THE EFFECT OF 12 WEEKS BASIC MALAYSIAN COMMANDO TRAINING ON PHYSICAL, BIO-CHEMICAL AND HYDRATION STATUS AMONG SUCCESSFUL COMMANDO CANDIDATES

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My late father and mother, a million thanks for all your selfless sacrifices towards my upbringing and education. You both have planted the seeds of mental toughness deep in my psyche even as a young boy. I miss you both so much! To my five brothers and five sisters, a thousand thanks for never failing to encourage and support me all the way through school, Sixth Form College and five Universities (UKM, OUM, UiTM, UPSI, and AeU) for my Medical Degree, Bachelor of Sports Science, Master of Business Administration and now at the dissertation stage of Doctor of Business Administration at Asia e University. Not forgetting to thank my close friend Corporal Shaari Haron (ex-commando) who accompanied and helped me in labeling the blood and urine samples, and was with me during the pilot study of Series 3/AK 2013 and throughout Series 1/AK 2014 until their graduation. Thanks to his son too, Mohd Shafiq, who was the official photographer during my on-going research.

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ABSTRACT

This research is undertaken to determine the physical characteristics, biochemical changes in blood and urine, and the degree of dehydration among successful soldiers participating in the Basic Commando Course series 1/AK 2014 for 12 weeks, at Sungai Udang Camp, Malacca. A total of 37 soldiers who had passed the commando practice test were selected to participate in this research, with special approval from the Malaysian Armed Forces Training Base. The anthropometric data of the body, fitness levels, and biochemical responses were taken before, during and after the entire duration of the training. Result of anthropometric profile for BMI, weight and waist circumference among the successful commando candidates (commando trainees) were significantly ($p<.005$) reduced during and post training training compared to pre training and significantly ($p<0.05$) increased in post training compared to during training. All physical fitness parameters also showed significantly ($p<0.05$) decrease in the level of physical fitness from the beginning to the end of the study period, however increased in post training compared to during training. The value of creatine kinase, creatinine, urea, and neutrophils increased, likely due to muscle injury or a drop in body immunity. Effects of red blood cells (RBC) and white blood cells (WBC) in the urine were also found, possibly due to infection or a hard workout. Result for hydration status was significantly ($p<0.05$) increased during training compared to pre training. No significant were found between pre and post training. In conclusion, the Malaysian commando selection training for twelve weeks produced a significant negative impact on the level of fitness, biochemical response (the benchmark for bodily health) and body hydration level of the military personnel involved. These study findings demonstrate the need for a specific recovery program after the commando's training session, for the welfare of members and to ensure that the physical preparedness of the trainees has returned back to its pre-training maximum level.

KESAN 12 MINGGU LATIHAN ASAS KOMANDO MALAYSIA TERHADAP FIZIKAL, BIO KIMIA DAN TAHAP HIDRASI DALAM KALANGAN CALON KOMANDO YANG BERJAYA

ABSTRAK

Penyelidikan ini adalah bertujuan untuk mengetahui ciri-ciri fizikal, perubahan biokimia darah dan air kencing, dan tahap dehidrasi anggota tentera yang berjaya dalam Kursus Asas Komando siri 1/AK 2014 selama 12 minggu, di Kem Sungai Udang, Melaka. Seramai 37 anggota tentera yang lulus latihan ujian komando telah dipilih untuk penyelidikan ini, dengan kelulusan khas Markas Latihan Angkatan Tentera Malaysia. Hasil dapatan kajian dalam kalangan anggota komando yang berjaya menunjukkan berlakunya penurunan yang signifikan ($p<0.05$) terhadap profil antropometrik untuk BMI, berat dan lilitan pinggang semasa latihan dan selepas latihan berbanding sebelum latihan. Walaubagaimanapun, berlaku peningkatan secara signifikan ($p<0.05$) selepas latihan berbanding semasa latihan. Kesemua parameter tahap kecergasan fizikal juga secara signifikan ($p<0.05$) menunjukkan penurunan dari mula hingga akhir program latihan. Namun berlaku peningkatan prestasi yang signifikan ($p<0.05$) selepas latihan berbanding semasa latihan. Nilai kreatin kinase, kreatinin, urea, dan neutrofil meningkat, mungkin akibat kecederaan pada otot atau pun penurunan imuniti tubuh. Surihan sel darah merah (RBC) dan sel darah putih (WBC) turut ditemui dalam air kencing, kemungkinan akibat infeksi atau latihan yang teruk. Nilai graviti spesifik (S.G.) didapati tinggi sebelum, sewaktu dan selepas latihan. Dapatan terhadap tahap hidrasi menunjukkan berlakunya peningkatan hidrasi yang signifikan ($p<0.05$) semasa latihan berbanding sebelum latihan. Tiada perbezaan signifikan ($p>0.05$) ditunjukkan sebelum dan selepas latihan. Kesimpulannya latihan pemilihan komando Malaysia selama 12 minggu memberikan kesan negatif yang signifikan kepada tahap kecergasan, respons biokimia (penanda aras kesihatan anggota badan) dan tahap hidrasi tubuh anggota tentera yang mengikuti latihan. Dapatan kajian ini menunjukkan betapa perlunya suatu program pemulihan khusus dilakukan selepas sesi latihan pemilihan komando, demi untuk menjaga kebajikan anggota tentera dan menjamin supaya fizikal anggota siapsiaga dan kembali normal ke tahap maksima seperti keadaannya sebelum sesi latihan berkenaan.

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CHAPTER 1

INTRODUCTION

1.1 Background of study

The word commando was from the Portuguese language, which simply means ‘command’. As a result of frequent contact between the Afrikaner and Portuguese settlers in Africa, the term ‘Kommando’ became well known (Dobbie & Eiliott, 1944). The British including Malaysian called it ‘Commando’. Most of the countries named it the ‘Special Forces’ and the North Atlantic Treaty Organization (NATO) called it ‘Special Operation Forces’. Special Forces were military units trained to conduct special operations (NATO, 2013). The special operation was defined as “military activities conducted by well-equipped forces specially designated, organized, and trained with selected personnel, using unconventional tactics, techniques, and mode of employment” (NATO, 2015).

In military science, the term commando should be referring to an individual, a military unit, or a raiding fashion of a military operation. Commando units have a variety of specialist capabilities in which they can function that variety of operations. Their broad ranges of deployment skills, like parachuting, airborne winching, mountain repelling, and amphibious touchdown made them elite soldiers.

The elite members acquire that title in three ways. One way is by continually being assigned the most exhausting and dangerous missions. Many airborne units are regarded elites in this way, because parachuting is inherently dangerous. Secondly, the mission desires a small, exceedingly-educated team of troopers who must meet high standards of training and sturdiness physically, mentally and emotionally. Thirdly, they had been elite through its recognition of continued success in battle. Commandos have to concentrate on the common mission for the wishes of the nation. The United States with exceptionally skilled amphibious forces capable of responding to any quantity of missions and any kind of climate. Not each commando can be equally nicely trained for each and every mission or climate (Christopher & Bilsborough, 2016).

In Malaysia, the 21 Grup Gerak Khas (English: twenty-first Special Service Group), commonly recognized as GGK - is a specific forces regiment of the Malaysian Army which conducts one of a kind missions and operations for the Malaysian government, such as direct action, counter-terrorism, sabotage, unconventional warfare, and intelligence gathering. It is the administrative and operational group to which the three regiments of the Gerak Khas and its aiding gadgets are subordinated.wounded (Pereira, 2002).

While the deployment of Rejimen Gerak Khas units was once secretive. It has been understood that Army and Navy Special Forces had been deployed again to Malaysia's many islets within the Spratly Islands (Shahriman, 2013). Grup Gerak Khas soldiers are deployed with 10 Paratrooper Brigade, PASKAL (Navy commando), and PASKAU (Air Force commando) concerned MALCON-UNIFIL to serve in Lebanon. (Star newspaper, 2007).

The Grup Gerak Khas (GGK) soldiers are deployed with different troopers from 10 Paratrooper Brigade and Royal Malaysian Police elite team, Pasukan Gerakan Khas (PGK) to calm issues in Timor Leste, in an Australian-led mission mentioned as Operation Astute.

The Special Forces, protected GGK, 10 Paratrooper Brigade, PASKAU and PASKAL had been deployed with the exclusive Malaysian contingents to be worried about the executive workload and operations on the International Security Assistance Force (ISAF) in Afghanistan. The group became deployed to assist and assist the New Zealand soldiers in peacekeeping missions and humanitarian aid on the Bamiyan District, Afghanistan (Hardi, 2010).

The Grup Gerak Khas has been mobilized to Lahad Datu, Sabah for 2013 Lahad Datu alongside various other Special Forces units. The team played a major role in hunting down the Sulu terrorist group.

The Tactical Strength, Conditioning or Physical Toughness primary purpose is to develop the operational fitness for military personnel. The operators must consider the physical demands of the operational related activities when developing specific comprehensive strength and conditioning programs. Throughout history, soldiers and warriors were physically trained by performing various strengths and conditioning exercises, which then, this had evolved eventually into athletic events. Thus, the first athletes were soldiers (Guths Muths & Jahn, 1870).

Physical training is conducted by military units to improve combat readiness. Aerobic capacity and muscle strength are the keys to readiness, while endurance training and resistance training would develop these abilities (Jameson & Vickers, 2010; Vickers, et al., 2010). Thus, it is obvious that appropriately designed physical training could enhance effective military task performance. However, military physical training is subject to time, budget and equipment constraints (Vickers, 2009; Vickers, et al., 2009). Military physical training must also promote non-physical outcomes such as self-confidence and mental toughness.

The first aspect that ought to be incorporated into military contextual fitness is the physical training, which is deemed critical for the success of the soldiers and cadets. Physical fitness is considered a basic skill necessary for military personnel to perform mission tasks effectively. Various study reports (U.S. Army, 1999 & 2010; Drystad, et al., 2007; Hammermeister, 2010), indicated that soldiers who scored well in the Army Physical Fitness Test (APFT) also had high functioning psychological skills, critical to high-level performance in the field. As with any form of physical activity, physical training requires motivation, focus, effort, and a considerable

amount of discipline (Atwater & Yammarino, 1993). Physical training sessions help to prepare the soldiers and cadets for the physical rigors of military operations and combat. These rigors often include cognitive, social, and physical skills that are implemented under high stress (Ward, et al., 2008). For instance, to improve the physical fitness of the Malaysian Army Commandos and prevent injuries, some of them even applied "Onion Oil" to their feet as a daily routine, to prevent blisters. Some of these procedures have been practiced for years sensation of the commando battalions.

Military training has traditionally been centered on skill acquisition, the development of technical proficiency, discipline, strength, endurance, and teamwork. Lectures and briefings provide basic knowledge, while demonstrations and repeated drills hone specific proficiencies. Certainly, a practice that is particularly involved in repeated drills can have psychological benefits, in also reducing the innovation. Thus, the uncertainty associated with the technical aspects of these tasks will increase military confidence. For the soldier, extra learning can decrease interference from competing responses (Thomson & Pasto, 2003; Driskell, et al., 2006) and may be particularly important in complex tasks (Keinan, & Friedland, 1996). For an elite athlete in any competition, this is a matter of winning or losing, whereby for the soldiers or commando at war, it is a matter of life and death.

1.2 Problem statement

The commando has played many significant roles in our country's defense. However, from the previous reports, more than 30% of the failures in the Basic Commando Course of 12 weeks were during the Selection Process. As for the camp training phase and the jungle phase of training, another 30% of the commando trainees failed to proceed to the swamp phase. There was a failure rate of more than 75% of the candidates after completion of the Basic Army's Commando Training Course. For the previous series of September 3/AK 2013 intake where the researcher did the pilot study, only 19.2% graduated as a commando and obtained their Diploma.

The commando as elite military personnel must be tough-minded, physically fit and strong, and emotionally stable compared to the elite athletes or the military soldiers. The researcher will focus this research on the physical and physiological aspects only of the future commandos.

To be successful in the commando basic training program, what kind of physical characteristics and physical fitness are needed? No one knows the current characteristics of the successful candidates. How or in what aspects does the commando training course affect the successful candidates? These questions remain unanswered and data on this would be invaluable in providing an insight into the efficacy of the training that is affecting the individual soldier.

The problem of 75% of the commando trainee's failure may likely be due to 1) the physical characteristics and fitness level, 2) the biochemical changes in the blood and urine, and 3) the hydration status which is not properly corrected as the outcome of the 12 weeks of prolonged strenuous exercise (PSE). The commando candidates were not knowledgeable of the training syllabus, and therefore made no serious attempt at adapting to the various terrains and weather conditions, months before being called-up. If information hand-outs were to be given to them early, then the failure or success rate could change significantly and this will minimize the logistic financial costs of the Ministry of Defence.

The Armed Forces personnel are required to look after their health, fitness, and appearance at all times to ensure that they are always prepared for all missions and ready for combat (Nolte, et al., 2002). Physical fitness is the prime requirement for the Armed Forces, and it is closely related to combat readiness and their health.

The performance of prolonged endurance training is associated with several potential physiological changes, of which the trainees, trainers, and doctors need to be aware. Although the findings are not uniform, several investigators have shown that PSE may be associated with low magnesium, low potassium and/or low sodium, but increased urea and creatinine levels. Adverse reactions, from the health point of view resulting from these biochemical changes, are rare. However, doctors and the commando should particularly be aware of the specific life-threatening effects of hyponatremia and the appropriate treatment required (Warburton, et al., 2002).

Losing water through exercise is an unavoidable result of heat regulation through increased respiration and sweating. When dehydration occurs, various physiological functions become impaired as indicated by symptoms such as headache, dizziness, nausea, muscle cramps and lead to other negative effects on physical performance. A fluid loss of only 2% of the body mass has been shown to cause a significant depreciation in performance, with more severe decrements fatigue and muscle cramps as dehydration levels increase. Later research works indicate that impaired performance may be manifested with losses even as low as 1 to 1.8% (Walsh, et al., 1994).

This is a quantitative sort of research and therefore the results are going to be beneficial to the Army commandos especially and the soldiers generally. It will improve the difference during a physical state before the course and therefore the criteria used during the selection process as the prerequisites by the Commando Selection Committee. Thus, it will, directly and indirectly, give benefit through optimizing the financial costs (which is usually a constraint to the nation) in producing a world-class commando.

1.3 Objectives of the study

For the study, the specific research objectives are as follows:

1.3.1 To determine anthropometric profile among commando trainees in pre, during and post session of the commando training program.

1.3.1 To investigate any changes in anthropometric profile among successful Malaysian commando trainees in pre and post of the commando training program.

1.3.2 To determine the muscular endurance characteristics among Malaysian commando trainees based on push-ups, sit-ups, pull-ups, and rope climbing tests in the pre, during and post-session of the commando training program.

1.3.3 To investigate any changes in muscular endurance characteristics among successful Malaysian commando trainees in the pre and post-session of the commando training program.

1.3.4 To determine biochemical profile in the blood and urine markers among commando trainees in the pre, during and post-session of the commando training program.

1.3.5 To determined biochemical profile of the successful Malaysian Commando trainees.

1.3.6 To determine hydration status among commando trainees in the pre, during and post-session of the commando training program.

1.3.7 To investigate any changes in the hydration status of the commando trainees in the pre and post-session of the commando training program.

1.4 Research questions

The following research questions are addressed in this study:

1.4.1 What are the anthropometric profile among commando trainees in pre, during and post session of the commando training program?

1.4.2 Will be there any changes in anthropometric profile among successful Malaysian commando trainees in pre and post of the commando training program?

1.4.3 What are the the muscular endurance characteristics among Malaysian commando trainees based on push-ups, sit-ups, pull-ups, and rope climbing tests in the pre, during and post-session of the commando training program?

1.4.4 Will be there any changes in muscular endurance characteristics among successful Malaysian commando trainees in the pre and post-session of the commando training program?

1.4.5 What are the biochemical profile in the blood and urine markers among commando trainees in the pre, during and post-session of the commando training program?

1.4.6 What are the biochemical profile of the successful Malaysian Commando trainees?

1.4.7 What are the hydration status among commando trainees in the pre, during and post-session of the commando training program?

1.4.8 Will be there any changes in the hydration status of the commando trainees in the pre and post-session of the commando training program?

1.5 Research hypothesis

1.5.1 Ho1: There is no significant different anthropometric profile among commando trainees in pre, during and post session of the commando training program.

1.5.2 Ho2: There is no any significant changes in anthropometric profile among successful Malaysian commando trainees in pre and post of the commando training program.

1.5.3 Ho3: There is no significant different muscular endurance characteristics among Malaysian commando trainees based on push-ups, sit-ups, pull-ups, and rope climbing tests in the pre, during and post-session of the commando training program.

1.5.4 Ho4: There is no any significant changes in muscular endurance characteristics among successful Malaysian commando trainees in the pre and post-session of the commando training program.

1.5.5 Ho5: There is no significant different biochemical profile in the blood and urine markers among commando trainees in the pre, during and post-session of the commando training program.

1.5.6 Ho6: There is no significant different biochemical profile of the successful Malaysian Commando trainees.

1.5.7 Ho7: There is no significant different hydration status among commando trainees in the pre, during and post-session of the commando training program.

1.5.8 Ho8: There is no any significant changes in the hydration status of the commando trainees in the pre and post-session of the commando training program.

1.6 Significance of the study

The study is the first of its kind in the Malaysian Army to identify the physical characteristics and fitness, biochemical changes in the blood and urine, and the dehydration status of the commando trainees.

Results of the study will contribute to a better understanding of the problem faced by the commando trainees in terms of physical, biochemical and degree of hydration changes in their body, with a view of making appropriate and adequate preparation before the selection process as a commando trainee.

Findings of the study can guide the army's battalion in general, and the commando training wing specifically in formulating improvement in their training methodology, logistics, strategic management, to minimize the financial constraints with more successful candidates in the future.

The study will contribute to the current scientific knowledge and information in the commando training field in Malaysia an internationally

1.7 Limitations of the Study

Limitations are those conditions that are beyond the control of the researcher, which may place restrictions on the conclusion of the study and its application to other situations. This study also has certain limitations that need to be taken into account when considering the study and its contributions. An important limitation includes:

1.7.1 Generalizations from the study be limited to the commando trainees of the Malaysian Army only and cannot be applied to any other groups.

1.7.2 For the research study, the researcher has decided to choose only: 1. Physical characteristics and physical fitness, 2. the blood and urine changes, and 3. the hydration status of the commando trainees based on the urine specific gravity.

1.7.3 The study only involves male soldiers from the Air Force, the Navy, and the Army. They came voluntarily for the course.

1.7.4 There is a limited body of research literature focusing on commando training in Malaysia. It was decided to exclude other possibilities such as the psychological and emotional abilities of the commando trainees. Moreover, taking blood and urine specimens and analyzing them is the first undertaking of its kind in the Army. Lack of information about the changes in the blood and urine in the training phases from local and international journals on military training inhibits to some extent the rapid progression of this study.

1.7.5 During the pre-training phase, the serum 'Full Blood Count (FBC), blood urea serum electrolytes, (BUSE), and the serum creatinine results were not accessible although the blood samples were sent to the pathology laboratory. This occurred due to the unavailability of the testing reagents at the 94 Terendak Army Hospitals at that time.

1.7.6 Serum magnesium was not taken as it is a special test and very costly.

1.8 Delimitations

1.8.1 Honesty

All the information received from the commando trainees has to be accurate and honestly written after the candidates performed the exercises based on the training program and the counts by the respective partner of each test instituted must be given accordingly to the trainers.

1.8.2 Commitment

The commando trainees should give their full commitment in completing the training program. Lack of commitment and not offering their full effort during the evaluation, and also during the training day could affect the results of this study. The blood and urine samples were taken before, during, and at the end of training to be analyzed by the same pathology laboratory throughout the course and the study duration, i.e. the 94, Armed Forces Hospital, Terendak, Malacca.

1.9 Definition operational

1.9.1 Commando candidate

Most military forces utilize commando infantry troops who are subject to a more rigorous selection process and undergo more arduous training compared with other

infantry troops. Acoording to Sundin, Jones, Greenberg, Rona, Hotopf, Wessely & Fear (2010), commando role was to operate with minimal, or no support, potentially behind enemy lines and against superior forces. Therefore, their must highly trained to enable them to operate independently for long periods and under harsh conditions. In this study, commando candidate refer to soldier from various units of the Malaysian Army's organization and was followed 12 basic commando training at Sungai Udang Camp, Malacca, Malaysia.

1.9.2 Physical activity

Is defined as any bodily movement produced by skeletal muscles that require energy expenditure. Physical activity in this study refer to sit up, push up, pull up and rope climbing.

1.9.3 Hydration status

According to Kavouras, (2002), hydration status can be measured by changes in body weight, haematological and urine parameters, bioelectrical impedance, skinfold thickness, heart rate and blood pressure changes. Plasma osmolality, urine osmolality and urine specific gravity are the most widely used markers of hydration. However, urine colour has also been used with reasonable accuracy when laboratory analysis is not available or when a quick estimate of hydration is necessary. In this study, urine specific gravity was used to measured hydration status among commando trainee.

1.10 Summary

This chapter introduces the meaning of the word Commando or Special Forces, and their roles for the Malaysian Army's Commandos serving at the local and the international arenas and means by which the "Commando Selection Committee" prepares them to become a good commando. It also discusses the problem statement, purpose, objectives, research questions, hypothesis, relationships, and the limitations and delimitations of the study.