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Impact of BMI on biochemical markers of Army personnel

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Abstract

Health of citizens is an important matter for any country especially when it comes to military personnel as they are supposed to be the first line of defense. It is therefore one of the major areas of research to understand the early symbols of any of the health issues. The present paper deals with the personnel of Indian army health which was assessed through dietary intake, anthropometric measurement, and biochemical assessment. It can be concluded that as regard to waist hip ratio, diastolic blood pressure, total cholesterol, HDL cholesterol, LDL cholesterol, triglyceride, fasting blood glucose level, non-obese group differed significantly with overweight and obese groups, while overweight and obese group do not differ significantly with each other.

Introduction

Health of citizens is an important matter for any country especially when it comes to military personnel as they are supposed to be the first line of defense [1]. It is therefore one of the major areas of research to understand the early symbols of any of the health issues. It is always probable that factors which is widely accepted as risky like that of the age of army personnel, the anthropometric parameters of army personnel, the gender of the army personnel may result into any kind of fatal illness [2-5]. In the present scenario, obesity has attracted the attention of many researchers as it is supposed to be behind many health issues. Obesity has been understood as accumulation of extra fat in the body [6]. Prevalence of prehypertension in young military adults & its association with overweight &dyslipidaemia [7], Prevalence of early stages of chronic kidney disease in healthy Army personnel [8], Differentials and Determinants of Syndrome 'X'andits Role as Coronary Risk among Healthy Middle Aged Indian Army Personnel etc and many more researches have been studied with respect to Indian military personnel.Studies indicate that obesity on rise in Indian armed forces too. Hence Body mass index (BMI) need to be studied of the Indian army personnel. The present paper will discuss multiple anthropometric parameters such as weight, height, waist circumference, waist-hip ratio and BMI.

Methodology

The present paper deals with the personnel of Indian army health which was assessed through Dietary intake, anthropometric measurement, and Biochemical assessment. The different food supplements from

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Soyabean, germinated pearl millet, germinated flax seed & germinated & regd. and Barley were developed using simple home scale techniques. The selected food supplement was fed to Army personnel for 12 weeks. After three months of feeding trial, the impact of feeding was studied pre and post of the intervention session. The present part of the research work presents the impact of BMI on biochemical parameters of respondents. To see the impact, ANOVA statistical technique has been used to analyze the data.

Data Analysis and Interpretation

Table 1.Mean, Standard Deviation scores of biochemical parameters in non-obese, overweight and obese respondents

		N	Mean	Std. Deviation	Std. Error	F Value
Waist Hip Ratio	Non-obese	235	.9152	.02746	.00179	14.454**
	Overweight	43	.9356	.03647	.00556	
	Obese	22	.9418	.04272	.00911	
	Total	300	.9201	.03152	.00182	
Waist Height Ratio	Non-obese	235	.4629	.04461	.00291	50.890**
	Overweight	43	.5063	.02536	.00387	
	Obese	22	.5436	.03922	.00836	
	Total	300	.4751	.04855	.00280	
Systolic Pressure	Non-obese	235	119.74	5.486	.358	1.647^{NS}
	Overweight	43	121.12	10.523	1.605	
	Obese	22	121.77	5.033	1.073	
	Total	300	120.09	6.430	.371	
Diastolic Pressure	Non-obese	235	78.65	5.813	.379	3.888*
	Overweight	43	79.44	3.601	.549	
	Obese	22	82.00	4.986	1.063	
	Total	300	79.01	5.550	.320	
Total Cholesterol Level	Non-obese	235	132.46	33.647	2.195	9.582**
	Overweight	43	143.56	40.772	6.218	
	Obese	22	166.00	51.006	10.875	
	Total	300	136.51	37.232	2.150	
HDL	Non-obese	235	43.49	10.443	.681	7.217**
	Overweight	43	39.16	11.952	1.823	
	Obese	22	36.18	6.953	1.482	
	Total	300	42.34	10.682	.617	
LDL	Non-obese	235	79.39	27.207	1.775	14.507**
	Overweight	43	93.09	30.094	4.589	
	Obese	22	110.23	38.288	8.163	
	Total	300	83.61	29.808	1.721	
Triglyceride	Non-obese	235	65.23	32.683	2.132	8.807**
	Overweight	43	70.21	23.274	3.549	

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	Obese	22	97.36	61.934	13.204	
	Total	300	68.30	35.377	2.042	
Fasting Blood Glucose Level	Non-obese	235	81.43	6.326	.413	4.695*
	Overweight	43	83.28	8.131	1.240	
	Obese	22	85.73	10.161	2.166	
	Total	300	82.01	7.026	.406	

Note: **significant at 0.01 level
*significant at 0.05

Table 1 indicate that F value in case of Waist Hip Ratio is 14. 454 wherein df stands at 2.297 at a significance level of .01.One can conclude hence that substantial difference exist amongst the categories available. Post-hoc testresults for all the three categories are presented in Table no 2.

Table 2.Post hoc table for waist hip ratio in non-obese, overweight and obese respondents

Waist Hip Ratio			
Tukey HSD			
Group BMI	N	Subset for alpha = 0.05	
		1	2
Non-obese	235	.9152	
Overweight	43		.9356
Obese	22		.9418
Sig.		1.000	.617

One can conclude from Post hoc data that waist hip ratio, non-obese group differed significantly with overweight and obese groups, while overweight and obese group do not differ significantly with each other.It can be concluded that respondents of non-obese group have waist hip ratio within the reference table than the respondents of overweight and obese groups.

Table 1 indicate that F value in case of waist height ratiois 50.890 wherein df stands at 2.297 at a significance level of .01. One can conclude hence that substantial difference exist amongst the categories available. Post-hoc test results for all the three categories are presented in Table no 3.

Table 3.Post hoc table for waist height ratio in non-obese, overweight and obese respondents

Waist Height Ratio				
Tukey HSD				
Group BMI	N	Subset for alpha = 0.05		
		1	2	3
Non-obese	235	.4629		
Overweight	43		.5063	
Obese	22			.5436
Sig.		1.000	1.000	1.000

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One can conclude from Post hoc data that w.r.twaist height ratio, all the three groups differed significantly with each other, group of non-obese respondents differ significantly with overweight and obese respondents, while respondents of overweight group differ significantly obese respondents. It can be concluded that respondents of non-obese group have waist height ratio within the reference table than the respondents of overweight and obese groups do not come under reference table. From the next section of the table 1, F value in case of systolic blood pressure is 1.647 which is not significant at any level of significance. One can conclude hence that no difference exist amongst the categories available with regard to systolic blood pressure.

From the next section of the table 1, F value in case of diastolic blood pressure is 3.888. One can conclude hence that substantial difference exist amongst the categories available. Post-hoc test results for all the three categories are presented in Table no 4.

Table 4.Post hoc table for diastolic in non-obese, overweight and obese respondents

Diastolic Pressure			
Tukey HSD			
Group BMI	N	Subset for alpha = 0.05	
		1	2
Non-obese	235	78.65	
Overweight	43	79.44	79.44
Obese	22		82.00
Sig.		.791	.090

One can conclude from Post hoc data that w.r.t diastolic blood pressure, group of non-obese respondents differ significantly with obese respondents, while respondents of overweight and obese group do not differ significantly with each other. It can be concluded that all the respondents of three group have come within the range of diastolic blood pressure, but respondents of obese group come into the category of pre-hypertensive stage. While respondents of non-obese and overweight groups come within the range of normal diastolic blood pressure.

From the next section of the table 1, F value in case of level of total cholesterol is 9.582. One can conclude hence that substantial difference exist amongst the categories available. Post-hoc test results for all the three categories are presented in Table no 5.

Table 5.Post hoc table for total cholesterol level in non-obese, overweight and obese respondents

Total Cholesterol Level			
Tukey HSD			
Group BMI	N	Subset for alpha = 0.05	
		1	2
Non-obese	235	132.46	

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Overweight	43	143.56	
Obese	22		166.00
Sig.		.348	1.000

One can conclude from Post hoc data that w.r.t total cholesterol, group of non-obese respondents differ significantly with obese group respondents, while respondents of overweight and obese group do not differ significantly with each other. It can be concluded that all the respondents of three group have come within the range of normal total cholesterol level, but respondents of obesegroup moving towards borderline of total cholesterol level. While respondents of non-obese and overweight groups come within the range of normal total cholesterol level. From the next section of the table 1, F value in case of high density lipoprotein (HDL) is 7.217. One can conclude hence that substantial difference exist amongst the categories available. Post-hoc test results for all the three categories are presented in Table no 6.

Table 6.Post hoc table for HDL level in non-obese, overweight and obese respondents

HDL			
Tukey HSD			
Group BMI	N	Subset for alpha = 0.05	
		1	2
Obese	22	36.18	
Overweight	43	39.16	39.16
Non-obese	235		43.49
Sig.		.401	.147

One can conclude from Post hoc data that w.r.tHDL cholesterol, group of non-obese respondents differ significantly with obese group respondents, while respondents of overweight and obese group do not differ significantly with each other. It is important to note that all the respondents of three groups lower than the reference range of HDL, but respondents of obese group moving towards borderline of HDL cholesterol level. From the next section of the table 1, F value in case of low density lipoprotein (LDL) is7.217. One can conclude hence that substantial difference exist amongst the categories available. Post-hoc test results for all the three categories are presented in Table no 7.

Table 7.Post hoc table for LDL level in non-obese, overweight and obese respondents

LDL			
Tukey HSD			
Group BMI	N	Subset for alpha = 0.05	
		1	2
Non-obese	235	79.39	
Overweight	43	93.09	
Obese	22		110.23
Sig.		.077	1.000

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One can conclude from Post hoc data that w.r.t LDL cholesterol, group of non-obese and overweight respondents differ significantly with obese group respondents. It is also noteworthy that all the respondents of three groups come under the reference range of LDL, but respondents of obese group moving towards borderline of LDL cholesterol level. From the next section of the table 1, F value in case of triglyceride is8.807. One can conclude hence that substantial difference exist amongst the categories available. Post-hoc test results for all the three categories are presented in Table no 8.

Table 8.hoc table for triglyceride in non-obese, overweight and obese respondents

Triglyceride			
Tukey HSD			
Group BMI	N	Subset for alpha = 0.05	
		1	2
Non-obese	235	65.23	
Overweight	43	70.21	
Obese	22		97.36
Sig.		.790	1.000

One can conclude from Post hoc data that w.r.ttriglyceride, group of non-obese and overweight respondents differ significantly with obese group respondents. It is also noteworthy that all the respondents of three groups come under the reference range of triglyceride, but respondents of obese group have higher level of triglyceride than the respondents of non-obese and overweight groups but do not under risk factor of triglyceride.

From the next section of the table 1, F value in case of fasting blood glucose level is4.695. One can conclude hence that substantial difference exist amongst the categories available. Post-hoc test results for all the three categories are presented in Table no 8.

Table 9.Post hoc table for fasting blood glucose level in non-obese, overweight and obese respondents

Fasting Blood Glucose Level			
Tukey HSD			
Group BMI	N	Subset for alpha = 0.05	
		1	2
Non-obese	235	81.43	
Overweight	43	83.28	83.28
Obese	22		85.73
Sig.		.449	.248

One can conclude from Post hoc data that w.r.tfasting blood glucose level, group of non-obese and overweight respondents differ significantly with obese group respondents. It is important to note that all the respondents of three groups come under the reference range of fasting blood glucose level, but respondents of obese group slightly higher level of fasting blood glucose than the respondents of non-obese and overweight

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groups but do not under risk factor of fasting blood glucose level.

Conclusion

It can be concluded that as regard to waist hip ratio, diastolic blood pressure, total cholesterol, HDL cholesterol, LDL cholesterol, triglyceride, fasting blood glucose level, non-obese group differed significantly with overweight and obese groups, while overweight and obese group do not differ significantly with each other. It is also noteworthy that all the respondents of three groups come under the reference range of waist hip ratio, diastolic blood pressure, total cholesterol, HDL cholesterol, LDL cholesterol, triglyceride, fasting blood glucose level, but respondents of obese group moving towards borderline of waist hip ratio, diastolic blood pressure, total cholesterol, HDL cholesterol, LDL cholesterol, triglyceride, fasting blood glucose level.

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