazard on promoting the resilience of children. Some believe that harsh conditions enhance the resilience of individuals (21,22) and this may be the result of this hypothesis. Facing difficulties

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and struggling to survive in Kermanshah children has promoted the sense of hope among them. Efforts to improve the socio-economic status can be one of the external components that require separate investigations regarding the social components affecting health and resilience.

Acknowledgments

This study was extracted from a PhD thesis performed in Tehran University of Medical Sciences, Tehran, Iran. The authors would like to appreciate the education department of Tehran province, all the schools of Golestan Province, including the principals, teachers, and high school students, girls and boys who collaborated in conducting this study.

Conflict of Interests

Authors have no conflict of interests.

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