

TESTING THE EFFECTIVENESS OF A RUNNING PROGRAMME ON THE MENTAL HEALTH OF CROATIAN POLICE OFFICERS

Ivana Glavina Jelaš, Ruža Karlović, Jurica Pačelat

Police College Zagreb, Croatia

Abstract

Police work is one of the most stressful in the world and can leave consequences upon officers' health. One of adaptive coping mechanisms that officers often use is workout, but with emphasis on the physical not psychological benefit, and more often they use anaerobic programs. Research shows that running workout improves mental health so the aim of this study was the experimental validation of the effectiveness of running workout program regarding the mental health of officers. The study was conducted on 31 subjects - 14 officers were in the experimental and 17 in the active control group. Before and after the completion of the 8 week running program, the respondents completed questionnaires: BAI (Beck Anxiety Inventory), BDI (Beck Depression Inventory), ASI (Anxiety Sensitivity Index) and CORE-OM (Clinical Outcomes in Routine Evaluation – Outcome Measure). There were statistically significant differences between the results prior and after the program for the whole sample. Results of Wilcoxon signed-rank test showed that there was statistically significant improvement of BDI results and the results on 3 CORE-OM subscales for the whole sample regardless of the group qualification. Regarding the comparison between groups, results showed that there was statistically significant improvement on BDI - in the experimental but not in the control group. This research confirmed well known fact regarding running workout – that it significantly improves mental health, in this case the health of police officers. This experimental study shows that running workout should be systematically offered to officers as effective mental health improvement tool.

Key words: police, mental health, depression, anxiety, running, exercise

Introduction

Police work is unquestionably one of the most stressful occupations in the world (Frank et al., 2017). Police stressors are grouped into operational and organisational. Operational stressors include all stressors arising from the nature of police work, such as exposure to danger, work with the perpetrators and victims of criminal offences, etc. Organisational stressors are those related to the organisation of the system and police work, such as relations with colleagues, bureaucratic limitations, inadequate equipment, etc. Research in Croatia and elsewhere has repeatedly confirmed that police officers find organisational stressors more difficult to handle than operational stressors (Collins and Gibbs, 2003; Glavina Jelaš et al., 2015; Glavina et al., 2013; Tot, 2010).

In view of the above, it is not surprising that police work leaves consequences on the mental and physical health of police officers, despite valid selection procedures at the time of admission to service and the selection of the best suited individuals for the performance of this demanding work. Arnetz, Lumley and Nevadal (2009) pointed out that police officers are at an increased risk of developing different mental health issues. Depressive and anxiety disorders are a frequent consequence of police work amongst the police population (Want et al., 2010; Husain 2014).

Research has shown that police officers are prone to the use of maladaptive coping mechanisms (Williams et al., 2010), while exercise as adaptive coping mechanism is eminent in police. Bezzera et al.(2013) listed exercise as the most effective strategy to mitigate the consequences of stress in their research on police officers. Anshel et al. (2012) showed the efficiency of a ten-week exercise programme on stress, work satisfaction, and energy levels amongst police officers. Maran, Zedda and Varetto (2018) also showed the efficiency of an exercise programme for stress reduction amongst police officers. Gerber et al. (2010) found that exercise certainly helped those facing chronic stressors, and that exercise was negatively correlated with the use of sick-leave of officers and emergency workers. Lyoka (2011) showed that a well-organised exercise programme contributed to the management of stress, anxiety and anger amongst police officers, and that it could increase self-confidence, emotional stability and cognitive functions of the subjects.

Both correlational and experimental research have confirmed that exercise leads to better mental health, in both clinical and non-clinical samples, irrespective of age and sex (Guszkowska, 2004). Skead and Rogers (2016) pointed out that research over the past one hundred years and more has consistently confirmed the efficacy of exercise in relation to stress, anxiety and depression. Conducted meta-analysis consistently confirm the efficacy of exercise in relation to stress, anxiety and depression (Josefsson et al., 2014; Statopholou et al., 2006; Rebar et al., 2015; Wipfli, Ramirez et al., 2013).

Further, physical exercise was shown to be very significant for cognitive functions, such as attention (Rassovsky and Alfassi, 2019), learning (Cotman et al., 2007) and memory (Roig et al., 2016). The positive effects of exercise on mental health are present in both aerobic and anaerobic exercise programmes (Kianian et al., 2018), although some authors give priority to aerobic programmes (Schmitt et al., 2019; Guszowska, 2004).

The role and efficacy of exercise is still mostly promoted for the expected and logical purpose of caring for physical health and it seems it is not deservedly recognised as a valid resource for maintaining and improving mental health. Sharma et al. (2006) and Callaghan (2004) pointed out that the importance of exercise is not adequately understood or appreciated by patients and mental health professionals alike and it is neglected treatment in the mental health care system.

Various theoretical hypotheses that try to explain how psychological mechanisms influence the effects of exercise on mental health have been proposed, the main being distraction hypotheses and self-efficacy hypotheses (Mikkelsen, 2017; Craft, 2013). The distraction hypothesis suggests that exercise provides diversion from unfavorable stimuli which leads to an improved mood (Peluso and De Andrade, 2005) while a distraction from stressors and a “time out” from daily activities leads to reducing anxiety (Anderson, 2013). The self-efficacy hypotheses suggests that dedicated involvement in challenging activities like regular exercise might lead to improved mood, self-confidence (Peluso and De Andrade, 2005) and self-esteem, which is a strong predictor of overall, subjective well-being (Cooney et al., 2013). Anderson (2013) states that, according to social cognitive theory, individuals with a sense of high self-efficacy (who trust their ability to manage potential threats) worry less and experience lower levels of anxiety arousal, while exercise can increase self-efficacy by providing experiences of successfully coping with the stress of exercising. Other explanations of psychological benefits of exercise include social interaction, contact and mutual support (Peluso and De Andrade, 2005); reducing anxiety sensitivity; changes in accessibility or intensity of ruminations, worries, and anxiety (Gaudlitz et al., 2013); the affect regulation hypothesis; behavioral activation hypothesis (Craft, 2013); and the sense of autonomy over our own exercise process (Skead and Rogers, 2016).

Regarding physiological mechanisms, alterations in the activity of the autonomic nervous system (Harvey et al., 2017) and the functioning of the HPA axis are often cited. Schmitt et al. (2019) stated that there are significant alterations in growth factors, immune-related mechanisms, neurotransmitters and that the endocannabinoid system may mediate the effects of aerobic exercise on neuroplasticity. The monoamine and endorphin hypothesis of the impacts of exercise on mental health is commonly mentioned (Peluso and De Andrade, 2005), while recent studies are focused on brain-derived neurotrophic factor (BDNF). A meta-analysis by Szuhaniya et al. (2015) showed that exercise enhances BDNF levels. BDNF is often examined in the studies of biological foundations for various mental disorders, especially depression and anxiety (Yu and Chen, 2011), so it is not surprising that there is a large number of studies examining the connections between BDNF, exercise and mental health. Their results support the efficacy of exercise (Takahashi et al., 2019).

Furthermore, running as a form of exercise has been consistently proven to be exceptionally useful for mental health. Keating et al. (2018) showed the positive effects of a 12-week running programme on stress, anxiety and depression. Nabkasorn et al. (2006) also confirmed the positive effects of an 8-week running programme on the symptomology and hormonal responses to stress. Babyak et al. (2000) confirmed the efficacy of a 10-month fast walking and running programme on the symptoms of major depressive disorder. Blumenthal et al. (2007) showed that their 16-week walking/running programme had an almost identical effect on the remission of depressive symptoms compared with pharmacotherapy. In their comparison of the effects of running and clomipramine, Bandelow et al. (2000) showed that both treatments were useful for anxiety symptoms in subjects suffering from panic disorder and agoraphobia.

In view of all the above, the first objective of this study was to develop an 8-week running programme and to examine its effects on the mental health of police officers regarding overall mental health, depressive symptoms, anxiety symptoms. In line with this aim of the study and earlier findings, our first hypothesis was that the participants will show reduction in mental health problems, depressive and anxiety symptoms after participating in the 8-week running programme relative to baseline. Another research question was to examine whether participants who trained under the active guidance and supervision of a coach (experimental group) would benefit more from the exercise than participants who trained on their own (active control group). The second hypothesis was that the experimental group will show significantly more reduction in mental health problems, depressive and anxiety symptoms after participating in the 8-week running programme relative to active control group.

Methods

Participants

Table 1 shows the characteristics of the research participants. The participants (19 M, 11 F) of the survey were police officers with an average length of service in the police force of 6.1 years (min 0 g, max 12 g) and at the same time students of the Police College mostly first year students with an average age of 27 years (min 19, max 35). After initial testing, participants were divided into experimental group (E) and active control group (Ac); first, the whole group participated in an assessment of the 1000-meter run, and participants were assigned to experimental or active control group based on

their score. Participants were divided into groups in such a way that it was possible and practical to implement training program, while two groups were similar in most measured characteristics. Former sport experience was also taken into account (measured at baseline by questionnaire created for the purpose of this research).

Table 1. Sociodemographic characteristics of participants

		f	%
Gender	M	19	63,3
	F	11	36,7
Group	E	14	46,7
	Ac	16	53,3
Age	19-21	6	19,9
	24-26	4	13,3
	27-29	11	36,7
	30-33	6	19,9
	34-35	3	10
Study year	I.	14	48,3
	II.	8	27,6
	III.	7	24,1
Years of police service	0-4	8	29,6
	5-8	13	48,2
	9-12	6	22,2

Instruments

Beck Anxiety Inventory (BAI), Beck, Epstein, Brown and Steer, 1988; Beck and Steer, 1990

The instrument consists of 21 items that are regarded as common symptoms of anxiety. The subjects are asked to use a 4-point scale to indicate the number of times during the past week they felt the symptoms. The total score is calculated by adding the score for all items. The calculated internal consistency was satisfactory and was Cronbach $\alpha=0,903$.

Clinical Outcomes in Routine Evaluation – Outcome Measure, CORE-OM; Barkham et al., 1998, 2001, 2005; Evans et al., 2002

The instrument consists of 34 statements that are used to evaluate general psychopathological conditions and the risk for the onset of psychological problems, and accompanies the effect of counselling and psychotherapy. The statements are grouped into four subscales: subjective well-being, problems/symptoms, functioning, and risk to self or others. The subjects use a 5-point scale in relation to the preceding week to express their degree of agreement with the statements. The score is calculated as a ratio of the sum of all answers and the number of statements answered. It is used to determine the critical value on the basis of which it is possible to recognise people with pronounced psychological conditions. The calculated internal consistency of each subscale was satisfactory and was Cronbach $\alpha=0,782$ for the scale of subjective well-being, Cronbach $\alpha=0,943$ for the scale of problems/symptoms, Cronbach $\alpha=0,763$ for the scale of functioning, and Cronbach $\alpha=0,639$ for the scale of risk to self or others.

Beck Depression Inventory, - BDI-II, Beck, Steer and Brown, 1996

The instrument consists of 21 statements that measure different levels of depression. A set of four possible responses are offered for each statement, ranging in intensity. The subject answers the questions by circling one of the four responses. The total score is the sum of all statements. The calculated internal consistency was satisfactory and was Cronbach $\alpha=0,919$.

Anxiety Sensitivity Index (ASI); Reiss, Peterson, Gursky and McNally, 1986; Peterson and Reiss, 1992)

The instrument is a 16-item scale that measures the amount of concern about various symptoms of anxiety. The subjects report their level of aversion towards various symptoms of anxiety on a scale from 1 to 5. The total result is the sum of numbers next to each item. The calculated internal consistency was satisfactory and was Cronbach $\alpha=0,883$.

Procedure

Ethical considerations regarding voluntary participation, informed consent, potential risk for the participants and confidentiality were taken into account when gathering participants and conducting the study, that received approval of the Police Academy Ethics Committee prior to implementation. Lecture concerning the research project and effects of exercise on mental health were held for full-time criminology students at the Police Academy where they had the opportunity to apply for participation in the study with a written informed consent and application form. Applied subjects were tested in a 1-km run, and they represented the final sample. On the basis of their results, they were divided into an experimental and active control group. As it was important to ensure homogeneity in the experimental group, slower and faster runners were placed into the active control group based on their results in the 1-km run.

Before the first training, all participants filled out all the questionnaires (Croatian versions) administrated by psychologists from Mental Health Centre of the Police College in Zagreb (who also corrected, analysed and interpreted the psychological measures). Screening process at the baseline psychological measures showed no evidence of elevated risk or severe levels of symptoms that would require exclusion from participation in the study or some other type of intervention. Besides questionnaires, prior to the first training session, participants were weighed, and provided with smart bracelets to measure blood pressure and heart rate before and after each training session as well as distance crossed in every training.

The E group was under the guidance of a professional running coach who prepared each workout and the entire programme. The Ac group did the trainings on their own, without active guidance. They received instructions before each workout about the length of the warm-up/stretching and running programme for the E group, and they were told to set their own tempo based on their physical abilities and spend the same amount of time doing physical activity, without any instructions about how it should be conducted. Trainings was held at the same time for both groups—three times a week over eight weeks, and with the same training sessions duration. After the programme ended, the subjects completed the same questionnaires as before the first training sessions, including an evaluation form, and they were once again weighed.

Results

The Wilconxon rank test results on the overall sample (Table 2.) showed a statistically significant decrease in the total scores on the Clinical Outcomes in Routine Evaluation measure (CORE - OM), expressed in medians (Md1 = 18, Md2 = 12), $z = -2.583$, $p = 0.01$, with a medium effect size ($r = 0.333$), after participating in the running program. Also, a statistically significant decrease in post-test outcomes was obtained in three out of four subscales of the questionnaires with a slightly lower effect size; functioning (Md1 = 8.5, Md2 = 6, $z = -2.196$, $p = 0.028$, $r = 0.283$), problems/symptoms (Md1 = 10, Md2 = 5.5, $z = -2.371$, $p = 0.018$, $r = 0.306$) and subjective well-being (Md1 = 3, Md2 = 2, $z = -2.449$, $p = 0.014$, $r = 0.316$). A significant decrease was also found in the symptoms of depression on Beck's Depression Inventory measure from Md1 = 2.5 in pretesting to Md2 = 1.0 after participating in the running program, with a medium effect size of $r = 0.344$. A statistically significant difference between pre-test and post-test was not obtained on the Anxiety Sensitivity Index and Beck's Anxiety Inventory.

Table 2. Wilconxon signed-rank test results - differences in pre-test and post-test for the total sample

	Pre-test (Md)	Post-test (Md)	Z	p	r
CORE	18.000	12.000	-2,583	,010	0.333
CORE F	8.500	6.000	-2,196	,028	0,283
CORE P	10.000	5.500	-2,371	,018	0,306
CORE W	3.000	2.000	-2,449	,014	0,316
CORE R	0.000	0.000	-1,663	,096	0,215
BAI	5.000	5.000	-0,850	,395	0,157
BDI	2.500	1.000	-2,577	,010	0,344
IAO	27.500	29.500	-.661	,509	0,085

The results of testing the differences between pre-test and post-test within the groups (E - experimental and Ac - active control groups), shown in Table 3., showed a greater decrease in symptoms in the experimental group on almost all measures except for the Anxiety Sensitivity Index. Almost statistically significant differences with the medium effect size were found in the experimental group on the CORE scales ($z = -1.884$, $p = 0.60$, $r = 0.356$) and on the subscales CORE P ($z = -1.959$, $p = 0.050$, $r = 0.370$) and CORE W ($z = -1.855$, $p = 0.064$, $r = 0.350$). However, a statistically significant difference was only found in the experimental group on Beck's Depression Inventory with Md = 4 in pre-testing to Md = 1.5 in post-testing ($z = -2.242$, $p = 0.025$, with a medium to high effect size $r = 0.423$).

Table 3. Wilcoxon signed-rank test results - differences in pre and post-testing by measures and by groups

	Group	Pre-test (Md)	Post-test (Md)	Z	p	r
CORE	E	14,4310	10.0000	-1,884	,060*	0,356
	Ac	23,5000	15.5000	-1,657	,097	0,293
CORE F	E	7,5000	5.5000	-1,571	,116	0,297
	Ac	8,5000	6.5000	-1,366	,172	0,241
CORE P	E	7.5000	4.5000	-1,959	,050*	0,370
	Ac	11.0517	7.5000	-1,346	,178	0,238
CORE W	E	2.5000	1.0000	-1,855	,064*	0,350
	Ac	3.0000	2.0000	-1,712	,087	0,303
CORE R	E	0.0000	0.0000	-,406	,684	0,076
	Ac	0.0000	0.0000	-1,802	,072	0,318
BAI	E	7.0000	4.5000	-1,141	,254	0,215
	Ac	4.0000	5.0000	-,105	,916	0,018
BDI	E	4.0000	1.5000	-2,242	,025	0,423
	Ac	2.0000	0.5000	-1,337	,181	0,236
IAO	E	27.0000	30.0000	-,157	,875	0,029
	Ac	29.5000	28.5000	-1,195	,232	0,211

Table 4. Mann – Whitney test results - differences between groups by measures in pre and post test

	Group	Pre-test (Md)	Mann-Whitney	Z	p	Post-test (Md)	Mann-Whitney	Z	P
CORE	E	14,4310	88.000	-0.998	0.318	10.0000	88.500	-0.978	0.328
	Ac	23,5000				15.5000			
CORE F	E	7,5000	104.000	-.334	0.739	5.5000	95.000	-0.709	0.478
	Ac	8,5000				6.5000			
CORE P	E	7.5000	91.000	-.874	0.382	4.5000	100.000	-0.504	0.614
	Ac	11.0517				7.5000			
CORE W	E	2.5000	99.000	-.546	0.585	1.0000	92.000	-0.847	0.397
	Ac	3.0000				2.0000			
CORE R	E	0.0000	111.000	-.047	0.963	0.0000	93.000	-1.015	0.310
	Ac	0.0000				0.0000			
BAI	E	7.0000	86.000	-1.086	0.277	4.5000	97.000	-0.351	0.726
	Ac	4.0000				5.0000			
BDI	E	4.0000	87.500	-1.027	0.305	1.5000	90.000	-0.388	0.698
	Ac	2.0000				0.5000			
IAO	E	27.0000	112.000	.000	1.000	30.0000	88.500	-0.978	0.328
	Ac	29.5000				28.5000			

Despite the non-random allocation of participants to groups and certain differences between groups, there is no statistically significant difference between groups in the baseline on any measured scales (shown in Table 4). Table 4. also shows the results of testing the difference between groups in the post-test where there are also no statistically significant differences between the groups on any measured scales.

Discussion

The results on the total sample of participants who participated in the running program (regardless of participation in the program with or without the trainer) indicate the usefulness of this type of exercise regarding mental health shown by significantly better results on the dimensions of functioning, problems/symptoms and subjective well-being. These results are consistent with findings of other researchers examining the effects of exercise programs on police officers regarding management of stress, anger, self-confidence, emotional stability and cognitive functions (Lyoka, 2011). Also, the results on the total sample of participants in this study showed reduction in symptoms of depression, measured by

Beck's Depression Inventory, which is consistent with the results of meta-analysis conducted by Josefsson, Lindwall, and Archer (2014) and meta-analysis of Statopholou et al. (2006) regarding the promising effectiveness of exercise in reducing depressive symptoms.

No statistically significant difference was found in the post-test between the experimental and active control group on any measured scale and the only statistically significant difference within the group was obtained on the measure of depression symptoms within the experimental group. Also, no statistically significant results were found regarding anxiety symptoms which is inconsistent with other researches mentioned in the introduction of this paper.

This study has several limitations. Firstly, it is a quasi-experimental design: the initial groups were not equalised, i.e. they were not grouped by case, so the inference power of the design is diminished. The principal deficiency is the absence of a true control group, i.e. one that was not exposed to the exercise programme as opposed to the active control group in this study, which—although it was not exposed to the independent variable, i.e. guided programme—was included in exercise. Another limitation of this study is the small sample size and it would be useful to repeat the research with more participants and improved design in the next phases of the project.

This is the first study of its kind conducted on police officers in Croatia. Police officers will have access to a programme whose efficacy on mental health has been demonstrated precisely on the population of police officers. Scepticism as a classic element of police subculture (Crank, 2004) is very useful in terms of quality performance of police work. However, this element of the so called working personality of police officers (Glasner, 2005) leaves its trace in other areas of their life and makes police officers suspicious in general. The essence of police work is search for evidence, and scientific evidence concerning the efficacy of a programme conducted on police officers can be truly useful in terms of their motivation to participate and use the programme.

In addition to introducing a control group, equalising the groups of participants, and increasing their number, future research should enhance control of specific external variables, such as the number of calories consumed, and overall diet. It would also be useful to control the duration and quality of sleep and all other factors that improve or undermine physical fitness.

In terms of the practical usability of the results, it is necessary to emphasize that exercise is one of the adaptive mechanisms that the police population uses to cope with stress (Bezzerà et al., 2013). The efficacy of exercise has been scientifically proven, not only in terms of physical, but also mental health (Guszkowska, 2004). Police work as one of the most challenging and stressful jobs in the world (Frank et al. 2017) requires constant and systematic care for the mental health of police officers. However, in view of the specific elements of the police subculture, access to this population is a challenge for mental health experts. Without belittling the value of classical psychological counselling and treatment to preserve the mental health of police officers, we wish to emphasise the importance of exercise as a proven and very logical way of caring for officers mental health. We are not referring here to police officers who have already developed serious mental health issues, in which case professional help in the form of psychological therapeutic treatment is imperative. Since mental health, like physical health, must be maintained, running is a useful tool in this respect. In the care for mental health of police officers, the emphasis should be on prevention. Despite the successfulness of selection of the psychologically and physically fittest candidates, police work leaves consequences on the health of police officers. That is why it is paramount to build mental resilience in healthy police officers, as they will inevitably be exposed to exceptionally difficult stressors whilst in service. It is vital to keep healthy police officers healthy and to work on their mental resilience, which will keep them functional despite exposure to stressors. One of the ways to build resilience is mental training, such as the MBCT (*Mindfulness Based Cognitive Therapy*) or MBSR (*Mindfulness Based Stress Reduction*), but also through physical exercise, as analysed in this study. Exercise is widely accepted by police officers, albeit primarily as a way of taking care of their physical health. Mental trainings are indispensable in caring for the health of police officers and they are being introduced in police systems throughout the world more and more frequently. However, in terms of mental health, it is very useful to examine tools that are more accessible to police officers and which they find easier to accept, such as aerobic physical exercise.

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