Demographics, Military Status, and Physical Health as Indicators of Personal Resilience Among U.S. Active Duty Service Members and Veterans

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Abstract Personal resilience refers to the ability to constructively adjust and move forward with ones' life following tragic events or situations. However, few studies have examined the characteristics of highly resilient active duty military or veterans. This study examined the relationships between personal resiliency scores (The Resiliency Scale), demographics, general Self-Reported Health (SRH), and health symptomatology (Patient Health Questionnaire-15) among 263 U.S. active duty and veteran service members. Pearson Product-Moment Correlations, an Analysis of Variance, and Regression Analysis were used with a significance level of 0.05. Results showed that active duty service members were more resilient than the veterans in this population ($p < 0.05$). Findings also demonstrated that a higher education level, longer time on active duty, higher SRH, and lower symptomology were correlated with ($p < 0.05$) and contributed to greater resilience [$F(4, 258) = 26.18$, $p < 0.01$), $R^2 = 0.54$]. These results demonstrate the importance of health and education, perhaps pointing toward a protective qualities that may also include longer service time.

Keywords Resilience · Military · Health · Symptomology · Time-in-service · Education

1 Introduction

When describing material that is 'resilient', it is said that it has the quality of being able to return to its' original shape after being stretched, pulled, or otherwise manipulated into a shape different from its' normal state. Using this description, a

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rubber band is resilient. The term resilience has been adapted to refer to individuals, teams, organizations and governments [1]. Personal resilience refers to an individuals' capacity to return to one's original state, or close to it, by positively adjusting and continuing forward momentum in one's life following trauma or significant hardship [2, 3], and to do so while maintaining acceptable functional, social, and psychological capabilities [3].

Personal resilience is of great interest to the U.S. military [4]. Military service members face adversity during deployments into harms' way, including possible death and physical injury (their own or that of others), as well as long durations away from family and support systems, dealing with different cultures, and austere climates and living conditions. The families of service members also face challenges as they confront the possibility of the death or injury to their family member, handling daily life stressors without one parent, and frequent "starting over" in making new friends, finding new housing, and entering new schools during military moves. Family stress naturally translates to additional stress for the active duty service member. Both the service member and his (or her) family members also must confront the realities of the reintegration of the service member back into the family after long absences. This reintegration may entail the return of a family member who is injured and irrevocably changed from the person they were when they initially left on deployment. Building resilient service members may prevent deleterious outcomes of exposure to war such as post-traumatic stress, depression, mood disorders, marital difficulties, or dysfunction in the family or military units.

Resilience can be developed or enhanced [5–9] in a number of ways (experience, training, sharing of experiences) in ones' lifetime [1, 10, 11]. Therefore, the U.S. military services offer a variety of training approaches thought to enhance resiliency to their service members [12, 13]. However, there may be characteristics of those who are shown to be resilient that could be identified and perhaps considered when developing resiliency training programs.

The purpose of this research was to examine the relationships between resiliency scores and demographics, self-reported physical health and self-reported health-related symptoms among U.S. active duty and veteran service members. This information could offer initial information about potential protective factors that may enhance personal resiliency.

2 Methods

2.1 Participants

Active duty U.S. military service members and veterans were recruited as research volunteers from Joint Base San Antonio, Fort Sam Houston and the surrounding vicinity through information booths, briefings, fliers, and email advertisements. Volunteers were recruited for a larger study focusing on the effectiveness of

Mindfulness-Based Stress Reduction offered in-person and over a virtual world. The data for this study was collected prior to mindfulness training interventions. An oral and written explanation of the study was presented to all potential volunteers as part of the informed consent process, and individuals who wished to participate signed an informed consent form. Participation in the study was voluntary and volunteers were able to terminate their participation at any time during the study. Participants were not compensated for their participation.

2.2 Surveys

Research volunteers completed pre and post-training evaluations as part of the larger study. This paper includes information from the pre-training surveys only.

Demographics. The volunteers were asked to complete a demographic questionnaire including information on their age, gender, weight, height, marital status, education level, military status, number of deployments in harms' way, and time-in-service. Body Mass Index (BMI) was calculated for each volunteer based on the individual's self-reported weight and height, and BMI was consequently used for analysis.

Self-rated Health (SRH). Volunteers rated their present, overall health on a 5-point Likert scale (poor, fair, average, good, excellent), responding to the question "Overall, how would you rate your health?" [14, 15]. Similar ratings of health, used during Behavioral Risk Factor Surveillance, demonstrate a test-retest reliability of 0.92 [16].

Patient Health Questionnaire (PHQ-15). Volunteers completed the PHQ-15, a self-administered version of the PRIME-MD diagnostic instrument [17]. The PHQ-15 is an abbreviated somatic symptom subscale derived from the full Patient Health Questionnaire [17]. The PHQ-15 includes 14 of the 15 most prevalent DSM-IV somatization disorder somatic symptoms and is rated on a three point scale (0 = not bothered at all; 1 = bothered a little; 2 = bothered a lot). The questionnaire asks participants to rate the extent to which they have experienced somatic symptoms "during the past 4 weeks". Symptoms in the survey include stomach pain, back pain, pain in the arms, legs or joints, headaches, chest pain, dizziness, fainting spells, etc. [17]. The questionnaire has been shown to be a valid instrument [18, 19]. The agreement between PHQ diagnoses and those of independent mental health professionals was high (0.65) and the PHQ has an overall accuracy of 85 % and sensitivity of 75 % [18].

Resilience Scale (RS-14). The 14-Item Resilience Scale (RS-14) [20] is a shortened version of the Resilience Scale (RS) [21]. The RS-14 includes 14 items with a 7-point scale for each item (1 = strongly disagree, 7 = strongly agree). The total score serves as an indication of a person's resilience, measuring an individual's ability, strength, and resources to manage and respond to life events. The RS-14 has high internal consistency reliability (0.93) and convergent validity (r = 0.63) [20].

2.3 Statistics

Descriptive analyses included identifying frequencies, means and standard deviations for outcome measures. T-tests were used to discover the difference in resilience among the demographics for two groups (i.e. gender) and one-way ANOVAs were used for groupings larger than two (i.e. race, marital status, education level, and military status). Pearson Product-Moment correlations were used to examine the association between the RS-14 resilience scores and demographic measures, the SRH, and PHQ-15 scores. A linear regression was carried out to investigate how the associated factors contribute to resilience scores. Data analyses were conducted with the IBM SPSS Statistics for Windows (Version 22, Armonk, NY: IBM Corp, Released 2013) using a significance level of 0.05.

3 Results

3.1 Descriptive, Correlation, and Group Comparisons

A total of 263 volunteers participated in the study. Volunteers' demographic data are shown in Table 1. Volunteers ranged in age from 24 to 74 (M = 47.78, SD = 12.13), 53.6 % were male and 66.2 % were veterans (66.2 %). The majority were Caucasian (53.2 %), married (56.7 %), and had attended some college (93.9 %).

The means and standard deviations of age, BMI, SRH, PHQ-15, time in service and the number of deployments in harm's way are shown at the bottom of Table 1. The SRH mean for all volunteers was 2.53, between average and good health. The percentages of volunteers falling into each of the SRH rating are shown in Table 2, showing the majority of volunteers rated their health as good.

The mean value for all volunteers on the PHQ-15 of 10.07 is in the medium range for symptom severity. Table 3 shows that the majority of volunteers fell into the low range for symptom severity.

The average resilience score of all participants was 75.13, which falls in the moderate range for resilience. The frequencies and percentages of those participants who fall into each of the resilience categories are shown in Table 4, showing most of the volunteers' resilience scores were in the moderately high range.

The resilience scores of the demographic groups are listed in Table 1. Resilience scores were not found to be different for gender, race, or marital status ($p > 0.05$). Resilience scores were different for military status [$F(3, 259) = 3.48$, $p < 0.05$]. A Tukey HSD post hoc analysis showed that active duty service members scored higher in resilience than veterans ($p < 0.01$). Reserves and Guard were not significantly different from active duty or veterans in resilience. Resilience scores were

Table 1 Descriptive results for demographic groups and resilience scores for each group, and correlations between resilience and demographic features

	N	(%)***	RS-14 Scores	(SD)
Gender				
Male	141	(53.6)	74.09	(17.64)
Female	122	(46.4)	76.33	(15.65)
Education**				
GED/High school	16	(6.1)	64.25	(15.47)
Some college/associate's	85	(32.3)	70.05	(18.90)
Bachelors	67	(25.5)	77.24	(14.90)
Masters/Doctorate	77	(29.3)	80.94	(13.47)
Other professional	18	(6.8)	76.06	(16.18)
Race				
African American	66	(25.1)	78.12	(14.37)
Native American	4	(1.5)	77.25	(14.84)
Caucasian	140	(53.2)	74.21	(17.11)
Hispanic	46	(17.5)	72.52	(19.13)
Asian	5	(1.9)	80.80	(15.68)
Other	1	(0.4)	84.00	–
Marital status				
Married	149	(56.7)	76.43	(16.05)
Divorced	56	(21.3)	74.13	(19.41)
Widowed	3	(1.1)	72.33	(10.02)
Single/Separated	45	(17.1)	72.89	(15.08)
Living with significant other	10	(3.8)	72.20	(20.50)
Military status*				
Active duty	79	(30.0)	80.11	(14.53)
Reserve	6	(2.3)	73.67	(8.62)
Guard	4	(1.5)	70.00	(16.59)
Veteran	174	(66.2)	73.03	(17.50)
	M	**(SD)**	**Correlation with RS-14**	**(N)**
Age	47.78	(12.13)	0.048	(263)
BMI	28.10	(4.64)	−0.056	(263)
SRH	3.47	(1.02)	0.453**	(263)
PHQ-15 total score	10.07	(5.76)	−0.384**	(263)
Time in service	14.89	(8.63)	0.264**	(263)
Number of deployments in harm's way	1.52	(2.23)	0.081	(177)

*Significant at the 0.05 level

**Significant at the 0.01 level

***The categories with a total of less than 263 have missing values, the total percentage may not be exactly 100 due to missing data or rounding

Table 2 Self-reported health by category (n = 263)

	Frequency	Percent (%)	RS-14 score	SD
Poor (5)	9	3.4	46.56	11.76
Fair (4)	47	17.9	68.81	18.08
Average (3)	48	18.3	69.21	17.27
Good (2)	130	49.4	78.70	13.69
Excellent (1)	29	11.0	88.00	8.00

Table 3 Patient health questionaire-15 score frequencies and percentages (n = 263)

Symptom severity	Frequency	Percent (%)	RS-14 Score	SD
Minimal (0–4)	52	19.8	85.06	10.83
Low (5–9)	80	30.4	78.49	15.72
Medium (10–14)	65	24.7	69.65	17.03
High (15 and above)	66	25.1	68.62	16.95

Table 4 Resilience scale frequencies and percentages for volunteers (n = 263)

	Frequency	Percent (%)	RS-14 score	SD
Very low (14–56)	36	13.7	43.50	10.54
Low (57–64)	25	9.5	60.24	2.54
On the low end (65–73)	40	15.2	69.08	2.53
Moderate (74–81)	44	16.7	77.68	2.22
Moderately High (82–90)	72	27.4	85.60	2.53
High (91–98)	46	17.5	94.39	2.47

higher for participants with higher education [$F(4, 258) = 6.79$, $p < 0.01$]. A Tukey HSD post hoc analysis showed that participants with GED/High School diploma had lower resilience than those with Bachelor's, Master's or doctoral degrees ($p < 0.05$); the participants with Master's or doctoral degrees showed higher resilience than those with some college experience or an associate degree ($p < 0.01$).

Pearson Product Moment correlations showed positive correlations between resilience and SRH and between resilience and time-in-service ($p < 0.01$, see Table 1). That is, higher scores on SRH and a longer time spent on active duty were associated with higher resilience. Resilience was negatively correlated with PHQ-15 scores, demonstrating that the more somatic complaints reported, the lower the resilience. Age, BMI and number of deployments in harm's way were not significantly correlated with resilience ($p > 0.05$).

Table 5 Linear regression predicting resilience

	Unstandardized coefficients		Standardized coefficients	t
	B	Std. error	Beta	
Constant	50.105	5.563		9.007
Time in service	0.368**	0.105	0.189	3.486
Education level	1.766*	0.877	0.112	2.012
Health rating	5.419**	1.032	0.329	5.253
PHQ total score	−0.448*	0.184	−0.154	−2.443

*Significant at the 0.05 level
**Significant at the 0.01 level

3.2 *Regression*

A simple linear regression was calculated to predict resilience scores based on measures that were significantly correlated with resilience, including education level, SRH, PHQ-15 total score and time-in-service. A significant regression equation was found [$F(4, 258) = 26.18$, $p < 0.01$], with an R^2 of 0.54, thus accounting for 54 % of the variability. The results from the regression are shown in Table 5.

4 Discussion

The majority of the active duty service members and veterans who volunteered for this study were highly educated, reported their health as good, and their resilience as moderately high. Approximately 62 % of the volunteers for this study had a bachelors' degree or higher and 93 % had attended some college. A 2008 report using manpower and personnel files from the Defense Manpower Data Center noted that among enlisted personnel from all services, that 93 % had a high school diploma or above, and 90 % of officers had a Bachelor's degree. Approximately, 1 % of enlisted personnel lack a high school degree, compared to 21 % of men in the civilian sector between the ages of 18–24 years of age [22]. As the education level in our population increased, resilience increased, demonstrating that knowledge appears to enhance resiliency. Although we did not find information on this relationship in the resilience literature, the idea that greater knowledge resilience speaks to characteristics associated with resilience, such as cognitive fitness, adaptability, and active problem solving [1].

Responses to the general SRH question are indicative of one's physical [23] and psychological health [24]. This supports the literature in which physical fitness is associated with resilience [25], as is emotional fitness [4, 25]. Emotional fitness related to resilience includes self-regulation, stability, and flexibility [1].

Somatization occurs when an individual has vague or recurring physical symptoms with no discernable physical or medical explanation. The symptoms are not being falsified, however, and the symptoms may cross various systems in the body, such as digestive, visual, neurological, and orthopedic pain symptoms. The symptoms are most often associated with individual psychological distress, such as anxiety or depression. Higher somatization symptoms are seen in those with high scores on the Post-traumatic Stress Disorder Checklist [26] and somatization has been added to the DSM-V symptoms of PTSD [27]. Individuals with somatic symptoms are often seen in primary care clinics and somatization is associated with impaired function and heavier healthcare use [10]. Hence, our findings that higher somatization is associated with lower resilience further supports the above mentioned concepts of resilience being associated with physical and emotional health [4, 25].

Longer time spent on active duty was also indicative of greater resilience. There are a number of possible rationales for this. Individuals who remain on active duty receive additional education to prepare them for each new increase in their military responsibilities. In general, over a full career a person in the enlisted ranks would attend basic training, advanced individual training, basic and advanced leadership courses, senior and master leadership courses, and the Sergeants Major Course. An officer could attend Officers Basic Training, the Captains Career Course, Intermediate Level Education, the School of Advanced Military Studies, School for Command Preparation, and Senior Service College. In addition, individuals are often sent to other training that may pertain to the military and/or training specific to their occupational specialty or to their next duty station (such as training to take a command position). The longer an individual spends on active duty, the more training and education they are likely to receive. However, in our population, although the active duty service members spent slightly longer on active duty than the veterans, the difference was relatively small (active duty time in service = 15.80 $\pm$ 8.61; veteran time on active duty = 14.52 $\pm$ 8.83. A second possible explanation is that military service encourages adaptability and flexibility, as they move to new locations and assignments, deploy, and take on new jobs of ever increasing responsibility. With each new duty station comes new supervisors, new co-workers, physical locations, and job duties. Also, should there be disagreements between co-workers or between a supervisor and supervisee, there is not an option to leave. Therefore, the active duty service member must learn to adapt to the situation and make it as acceptable and productive as possible. Overall, the lifestyle of an active duty service member provides experiences that are likely to increase the following characteristics associated with resilience: accepting reality and situations they cannot directly alter [4, 25, 28]; a "can do" attitude (initiative taking and perseverance) [29, 30]; flexibility [29, 31]; and physical fitness [4, 25]. Again, while the time in service was only 1.28 years greater among active duty service members when compared with veterans, they are still embedded in the military culture. Third, social support systems are also associated with resilience [32] and remaining on active duty may lend social support through continued contact with others who have had similar experiences.

In order to have a more resilient military force, the information gained from this study could be applied in the following ways:

- Recruit individuals for military who have higher levels of education.
- Provide additional education, earlier in the service members' careers.
- Promote physical, cognitive, and emotional health.
  - Continue to provide physical fitness training, along with early assessment of physical injury, and provision of physical rehabilitation, when needed.
  - Provide mental fitness training that touches on both cognitive and emotional health.
  - Consider combining fitness training, giving equal consideration to both physical and mental fitness or combine combatant training with mental fitness training in a manner similar to martial arts training.
  - Reinforce concepts and actions that promote cognitive adaptation.
- Emphasize the characteristics of resilience during military training to include those not mentioned in this paper, but delineated elsewhere [1].
- Continue to assess and identify characteristics of resilience important for military service members.

5 Limitations

The data collected in this study were from a cross-section of a population at a particular point in time, thus additional longitudinal research is needed to further investigate the relationship between resilience and demographic features over time. Self-report measures used in this study made it possible for the participants to respond with a bias of making a better impression on other people (even though volunteers were aware than only the researchers would see their data). Additional performance based measures, if available, could be beneficial for future investigations. Finally, the results in this study are from active duty military and veteran volunteers, under non-deployment conditions. Caution should be used in applying these results to other populations.

6 Conclusions

Among this population of military active duty and veterans, a higher level education, more time spent on active duty, a higher rating of self-reported health, and lower somatization predicted higher personal resilience, accounting for 52 % of the variability. In addition, those on active duty were more resilient than those who were military veterans. It appears that improving resilience among service members

should entail fostering education, physical and mental fitness, and the experiences and training that encourage development of characteristics associated with resilience.

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