PSYCHOLOGY

Juscelino Araujo Zampiere Filho[1(ABCDEF)],
Dirceu Ribeiro Nogueira da Gama[2(ACDEF)],
Juliana Brandao Pinto de Castro[3(ACDEF)], Rodrigo Gomes de Souza Vale[4(ACDEF)]

1 ORCID: 0000-0003-1971-2588
Rio de Janeiro State University, Postgraduate Program in Exercise and Sport Sciences, Institute of Physical Education and Sports, Rio de Janeiro (Brazil)
2 ORCID: 0000-0003-4972-650X
Rio de Janeiro State University, Postgraduate Program in Exercise and Sport Sciences, Laboratory of Exercise and Sport (LABEES), Rio de Janeiro (Brazil)
3 ORCID: 0000-0002-5656-0782
Rio de Janeiro State University, Postgraduate Program in Exercise and Sport Sciences, Laboratory of Exercise and Sport (LABEES), Rio de Janeiro (Brazil)
4 ORCID: 0000-0002-3049-8773
Rio de Janeiro State University, Postgraduate Program in Exercise and Sport Sciences, Laboratory of Exercise and Sport (LABEES), Rio de Janeiro (Brazil);
Estacio de Sa University, Laboratory of Exercise Physiology, Cabo Frio, RJ (Brazil)
Corresponding author: Juliana Brandao Pinto de Castro
Affiliation: Universidade do Estado do Rio de Janeiro, Laboratório do Exercício e do Esporte (LABEES)
Address: Rua Sao Francisco Xavier, 524, Pavilhao Joao Lira Filho, 9º andar, Bloco F, sala 9134/5, Maracanã, Rio de Janeiro, RJ, Brasil, CEP: 20550-900
e-mail: julianabrandaoflp@hotmail.com – phone: +55(21)2334-0448

Analysis of the associations between self-esteem and resilience of *krav maga* practitioners

Abstract

Background. Resilience and self-esteem are psychological qualities that help to deal with conflicting situations of everyday life. The martial arts provide the integral development of the individual, contemplating physical and psychic aspects.

Aim. To investigate resilience and self-esteem levels of Krav Maga practitioners.

Methods. The sample comprised 399 practitioners (283 men and 112 women) associated with the South American Federation of Krav Maga. Resilience and self-esteem were assessed using the Connor-Davidson Resilience Scale (CD-RISC) and the Rosenberg Self-Esteem Scale (RSES), respectively. Sociodemographic data were collected using a questionnaire.

Results. Most of the sample was composed of post-graduates (38.8%) and the orange belt (21.4%). Male students showed higher values of age, time of practice, and self-esteem (p <0.05) when compared to female students. The Spearman correlation test showed a positive and significant association between self-esteem and resilience (rho = 0.552; p < 0.001). Schooling was related to self-esteem (rho = 0.313; p < 0.001) and resilience (rho = 0.142; p = 0.004). The longer practice time was associated with higher levels of resilience (rho = 0.173; p = 0.001) and self-esteem (rho = 0.207; p < 0.001).

Conclusions. The regular practice of Krav Maga is associated with higher levels of self-esteem and resilience.

Introduction

Martial arts are techniques of the corporal fight, involving or not implements like daggers, sticks, or swords, aiming at subjugating opponents [Martinez Guirao 2010]. Unlike combat sports, *stricto sensu* martial arts are not guided by the competitive principles of modern sports, which purpose is to discern the most skilled individuals in coping situations based on previously agreed rules and valid for everyone [Bromley *et al.* 2018]. Examples of martial arts without a sports inclination are the original *jiu-jitsu, aikido, kendo*, and *krav maga*.

Krav maga consists of a self-defense system developed by the armed forces of Israel throughout the 20th century, based on the combination of traumatic blows, falls, twists, and strangulations [Mor 2018]. However, in the last 50 years, the teaching of Krav maga has surpassed the military sphere, also including civilians. Its adhesion is observed in the main nations of Europe and the Americas [Samson 2019]. The reason for this was not only the recognition of the efficiency of the proposed combat techniques but also the possible positive effects resulting from their systematic training for physical fitness [Samson 2019].

Krav maga martial artists tend to increase their levels of strength, speed, reaction time, balance, aerobic power, and muscle endurance as they become veterans [Di Bacco *et al.* 2020; Staller *et al.* 2017]. Moreover, positive changes in body composition are documented among the effects provided by its practice [Andrade Neto *et al.* 2020]. However, as it is a martial art, it is common for skin, ocular, bone, joint, and muscle lesions to occur [Staller *et al.* 2017]. Review studies indicate that the persistence of such situations for extended periods tends to have an impact on the production of negative emotions, such as insecurity, demotivation, fear, anger, and aggression [Slimani *et al.* 2017; Andrade *et al.* 2020; Quel, Bennet 2019]. In extreme cases, such imbalances can develop into severe behavioral disorders, such as phobias, melancholy, anxiety disorder, and depression [Samulski 2002].

A psychological quality whose assimilation and improvement contribute to minimizing the negative impacts inherent to these situations of uncontrolled is resilience [Silva, Oliveira 2017]. This quality refers to the ability to cope with stressful events because of positive mental adaptations developed after an exposure stage [Silva & Oliveira, 2017]. The more resilient the subject becomes, the better the ability to adjust to the pressures suffered and devise mechanisms to overcome them [Gama *et al.* 2018; Nezhad, Besharat 2010]. Social and personal factors determine resilience. On the social plane, it is influenced by cultural experiences, education level, family interactions, friendships, and interpersonal relationships. At the individual level, it is conditioned by temperament and personality traits [Campbell-Sills *et al.* 2006; Mancini, Bonano 2009].

Usually, resilient people deal with problems in a mature way because they act to identify the main causes to build rational strategies for solving them [Mancini, Bonano 2009]. This procedure increases the chance of being successful. When this happens, they tend to represent themselves as potentially competent and assertive individuals [Mancini, Bonano 2009]. In turn, the self-perception of success increases self-esteem, understood as the optimistic assessment of the own abilities and the criticism of personal conduct, feelings, and beliefs [Litwic-Kaminska 2013; Kapikiran, Acun-Kapikiran 2016].

The information exposed allows us to suppose, as a study hypothesis, that krav maga practitioners with high levels of resilience also exhibit high self-esteem because they can better withstand the adversities that arise in the daily training (such as fatigue, injuries, and pain), as they seek to solve them with directivity and effectiveness. Therefore, the present study aimed to investigate the levels of resilience and self-esteem of krav maga practitioners.

Methods and methods

Participants

The present study is characterized as a descriptive, correlational, and cross-sectional survey [Thomas *et al.* 2015]. The research comprised active *krav maga* practitioners, duly associated with the South American Federation of Krav Maga (FSAKM), with the headquarters located in the city of Rio de Janeiro, Brazil. The participants needed to be training krav maga constantly for at least six months to be included in the study. Individuals who did not completely answer the anamnesis and questionnaires were excluded from the study.

This study followed the ethical recommendations of research with human beings, according to Resolution 466/12 of the National Health Council [Brazil 2013]. This study was authorized by the FSAKM. The request to the FSAKM was made on March 30, 2020. After authorization from the federation, questionnaires were sent to students via the internet and answered in the period from April 7 to 14, 2020.

Data collection procedures

Self-esteem was measured through the application of the Rosenberg Self-Esteem Scale (RSES), revised and adapted to the Portuguese language by Hutz and Zanon [2011]. RSES was developed based on a survey of 5024 participants of both sexes, from different social classes, ethnicities, and educational levels. This scale consists of 10 questions that assess self-esteem in adolescents and adults. Each question is composed of Likert items from 0 to 3 points (strongly disagree = 0; disagree = 1; agree = 2; strongly agree = 3). Positive (1, 2, 4, 6, and 7) and negative (3, 5, 8, 9, and 10) statements are mixed and the

result is obtained by adding the score according to the responses of the participants. A score below 15 indicates extremely low self-esteem, between 15 and 25 points demonstrates healthy self-esteem, and a score above 25 corresponds to strong and solid self-esteem.

Resilience was assessed using the Connor-Davidson Resilience Scale (CD-RISC), adapted to the Brazilian socio-cultural and idiomatic context by Lopes and Martins [2011]. This questionnaire consists of 25 items arranged on a Likert scale from 0 to 4 points. CD-RISC is used to assess how much people can perceive their ability to adapt to the changes imposed by the environment and reflect the ability to recover from challenges and negative experiences. The score varies between 0 and 100 points. The closer to 100, the greater the resilience.

Furthermore, a sociodemographic questionnaire was applied to gather information on age, sex, location, practice time, belt graduation, schooling, and training frequency. This questionnaire collected data with 9 items concerning age, schooling, time of krav maga practice, belt color, frequency of training sessions per week, and number of hours of training sessions per week.

Age, schooling, practice time, weekly training frequency, number of weekly hours trained, and belt graduation level are, respectively, indicators of the individual's life experience, the formal educational level obtained, and the personal experience accumulated in the field of krav maga. Therefore, they serve to inform the maturity of the individuals, the levels of specific knowledge of the modality, and the amount of academic knowledge they had access to. Thus, they consist of variables that can exert some influence on the expectations that the subject has (self-esteem), and the capacity to mold the behavior to adverse situations (resilience).

Statistical analysis

The data were treated using the IBM SPSS Statistics 25 program and presented as mean, standard deviation, minimum and maximum values, and absolute and relative frequencies. The normality of the data was verified by the Shapiro-Wilk test. The t-Student or Mann-Whitney tests, when appropriate, were used to compare genders (male *vs.* female). We applied the Spearman correlation test to analyze the possible associations between the study variables. The study adopted a level of $p < 0.05$ for statistical significance.

Results

The sample consisted of 399 krav maga practitioners (283 male students and 112 female students). Schooling was from elementary school to postgraduate school, divided into incomplete elementary school (2%), complete elementary school (0.5%), incomplete high school (3.8%), complete high school (7.8 %), incomplete higher edu-

cation (16.3%), complete higher education (30.8%), and postgraduates (38.8%). The belt graduations were white (6.5%), yellow (16.5%), orange (21.4%), green (16.4%), blue (12.3%), brown (17.2) %), and black (9.7%). The descriptive results of the sample are shown in Table 1.

Table 1. Descriptive results of the general sample (n = 399).

Variables	Mean	SD	Minimum	Maximum
Age (years)	37.17	11.31	18	68
Schooling	5.84	1.33	1	7
Practice time (years)	3.06	1.72	1	7
Belt graduation	2.92	1.28	1	5
Freq/week	2.23	0.97	1	6
Hour/week	3.46	2.12	2	11
Self-esteem (score)	22.79	4.73	4	30
Resilience (score)	72.74	12.53	23	100

SD: standard deviation; Freq/week: frequency of training days per week; Hour/week: frequency of training hours per week.

Table 2 presents the characteristics of the sample separated by gender. In the comparisons of the study variables between the sample groups (male *vs.* female), the male group had the highest values for age, practice time, and self-esteem ($p < 0.05$) when compared to the female group. The other variables did not show significant differences.

Table 2. Descriptive results of the male (n = 287) and female (n = 112) sample groups.

Variables	Male (Mean ± SD)	Female (Mean ± SD)	Δ	p-value
Age (years)	38.11 ± 11.38	34.76 ± 10.83	3.35*	0.008
Practice time (years)	3.33 ± 1.78	2.36 ± 1.32	0.98*	<0.001
Freq/week	2.26 ± 1.01	2.16 ± 0.85	0.10	0.352
Hour/week	3.58 ± 2.24	3.15 ± 1.74	0.43	0.068
Self-esteem (score)	23.13 ± 4.60	21.93 ± 4.97	1.20*	0.014
Resilience (score)	73.09 ± 12.86	71.84 ± 11.65	1.25	0.183
Schooling	5.79 ± 1.34	5.95 ± 1.29	-0.15	0.293
Belt graduation	2.97 ± 1.25	2.79 ± 1.34	0.17	0.193

SD: standard deviation; Freq/week: frequency of training days per week; Hour/week: frequency of training hours per week; Δ: absolute mean difference; * $p < 0.05$.

Table 3 shows the results of the Spearman correlation test. There were positive and significant correlations between self-esteem and age, education, and practice time ($p < 0.05$). There were positive and significant correlations between resilience and age, schooling, practice time, and hours per week ($p < 0.05$). The study showed a positive and significant correlation between self-esteem and resilience ($p < 0.05$).

Table 3. Results of the correlation test between the study variables.

		Age	Schooling	PT	Belt	Freq/week	Hour/week	Self-esteem
Schooling	rho	0.394*						
	p-value	<0.001						
PT	rho	0.182*	0.167*					
	p-value	<0.001	0.001					
Belt	rho	0.117*	0.052	0.034				
	p-value	0.020	0.303	0.496				
Freq/week	rho	-0.010	0.013	0.178*	0.008			
	p-value	0.841	0.800	<0.001	0.879			
Hour/week	rho	-0.051	-0.055	0.376*	-0.031	0.615*		
	p-value	0.312	0.272	<0.001	0.534	<0.001		
Self-esteem	rho	0.393*	0.313*	0.207*	0.063	0.072	0.069	
	p-value	<0.001	<0.001	<0.001	0.208	0.152	0.172	
Resilience	rho	0.168*	0.142*	0.173*	0.048	0.033	0.116*	0.552*
	p-value	0.001	0.004	0.001	0.343	0.509	0.021	<0.001

PT: practice time; Freq/week: frequency of training days per week; Hour/week: frequency of training hours per week; * p < 0.05.

Discussion

The present study aimed to investigate the resilience and self-esteem levels of krav maga practitioners. In comparative terms, the male group showed higher values of age and practice time than the female group. This indicates that age issues did not rise to men as obstacles to initiation and permanence in Krav maga training. Besides, it was noted that men were likely to continue training for longer periods than women.

The sample recruited in our study, which was indicated by the FSAKM, had a different number of males and females, with more men (72%) than women (28%). This data reflects the relative representativeness of the population of South American Krav Maga practitioners. This result is consistent with the survey type-study carried out by Alsarve and Anne Tjonndal [2020] with mixed martial arts athletes in Sweden and Norway. Through a culturalist approach, the authors considered that spaces for the practice of martial arts are niches where the reproduction of male values still prevails. For them, men who associate their existential situation with virility, strength, resistance to pain, and agonism feel prone to frequent such environments because they understand that these spaces are suitable for the re-foundation of the physical, moral, and psychic conditions that guide their social identities.

Alsarve and Anne Tjonndal [2020] highlighted the importance of remembering that martial arts academies are places where teaching-learning processes of combat content take place. The authority of the master as a source of unquestionable knowledge consists of an absolute value in most of these academies. Although people join them for reasons related to the adoption of an active lifestyle in the contemporary era, it must be remembered that, in their pedagogical contexts, imaginary reproduction of situations with a warlike aspect occurs. On the historical plane, according to the authors,

the act of warfare is a symbolic attribute linked to the male gender. However, they reiterate the need for such a hypothesis to be complemented by empirical research.

Another difference found in the present study concerns self-esteem, which was significantly higher in the male segment compared to the female segment. This finding differs from the results of the research by Weiss and Miller [2019] on the psychological effects of taekwondo, in the short and long term, on 57 American fighters with ages ranging from 18 to 61 years. In this research [Weiss, Miller 2019], there was no detection of a statistically significant difference between men (n = 32) and women (n = 24) in the self-esteem item. However, in an investigation carried out with 80 Indian taekwondo practitioners (40 men and 40 women) between 17 and 28 years old, Rana and Yadav [2018], registered higher levels of self-esteem precisely in the female group. Likewise, in a study performed with 161 Romanian taekwondo athletes, whose average age was 21.18 ± 2.34 years, Kumartaşli *et al.* [2017] identified the female fighters' self-esteem (n = 79) surpassing that of the male fighters (n = 82). The information made available in the studies listed allows us to estimate that, at first, strict gender factors are not determinants in the structuring of the self-esteem of combat sports and martial arts practitioners.

Positive and significant correlations between age, schooling, and practice time with self-esteem were also observed in the present study. Qurban *et al.* [2019] offer theoretical support for understanding such a relationship. According to the authors, the more the evolution of the specific expertise of an individual in the motor, tactical, and mental planes is accompanied by the learning of scientific, philosophical, artistic, and political knowledge, the greater the personal aptitude becomes to critically assess abilities and limitations. The main consequence of this combination is the increase in self-knowledge, which affects the development of rational ways of acting,

that is, without impulsiveness. As a result, the probability of making weighted decisions daily increases, and with that, the positive diagnoses of themselves. To this, it is crucial to recognize that the choices made have been accompanied by successful developments.

Resilience, in the present study, showed positive and significant correlations with practice time and training hours per week. This result was consistent with the investigation by Yarayan *et al.* [2018], who detected the same relationship in Turkish boxers and karatekas. For them, the training volume was an intervening variable in improving resilience over the years. Similarly, Pujszo *et al.* [2019] noted that German judo, jiu-jitsu, and taekwondo practitioners of both sexes increased the levels of perseverance and sense of consequence of their actions, as resilience categories, as they gradually graduated from the white to the black belt. Thus, the temporal perception of the fighters that there have been improvements in their athletic and technical states, as well as the recognition of peers in this regard, has an impact on the desire to achieve goals and not give in to difficulties.

Similarly, age showed positive and significant associations with resilience in the present study. The survey conducted by Kilic [2020] reached a similar result, showing increases in the resilience levels of 104 Turkish karatekas of both sexes and mean age of 19.85 ± 4.10 years in line with the increase in ages. On the other hand, the study carried out by Sahin and Guclu [2018] found no links between age and resilience among Turkish footballers. Contrary to these findings, the research by Cutuk *et al.* [2017] found inverse correlations between resilience and age among university *judo* athletes. Mancini and Bonano [2009] propose a phenomenological explanation for this issue. Age does not, in itself, correspond to a variable that has too strong an impact on resilience when conceived from a quantitative bias. More important than the number of accumulated years is the set of difficulties that the subject had access to during existence and that forced the athletes to improve the ways of consciously dealing with those difficulties. Hence, it is not the sum of years that have passed, but the quality of the experiences that have taken place over the years that can make someone more or less resilient to the appearance of discomfort.

Positive and significant correlations between resilience and schooling detected in the present study reiterate the findings of Gama *et al.* [2018]. In their research with *jiu-jitsu* and kickboxing Brazilian athletes, the authors found that the resilience of individuals with higher schooling had greater scores than that of peers whose schooling was limited to high school. Regarding this finding, Southwick *et al.* [2011] argue that, as schooling progresses, the obligations to be fulfilled by students become stricter and, consequently, stress. Moreover, this variable can be amplified by aspects of personal life, such as the need to reconcile study with work, married life,

and control of financial expenses according to the costs of food, clothing, purchase of teaching materials, among others. Furthermore, in the case of higher education, the mandatory production of papers and studies for scientific congresses, the writing of dissertations and theses, and the progressive introduction to teaching in higher education also require emotional balance and overcoming. Therefore, the higher the level of education, the more complex the pedagogical challenges to be overcome.

Finally, the present study observed a positive and significant correlation between self-esteem and resilience. The investigations by Tian *et al.* [2018], Balgiu [2017], and Arslan [2019] conducted with high school and university students reached similar results. Self-esteem works as an internal protective factor of psychic health, leveraging the improvement of cognition and emotional balance [Tian *et al.* 2018]. Consequently, this promotes the person's adaptability to stressful situations, as well as strengthens the ability to resist displeasure and even reverse it.

Moore *et al.* [2018] found a similar result in an investigation carried out with 283 secondary school students undergoing a martial arts initiation program in Australia. Students aged between 12 and 14 and performed 50-minute training sessions once a week. After the first 12 weeks of training, the levels of resilience and self-esteem increased in the intervention group in relation to the control group. The authors suggest that this increase occurred because the learning of motor techniques of attack, defense, and fall had an impact on the production of a positive body image, which was also associated with increased expectations of self-efficacy, subjective sense of well-being, and optimism. However, they emphasize the need to map to what extent the teaching methodologies used, and the teacher's didactic posture are potential intervening factors in these acquisitions.

A limitation of the present study concerns the nature of cross-sectional research. This means that the relationship between self-esteem and resilience was estimated at just one time and was not measured again on later occasions. Thus, the study does not allow for assessing how resilience and self-esteem behave over time.

Conclusions

The present study showed positive associations between resilience and self-esteem of *krav maga* martial artists. The guiding hypothesis of our investigation was confirmed. Regarding the positive correlations of resilience and self-esteem with age, education, and practice time, they can be explored pedagogically by teachers of the modality to encourage their students to see the obstacles that arise in their daily training as opportunities to improve their physical, technical, and psychic conditions. In addition, they should encourage them to increase and diversify schooling and learning content not necessarily

linked to *krav maga*. Such feedback is of value for affective and cognitive-moral maturation.

The positive association between resilience and self-esteem illustrates one of the central ideas raised by the conceptual framework that underlies Jungian Psychoanalytic Therapeutics. According to it, the development of psychic mechanisms for coping with daily adversities is favored when the subject becomes more aware of the positive qualities that must be improved or maintained, added to the negative ones that need to be kept under surveillance. That is, the enlightened restructuring of personal existence is not disconnected from the experience of the external world and vice versa. Therefore, one learns to overcome problems by looking at them to solve them; the counterpart of those who do not shy away from this exercise is the expansion of self-confidence and the ability to extrapolate such an attitude to the most adverse contexts. However, the awakening of this attitude is not necessarily spontaneous, often requiring social support or motivating stimuli. Teachers can serve as one of these vectors.

Future studies should analyze the interrelationships between resilience and self-esteem according to a longitudinal perspective. Through them, it will be possible to infer how both behave on a temporal scale.

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Analiza związku między poczuciem własnej wartości a odpornością psychiczną praktykujących Krav Maga

Słowa kluczowe: sztuki walki, sporty, odporność psychiczna, poczucie własnej wartości, zachowanie, osobowość

Streszczenie

Tło. Odporność psychiczna i poczucie własnej wartości to cechy psychologiczne, które pomagają radzić sobie z konfliktowymi sytuacjami codziennego życia. Sztuki walki zapewniają integralny rozwój jednostki, uwzględniając aspekty fizyczne i psychiczne.

Cel. Celem badania było zbadanie poziomu odporności psychicznej i poczucia własnej wartości u praktykujących sztukę walki Krav Maga.

Metody. Badanie obejmowało 399 zawodników (283 mężczyzn i 112 kobiet) zrzeszonych w Południowoamerykańskiej Federacji Krav Maga. Odporność psychiczna i poczucie własnej wartości zostały ocenione za pomocą skali odporności psychicznej Connora-Davidsona (CD-RISC) i skali poczucia własnej wartości Rosenberga (RSES). Dane socjodemograficzne zostały zebrane za pomocą kwestionariusza.

Wyniki. Większość badanej grupy to osoby posiadające stopień magistra (38,8%) i pomarańczowy pas (21,4%). Mężczyźni wykazali wyższe wartości wieku, czasu praktyki i poczucia własnej wartości (p <0,05) w porównaniu do kobiet. Test korelacji Spearmana wykazał pozytywny i istotny związek między poczuciem własnej wartości a odpornością psychiczną (rho = 0,552; p <0,001). Wykształcenie było związane z poczuciem własnej wartości (rho = 0,313; p <0,001) i odpornością psychiczną (rho = 0,142; p = 0,004). Dłuższy czas praktyki był związany z wyższymi poziomami odporności psychicznej (rho = 0,173; p = 0,001) i poczucia własnej wartości (rho = 0,207; p <0,001).

Wnioski. Regularna praktyka Krav Maga wiąże się z wyższym poziomem poczucia własnej wartości i odporności psychicznej.