

Reprint :

BMRC. Bulletin, 2 : 27-30, 1976

**STUDY OF ENERGY EXPENDITURE AND FOOD INTAKE
OF SOME WORKING CLASS PEOPLE OF BANGLADESH
PART-II***

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Apart from scientific importance, a knowledge of the energy expenditure during common occupational activities of working class people is important in assessing and planning the optimal daily dietary intake. In an earlier publication (Fariduddin et al., 1975) data on the basal metabolic rate, resting energy expenditure and energy expenditure during occupational activities like rickshaw-peddalling and cart-pulling and their daily dietary intake were presented. In the present series, studies were carried out to determine the energy expenditure during ploughing, digging and earth-cutting, carpentering and brick-breaking. In addition, the dietary intake of a group of cultivators (doing ploughing) having small agricultural holdings were also determined.

MATERIALS AND METHODS

The energy expenditure was determined by indirect calorimetry. The expired air was collected into Douglas bag made of vinyl plastic and the volume was measured in a calibrated dry gas meter. The O₂ and CO₂ content of the expired air was determined by using the Lloyd's modification of the Haldane's gas analysis apparatus. The procedure consisted of collection of expired air for a period of time after allowing the subject to become accustomed to breathing through the apparatus. The expired air was collected at the height of the activity. The determination was carried out on each subject for three consecutive days.

The caloric intake was determined by actual weighing of the food stuffs and finding out their calorific values from standard tables (Leung et al., 1952). The caloric intake of each subject was also determined for three consecutive days.

Description of the activities

The cultivators ploughed wet land and the plough was drawn by bullocks.

* Supported in part by a grant from the Bangladesh Medical Research Council.

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The carpenters carried out wood planing using carpenter's plane. Those involved in digging and earth-cutting were subjected to the determination while carrying out their usual activities in a brickfield. The brick-breakers were subjected to the measurement while breaking bricks in sitting position. The earth-cutters and diggers were working with usual age-old implements.

RESULTS

Thirty-four subjects belonging to different occupations were included in the study. Their age and anthropometric data are shown in Table-I.

TABLE-I
Age and anthropometric data of 34 subjects \pm S.D.

Occupation	No. of subjects	Mean age yrs.	Mean ht. cm.	Mean wt. kg.	Mean surface area m ²
Cultivator	10	29.70 \pm 6.10	169.84 \pm 9.15	54.92 \pm 5.80	1.64 \pm 0.090
Carpenter	12	28.58 \pm 4.80	159.27 \pm 6.82	46.18 \pm 5.40	1.45 \pm 0.097
Labourer (earth-cutting)	6	25.50 \pm 4.61	163.67 \pm 4.91	44.25 \pm 3.69	1.45 \pm 0.088
Labourer (brick-breaking)	6	25.00 \pm 4.76	164.08 \pm 2.91	46.83 \pm 2.90	1.48 \pm 0.034

Energy Expenditure

The mean energy expenditure during the activities under study are shown in Table - II. It may be seen that energy expenditure in terms of Kcal/min/m² body surface area was equal during ploughing, wood-planing and earth-cutting or digging. Comparatively less energy was expended during brick-breaking.

TABLE-II
Mean energy expenditure \pm S.D.
during ploughing, wood-planing, earth-cutting and brick-breaking

Activity	No. of subject	Kcal/min/subject	Kcal/min/kg	Kcal/min/m ²
Ploughing	10	5.45 \pm 0.59	0.096 \pm 0.012	3.33 \pm 0.403
Wood-planing	12	4.24 \pm 0.62	0.090 \pm 0.012	3.02 \pm 0.470
Earth-cutting	6	5.19 \pm 0.47	0.113 \pm 0.012	3.57 \pm 0.320
Brick-breaking	6	3.40 \pm 0.52	0.068 \pm 0.006	2.28 \pm 0.290

Dietary intake of cultivators

The dietary intake of the group of cultivators whose energy expenditure during ploughing was studied are shown in Tables III and IV. The cultivators had their own poultry, cattles and ponds. The ponds provided the requirement of fish. They also grew their own vegetables. The bulk of the caloric intake was contributed by carbohydrate; fat intake was very low but protein intake was within normal limits.

TABLE-III

Daily caloric intake and percent contribution of protein, fat and carbohydrate in the diet of cultivators \pm S.D.

No. of subject	Mean caloric intake/day in Kcal.	Mean % contribution to the total caloric intake		
		Protein	fat	carbohydrate
10	2400 \pm 412	17.56 \pm 1.83	4.85 \pm 1.08	77.37 \pm 2.59

TABLE—IV

The protein intake of cultivators according to source \pm S.D.

No. of subject	Mean protein intake in gms. per day	% animal protein	% vegetable protein
10	99.6 \pm 19.94	47.8 \pm 7.8	52.2 \pm 7.83

DISCUSSION

The present results taken along with our previous data (Fariduddin et al., 1975) shows that caloric expenditure varies with the nature of work. Whereas high caloric expenditure were observed with rickshawpedalling (7.84 Kcal/min) and cartpulling (6.08 Kcal/min), comparatively less energy expenditure were seen during brick-breaking ((3.40 Kcal/min) or wood-planing (4.24 Kcal/min). Earth-cutting (5.19 Kcal/min) caused intermediate level energy expenditure. These results may be helpful in formulating the dietary intake of the working class people.

The determination of daily caloric intake showed highest consumption by rickshawpedallers (3128 Kcal) followed by cartpullers (2489 Kcal) and cultivators (2400 Kcal). The protein intake was highest among the cultivators and about 50% of total intake of protein was obtained from animal sources. Fat intake of all the groups studied were low.

SUMMARY

Data on energy expenditure during some occupational activities (ploughing, wood-planing, digging, earth-cutting and brick-breaking) and the dietary intake of a group of cultivators are presented and the results are discussed.

REFERENCES

Fariduddin, K.M.; Rahaman, M.M. and Ahsanullah, A.B.M.; Study of Energy Expenditure and Food Intake of Some Working Class People of Bangladesh. *BMRC. Bulletin, 1* : 24-31, 1975.

Leung, W. Wu.; Pecot. R.K. and Watt, B.K.; Agricultural Handbook No.34, US Dept. of Agriculture, Washington, D.C., 1952.