

Impact of cardiometabolic risk factors on the quality of life of soldiers of Kinshasa

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Abstract. The objective of the study was to determine the impact of cardiometabolic risk factors on the quality of life of Kinshasa soldiers, carried out in the period from October 5, 2020, to February 2021 where all rank categories of the army: corporals and soldiers, non-commissioned officers and non-commissioned officers, senior officers, aged 19 to 69, took part in this study. The Cardiovascular Exploration Center of the Military Health Corps served as a pilot point. A convenience sample of 899 soldiers who participated in our survey. The data collection was carried out by a self-questionnaire evaluating the 4 areas of human life: (physical health, mental health, social relations, and environment). The scores of the different dimensions of the questionnaires were calculated. The average of these elements was also calculated for each dimension. Scores for all dimensions were obtained. The "General state of health" dimension, whose score varies from 1 to 5, was also carried out. A validated scale has been determined by military category scores calculated such that 0 corresponds to the worst (poor) quality of life and 100 to the best for the multi-item dimensions. Anthropometric, physiological, energy expenditure and body composition data were also collected. A total of 899 soldiers responded to the questionnaire, made up of 797 men and 102 women, i.e. 88.7% vs. 11.3%. It is shown that the majority of servicemen had a poor quality of life (87.5%) compared to 12.5%. Among the servicemen with low quality of life, it appears that 33.5% were corporals, 28.8% were servicemen (1st and 2nd class), therefore the category of non-commissioned officers (3rd and 2nd class) sergeants -1 Sergeant Major and Warrant Officers have respectively 19.9% and 17.5%, i.e. $p < 0.001$. The majority of soldiers had a secondary school education (69.4%) and 87.5% had at least one morbid history. The quality of life seems to be altered among the soldiers in Kinshasa, and therefore poorly perceived by the same soldiers interviewed.

Keywords. Cardiometabolic risk factor, military, quality of life.

Introduction

Nowadays, the evolutions of lifestyles and societal changes have led to an increase in risk factors within the armies of the world, decreasing the quality of life and the life expectancy of their valiant soldiers; this has become a public health problem. These risk factors have induced a fundamental change in military structures, weakening the many armed forces: such as the armed forces of the Democratic Republic of Congo. The current quality of life of the military is marked by an increase in sedentary, responsible occupations, and chronic non-

communicable diseases (World Health Organization, 2017).

All the parameters of the demographic evolution observed within our armed forces show foreseeable progressions of morbidity: chronic and degenerative diseases will increase, and the notion of dependence will not be negligible. It has long been known that untrained military personnel suffers from several illnesses, four or five on average at age 49 and over, many of which affect their overall quality of life.

These risk factors in the military population would lead to premature aging, having a vegetative impact on the quality of life, related to health. Thus,

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musculoskeletal problems are not negligible and seem to have a greater impact compared to other pathologies (World Health Organization, 1993).

The World Health Organization 1994 defines the quality of life as "the perception that an individual has of his place, in the context of the culture, and the system of values in which he lives, in relation to his objective, expectations, standards, and concerns.

All of this revolves around three main dimensions: the physical or physiological dimension, the mental or psychological dimension, and the social and environmental dimension. A good state of physical health contributes to the quality of life by acting on the various factors: satisfaction with the body, lower stress level, positive affective experiences through group integration or positive regard from others, active participation in military missions (Monge et al., 2013). It also defines risk factors as all of the diseases that handicap the proper functioning of the human body. Many studies in the field of armies have shown that a better quality of life has a beneficial influence on the health of soldiers. The benefits are diverse and numerous: reduction in the morbidity and mortality of certain pathologies (cardiovascular diseases, vascular, respiratory diseases, cancer, obesity, traumas, and handicaps), maintenance and/or increase of physiological functions (muscle function, bone capital, endothelial function, immune system, cerebral functions and nervous system genetic factors of response to training) and also the quality of life (Oleson et al., 1990; Revicki et al., 2000).

For many soldiers, poor quality of life is accompanied by a decrease in cognitive and physical performance and well-being. However, recent studies have shown that certain environmental factors, such as maintaining an active lifestyle and exercising on a regular basis, can moderate these deleterious effects of a sedentary lifestyle (Leidy et al., 1999).

Cross-sectional studies suggest that better cognitive performance has cumulative effects on better quality of life in military personnel. Additionally, intervention studies, in which rather inactive military personnel participate in a regular military physical exercise program at an intensity sufficient to increase their quality of life, have also confirmed the relationship between cognitive vitality and mental health (Feld et al., 1995; Gotay et al., 1992; Bergner et al., 1998). According to Wood-Dauphinee (1999), it is possible to increase the quality of life through the practice of regular military physical training by increasing the maximum cardiac output and the maximum stroke volume. This increase in maximal oxygen consumption is important for the subject's quality of life (Wood-

Dauphinee, 1999). The objective of the study was to determine the quality of life of the soldiers of the Kinshasa garrison and the consequences on their physical health.

Methods

A traversable and descriptive study with Who-Bref questionnaire survey was conducted on soldiers in the Kinshasa garrison between October 2020 and February 2021, aged 19 to 69. The Cardiovascular Exploration Center of the Military Health Corps served as the setting, where a convenience sample of 899 soldiers took part. The collection of data was carried out by a self-administered questionnaire integrating the Who-Bref score made up of 26 items, evaluating the four areas of the man's life where the different scores of the questionnaire were calculated. This allowed us to calculate the average of these items which informed us more about each dimension. This is a subjective self-report scale that measured mental health, well-being, environment, and social relationships. The answers to the items are made on a 5-level scale. All army rank categories took part, except Generals. Anthropometric, physiological, body composition, and energy expenditure data were collected. The Subjective Self-Assessment Quality Scale comprised of 26 validated who-Bef questions that assess the military's overall quality of life, perceived general health status (Skevington et al., 2004). These 24 items are divided into the following 4 domains: physical health (7 items): pain-discomfort, sleep-rest, fatigue-energy, mobility, activities-work and dependence on treatments, mental (psychological) health (6 items): positive emotions, thinking, learning, memory and concentration, self-esteem, body image, negative emotions, spirituality, and personal beliefs, social relationships (3 items): personal relationships, social support, and sexual activity, environment (8 items): freedom, security, home environment, financial and medico-social resources, accessibility and quality of care, access to information, leisure activities, housing, and transport. Scoring is done on 4 types of 5-point response scales, allowing the evaluation of intensity ("not at all-extremely"), capacity ("not at all-completely"), frequency ("never-always"), the evaluation ("very satisfied/dissatisfied, very good/bad") varies according to the questions asked. Each domain, therefore, has its intervals of possible scores in absolute figures: for physical health, the minimum possible score is 7 and the maximum is 35, for psychological health, the minimum score is 6 and the maximum 30, for the domain of social relations

the minimum is 3 and maximum 15, for the environment the minimum is 8 and maximum 40. The calculation for each domain is done using a calculation grid developed by the WHOQOL-BREF creation team, obtaining a score transformed from 4 to 20. Since each domain has a number of unlike items, in studies using the BREF, scores are usually scaled back to a standard measurement scale, called the 0-100 transformed score (Bauduceau et al., 2005).

Ethical Considerations

The military readily agreed to participate in our study according to the Helsinki declaration or the survey was approved by the Ethics Committee of the School of Public Health number ESP/CE/151/2020. Informed consent was also obtained from all military subjects.

Statistical Analysis

Data collection and statistical analysis were performed using Microsoft Excel software. We carried out a descriptive analysis in which the quantitative variables are expressed in the form of mean \pm standard deviation [min, max] and the qualitative variables in number and percentage.

Univariate analyzes essentially used Fisher's test. Then we compared the averages to the different domains of the WHOQOL BREF: a global assessment of their quality of life, global assessment of their health, physical health, psychological health, social relations, and environment. We have the Chi-square test comparing the categorical variables of the dependent samples when the number of participants was sufficient; otherwise, the. This is an adaptation of the Test. When the normality assumption is not acceptable, the Kruskal-Wallis nonparametric test replaces it. The Bravais-Pearson linear correlation test was used to determine if there was a significant linear relationship between two quantitative variables.

Results

General Characteristics of the Population on Quality of Life of the Military

We find that the majority of military personnel had the poorest quality of life (87.5%) compared to 12.5% who reported having the best quality of life.

Among non-commissioned officers and non-commissioned officers with poor quality of life, corporals were more represented with 33.5%.

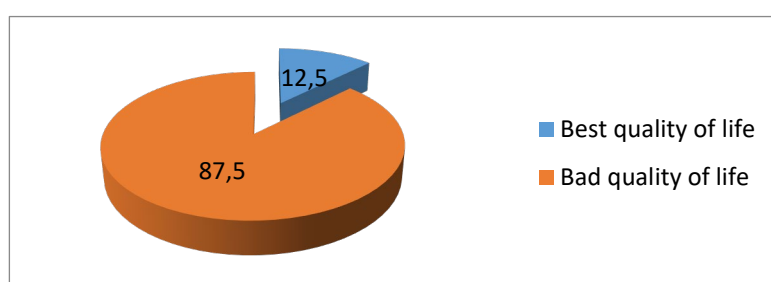


Figure 1. Frequency of quality of life.

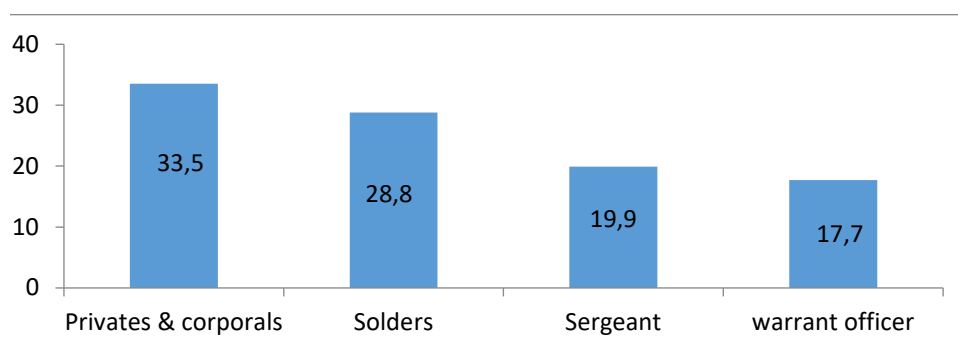


Figure 2. Distribution of soldiers according to poor quality of life.

Table 1

Risk factors according to quality of life.

Variables	Whole group	Better Quality of life		Bad Quality of life		p
	n (%)	n =112	%	n = 787	%	
HTA	89 (9.8)	9	0.8	80	10.1	0.003*
Diabetes mellitus	28 (3.1)	7	0.6	21	2.6	0.001*
Overweight & obesity	54 (6.0)	5	0.4	49	6.2	0.002*
Dyspnea on exertion	36 (4.0)	6	0.5	30	3.8	0.001*
Asthma	37 (4.1)	5	0.4	32	4	0.001*
Gonarthrosis	31 (3.3)	7	0.6	24	3	0.001*
Low back pain	37 (4.1)	7	0.6	30	3.8	0.001*
Alcohol	39 (4.3)	4	0.3	35	4.4	0.002*
Tobacco	32 (3.5)	7	0.6	25	3.1	0.002*
RAH	70 (7.7)	7	0.6	63	8	0.043*
RCM	48 (5.3)	5	0.4	43	5.4	0.009*
ATS	87 (9.6)	7	0.6	80	10.1	0.006*
Muscular	69 (7.6)	9	0.8	60	7.6	0.001*
Fat	60 (6.7)	10	0.8	50	6.3	0.064
NAP	95 (10.5)	10	0.8	85	10.8	0.003*
DE	87 (9.6)	7	0.6	80	10.1	0.014*

HTA: Arterial Hypertension; RAH: Abdominal and Hip Risk; RCM: Cardiovascular risk; ATS: Arteriosclerosis; DE: Energy Expenditure.

* $p < .05$

As shown in Table 1, significantly the low level of practice of physical activity represented with 10.5% ($p=0.003$), as well as low energy expenditure ($p<0.014$) and the frequency of hypertension significantly higher among soldiers ($p=0.003$), which led to the early onset of chronic non-communicable diseases among Congolese soldiers ($t=1.331$; $p<0.01$) and the risk among military ($t=0.974$; $p<0.01$).

In univariate analysis, age ≥ 40 years, rank of privates & corporals, hypertension, ATS, overweight and very high body fat were the factors associated with poor quality of life among soldiers. After adjustment, age ≥ 40 years (ORa: 1.88 95% CI: 1.03-3.50; $p=0.049$), ATS (ORa: 6.80 95% CI: 2.45-18.86; $p<0.001$), overweight (ORa: 4.51, 95% CI: 2.69-7.54; $p<0.001$), very high body fat (ORa: 15.24, 95% CI: 3.09-25.21; $p=0.001$) and low DEPE (aOR: 6.69 95% CI: 1.76-8.54; $p=0.005$) emerged as independent factors associated with poor quality of life in military personnel (Table 2).

Discussion

We observed in both groups a predominance of the male sex, i.e., 88.7% against 11.3% (sex ratio 8M/1F). The study concerned 899 soldiers who answered the questions. The quality of life of these soldiers is recorded in Figure 1. It is shown that the majority of the soldiers had a poor quality of life (87.5%) vs 12.5% had the best quality of life. Among the poor-quality soldiers, we found 33.5% were corporals, 28.8% were privates, 19.9% were the category of sergeants, and that warrant officers covered 17.7% (Figure 2). The mean age was 45.4 ± 11.9 years (range from 19 to 69 years). 38.4% were non-commissioned officers and 37.7% were officers. The majority of soldiers had a secondary education level (69.4%). It is noted that 87.5% had at least one morbid history. This distribution also varies according to the grades; Corporals, privates, non-commissioned officers, and officers.

Table 2

Factors associated with poor quality of life.

Variables	Univariate analysis		Multivariate analysis	
	p	OR (IC 95%)	p	ORa (IC 95%)
Aged				
18≥40 old		1		1
	<0.001	2.89 (1.64-5.08)	0.049*	1.88 (1.03-3.50)
Grade				
Officers		1		1
Privates & corporals	0.022*	2.02 (1.10-3.63)	0.124	0.60 (0.31-1.15)
Sous-officers	0.899	0.97 (0.63-1.50)	0.940	0.98 (0.50-1.90)
HTA				
No		1		1
Yes	0.006*	1.82 (1.19-2.79)	0.382	1.24 (0.76-2.02)
ATS				
No		1		1
Yes	0.001*	5.99 (2.17-16.53)	<0.001*	6.80 (2.45-18.86)
Overweight				
No		1		1
Yes	0.004*	1.82 (1.21-2.73)	<0.001*	4.51 (2.69-7.54)
Fat				
Normal		1		1
Weak	0.094	0.41 (0.14-1.17)	0.210	0.49 (0.17-1.48)
High	0.881	0.92 (0.30-2.79)	0.068	3.08 (0.92-10.30)
Very high	0.023*	5.95 (1.28-7.62)	0.001*	15.24 (3.09-25.21)
DE				
		1		1
Moderate	0.289	1.59 (0.67-3.77)	0.432	1.52 (0.54-4.33)
Weak	0.001	7.85 (2.45-12.19)	0.005*	6.69 (1.76-8.54)

HTA: Arterial Hypertension; RAH: Abdominal and Hip Risk; RCM: Cardiovascular risk; ATS: Arteriosclerosis; DE: Energy Expenditure.

* $p < .05$

An explanatory factor for this distribution. It is a self-questionnaire evaluating their quality of life where the results were observed significantly on the morpho-physiological parameters and the body composition studied ($p < 0.001$). Individual WHOQOL BREF scores for overall and psychological health have not been shown to improve quality of life, nor has the overall well-being of Congolese soldiers. However, in the comparative analysis of these 26 items, a note of low participation of the military and the lack of experience in this kind of study determines

the quality of life. However, several studies conducted between 2009 and 2016, in South Africa from China to Europe and the United States, revealed that the morpho-physiological profile and body composition of soldiers would be overweight around 10-20%, or even suffer from outright obesity. On the other hand, the French army carried out a survey. The results showed that between 40 and 50 years old, one soldier out of 2 was HTA+ and beyond 60 years old, which harmed the quality of life of his military (Bauduceau et al., 2005). The South African Army in

2012, made a statistic from the Military Health Service where the results revealed that almost 10% of members of the South African Armed Forces were obese, thus their military experts raise an alarming cry about the quality of life of South African soldiers which has a cost in terms of health (Desjeux et al., 2009). The RAND Corporation 2013 published a health report and leads a reflection on global policies, in the latter, the results show that nearly 66% of American troops are overweight or obese (Desjeux et al., 2009).

The Organization for Economic Co-operation and Development published a damning report on the physical health of the Mexican military was at risk, it reveals that the rate of obesity was the highest among the 35 member countries (32, 4% of the population), behind the United States (OECD, 2015).

With regard to studies carried out within the Indian army, the results show that a third of Indian soldiers did not have the best quality of life and that they were overweight. However, a licensing study carried out at the Higher Institute for Rural Development in Bukavu in the Democratic Republic of Congo in 2016 showed that the living conditions and survival of soldiers in this city were precarious with a low incidence among Senior Officers, Junior Officers, NCO 1st, 2nd, and 3rd Class as well as non-commissioned soldiers, whose average age was 40 years 41. The same study showed that most of these soldiers were without the level of 10%, 16% had a primary certificate level, 24% had a 4-year post-primary level, 40% had a D6 level, 20% a graduate level, and 10% had a license level (Kiana et al., 2021). On the other hand, Kiana Ngasa et al, in 2021, carried out a study in the military garrison of Kinshasa on the positive effects of interval training exercises on the morpho-physiological parameters of the soldiers of Kinshasa, the results showed that the Kinshasa soldiers developed many of the risk factors, the worse their quality of life was. The same study found that hypertensive junior officers were obese and less enduring than their overweight junior officers' counterparts respectively: 30.9 ± 6.22 Kg/m² vs 27 ± 4.1 Kg/m² for Body Mass Index and 38.0 ± 4.9 ml/min/kg vs 32 ± 3.9 ml/min/kg for cardiorespiratory endurance (Kiana et al., 2021).

This study has shown that the soldiers of the Kinshasa garrison do not escape this world rule of a sedentary lifestyle where its results show that 57.5% were HTA+, 4.1% obese, 4.8% overweight, 1.6% had arteriosclerosis, more than 2.4% had a high-fat rate, 5.2% had a low muscle percentage, and finally 4.0% had a low energy expenditure. This would explain why there is a physical health problem within the

Armed Forces of the Democratic Republic of Congo. The results of our study seem alarming for the Congolese soldiers who do not promote physical well-being. The poor quality of life of these soldiers implies consequent modifications to their lifestyle, requiring a program of physical another side, and on the other side the revitalization of compulsory military physical activities in all the armed forces of the DRC.

Conclusion

It appears from this study that the majority of Congolese soldiers have a poor quality of life. We suggest that the military authorities can revitalize and organize military physical activity programs allowing their personnel to acquire a very better physical condition and finally have a good quality of life.

Authors' Contribution

Study Design: NKN, CN, GK, CN, WK, AN, BM, KV; Data Collection: NKN, CN, GK, CN, WK, AN; Statistical Analysis: BM, KV; Manuscript Preparation: NKN, CN, GK, CN, WK, AN, BM, KV; Funds Collection: NKN, CN.

Ethical approval

Procedures were done according to the Declaration of Helsinki and approved by the Ethics Committee of the School of Public Health number ESP/CE/151/2020.

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Conflict of Interest

The authors hereby declare that there was no conflict of interest in conducting this research.

References

Bauduceau, B., Baigts, F., & Bordier, L. (2005). Etude épidémiologique des facteurs de risque et du syndrome métabolique en milieu militaire (étude EPIMIL). *Diabetes Metab*, 31, 353-359.

- Bergner, M. (1989). Quality of life, health status, and clinical research. *Med Care*, 273 (Suppl), S148-156.
- Desjeux, G., Balaire, C., Pommier de Santi, V., Léon, C., Aspar, A.-M., Deparis, X., & Thévenin-Garron, V. (2009). Enquête préliminaire sur les besoins de prévention en santé des militaires d'active. *Medécine Armées*, 37, 389-397.
- Feld, R. (1995). *Endpoints in cancer clinical trials: is there a need for measuring quality of life? Support Care Cancer*, 3(1), 23-27.
- Gotay, C.C., Korn, E.L., McCabe, M.S., Moore, T.D., & Cheson, B.D. (1992). Quality-of-life assessment in cancer treatment protocols: research issues in protocol development. *J Natl Cancer Inst*, 84(8), 575-579.
- Leidy, N.K., Revicki, D.A., & Geneste, B. (1999). Recommendations for evaluating the validity of quality of life claims for labeling and promotion. *Value Health*, 2(2), 113-127.
- Monge, J. (2013). Fibrous dysplasia in a 120,000+ year old Neandertal from Krapina, Croatia. *PLoS One*, 8(6), e 64539.
- Ngasa, K., Kusuayi, G., Gustave, M., Claude, N., Celestin, M., Monique, N., Nkiama, C., Kalumbe, K., Gilbert, K., & Willy, K.L. (2021). Effects of interval training on the morpho-physiological parameters of hypertensive soldiers. *Turk J Kinesiol*, 7(1), 17-21.
- OCDE, (2015). Enquête Préliminaire Sur Les Besoins de Prévention en Santé Des Militaires Américains, 37(5).
- Oleson, M. (1990). Content validity of the quality of life index. *Appl Nurs Res*, 3(3), 126-127.
- Revicki, D.A., Osoba, D., Fairclough, D., Barofsky, I., Berzon, R., Leidy, N.K., & Rothman, M. (2000). Recommendations on health-related quality of life research to support labeling and promotional claims in the United States. *Qual Life Res*, 9(8), 887-900.
- Skevington, S.M., Lotfy, M., O'Connell, K.A., & WHOQOL Group. (2004). The World Health Organization's WHOQOL-BREF quality of life assessment: Psychometric properties and results of the international field trial. A report from the WHOQOL group. *Quality of Life Research*, 13(2), 299-310.
- Statuesque annuelle de l'Organisation de coopération et de développement économiques (OCDE), 2015: Enquête préliminaire sur les besoins de prévention en santé des militaires américains, T. 37 - n° 5
- WHO, (1993). Study Protocol for the World Health Organization Project to Develop a Quality of Life Assessment Instrument (WHOQOL). *Quality Life Res*, 2(2), 153-159.
- WHO, (2017). Stratégie mondiale pour l'alimentation, l'exercice physique et la santé (Internet); Rabermananjara & parsley, (2006); *Evaluation of the quality of life in clinical research in cancer logy*. Bull Cancer.
- Wood-Dauphinee S. (1999). Assessing quality of life in clinical research: from where have we come and where are we going? *J Clin Epidemiol*, 1999, 52(4), 355-563.