

Energy Intake and Energy Expenditure of Prisoners Involved in Different Worksheds

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ABSTRACT Modern prison is not just a mechanism for inflicting punishment on the offender, it is also a centre of rehabilitation. As a means of rehabilitation the convict prisoners are employed at different workshed, which is also a source of economic contribution to the prison. An attempt has been made to assess the energy intake and energy expenditure of the prisoner, which might effect their work efficiency at prison. The mean energy intake was lowest in subjects involved in carpentry work (2428 kcal) compared to subjects performing weaving 2585 kcal and kitchen work 2580 kcal. The mean energy expenditure of subjects involved in weaving and kitchen work was 2305 kcal and 2217 kcal, respectively. The 't®' test applied showed a significant difference in the mean energy intake and energy expenditure of the subjects in all the three groups performing different activity.

INTRODUCTION

Prison is an ancient institution, where diverse types of people, who had run a foul of the law, some of them possibly innocent live. Modern prison is not just a mechanism for inflicting punishment on the offender, it is also a center of rehabilitation as well. The main aim of the prison is to rehabilitate the prisoners and develop work efficiency necessary to earn their livelihood and prevent them from reverting to crime again. As a means of rehabilitation the prisoners are employed in different workshed, which is a source of income to the prison.

A low work output of the prisoner may be partly due to their nutritional status. Nutrition and health status of prisoners is determined by dietary intake, health status and environmental conditions. Constraints if any faced by them during their long stay will result in low quality human capital and less productive work force. It is of interest to study whether, the energy intake and energy expenditure of the prisoners is well balanced so as to maintain good health and contribute to prison income through their effective work force. Hence, the present study is being undertaken.

MATERIALS AND METHODS

The present study was conducted at Central

Prisons, Bangalore. Sixty convict prisoners in the age group 20-50 years involved in weaving, carpentry and kitchen work was selected to assess their energy intake and energy expenditure. Further, from each activity 20 subjects were selected by simple random sampling. Three days weighment method for consumption of institution diet and 24 hrs recall for additional food consumed was used to assess the dietary intake. Conversion factor (Chadha et al., 1995) was used for calculation.

Conversion factors (CF) =

Quantity of each raw food ingredient in a preparation

Total amount of cooked food preparation

Quantity of cooked preparation consumed by each individual was multiplied by CF to determine the daily intake of equivalent raw food ingredients used in particular preparation. Nutritive value of the diet was calculated using food composition table (Gopalan et al., 1999).

To estimate energy expenditure, time spent on different activities by subjects for period of 24 hours in minutes was recorded. The energy cost of different activities was obtained from literature (FAO/WHO/UNU, 1985) which considered both Basal metabolite rate (BMR) and Specific dynamic action (SDA) of food. The time spent on each activity was then multiplied by

energy cost of the activity. The energy expenditure for each activity was computed to know the total energy expenditure on physical activity. To calculate the energy cost for sleep, BMR was calculated as per the equations for predicting BMR (kcal/24 hrs) (ICMR, 2000) for the age of 30 to 60 years.

$$\text{BMR} = 10.9 \times \text{Body weight (kg)} + 833$$

The value thus obtained was multiplied by the energy cost for sleep (FAO/WHO/UNU, 1985). Total energy expenditure comprised of energy spent through physical activity and sleep.

RESULTS AND DISCUSSION

Energy intake and expenditure by activity is presented in Table 1. The mean intake of energy was lowest in subjects involved in carpentry work (2428 kcals) compared with subjects performing weaving (2585 kcals) and kitchen work (2580 kcals). Further, it significantly differed when compared with the other two groups ($F = 4.10$). The mean energy expenditure was also found to be higher among those involved in carpentry work (2893 kcals). Energy expenditure of subject involved in weaving and kitchen work was 2305 and 2219 kcals, respectively. Group of subjects whose occupation being carpentry differed statistically compared with their counterparts in

the other two groups involved in weaving and kitchen work with respect to energy expenditure. The 't' test applied showed a significant (at 1% level) difference in the mean energy intake and energy expenditure of the subjects in all the three groups performing different activity. The results indicate a lower intake (2531 kcal) than the reported value of 2820 ± 577 kcal per day by Chipionkar et al. (1992) who studied energy intake and resting metabolic rate of Indian men which may be attributed to the lower intake of energy dense foods or rejection of food served in institution due to various reasons such as psychological depression, poor quality food, monotonous food daily served and health reasons.

The association between energy balance and type of activity performed is presented in Table 2. Ninety per cent of the subjects involved in carpentry work had negative energy balance where intake was found too be less than the expenditure, vice-verses was observed among the subjects involved in kitchen work and weaving. As observed in the data on dietary intake energy consumed was higher among kitchen workers. Among the three activities carpentry involves slightly more energy. Hence, they were on negative energy balance (90%). However, chi-square test indicated a significant difference in energy balance between the activity.

Table 1: Energy intake and expenditure by activity

Occupation	N	Intake		Expenditure		't' value
		Mean	SD	Mean	SD	
Weaving	20	2585 ^a	355	2305 ^x	160	3.21**
Carpentry	20	2428 ^b	338	2893 ^y	123	5.78**
Kitchen work	20	2580 ^a	376	2219 ^x	145	4.01**
Combined	60	2531	364	2472	332	
F-value		4.10*	5.37*			

Common letter indicate non-significant between means

** = Significant at 1 per cent level

NS = Non-significant

Table 2: Association between energy balance and type of activity

Activity	Energy balance of subjects						χ^2 value
	Positive		Negative		Total		
	N	%	N	%	N	%	
Weaving	15	75	5	25	20	100	24.65**
Carpentry	2	10	18	90	20	100	
Kitchen work	16	80	4	20	20	100	
Combined	33	55	27	45	60	100	

** = Significant at 1 per cent level

CONCLUSION

It can be concluded that the type of activity seemed to have influence on the energy intake or energy balance. Though all the three types of activity are sedentary, but still carpentry work seems to require slightly higher energy requirement, than the other two activities. However, the food supplied in institution remained same in quantity and quality for all the inmates irrespective of the activity in which involved. Hence, this might be one of the reasons for subjects involved carpentry to be on negative energy balance.

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