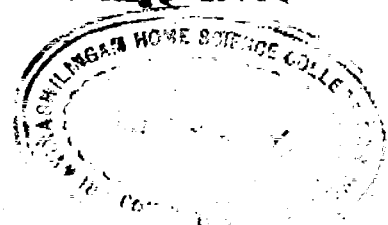


**ENERGY INTAKE AND EXPENDITURE OF ADULT WOMEN IN
FIVE SELECTED OCCUPATIONS**

**By
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I INTRODUCTION

Life, is a machine driven by energy. Something new is born when molecules are built into macromolecules, macromolecules into organelles, organelles into cells, cells into organs, organs into individual and individuals into a society or ecological 'associates' - and for this organisation, price must be paid and the price is ENERGY (Richard H.T.W. - Piennes 1972).

The human body is an engine working by utilising the fuels present in foods (Passmore et al 1974). Every act and movement of life involves, in terms of formal physics, a transformation, or in everyday term an expenditure of energy.

The human body is never at rest. Even when we sleep, the heart beats, the blood vessels circulate blood, the chest walls move, the temperature is kept constant, digestion goes on and the muscles of the body maintain their tone. Also the human body requires energy for the utilisation of food and perform the physical activity (Stevenson et al 1973).

Energy is expended whenever work is performed by the body, regardless of the nature of work - whether voluntary or involuntary (Davidson et al, 1973). The energy needs of an individual are ordinarily considered to be the sum of the basal metabolism, the calories expended in physical activity, and a small increment due to specific dynamic action (Hegsted, 1974).

The fundamental purpose for which people eat food is to use it as fuel to keep their bodies going, (Pyke, 1975) for the body needs energy for performing its several pieces of indispensable work. (Gopalan, 1970).

The input of energy is discontinuous, that is periodic, in complete contrast, energy expenditure is continuous, being composed of basal expenditure with added episodes of additional expenditure related to work. The time spent in the acquisition or spending of energy by human subjects is extremely variable, depending on factors such as occupation social status, age, income and disposition (Parsons, 1973).

Research in human energy metabolism commenced with the discovery of gases and combustion of foods. Combustion

in living beings was first described by Lavoisier at the end of 18th century. (Davidson et al, 1975).

Lavoisier's epoch making discoveries were followed by the well known studies on energy by Lusk (1918), Voit (1881), Atwater (1895) and the National Research Council (1943).

The nutritionist needs to know about energy expenditure in order to be able to recommend energy intakes (Bradfield, 1971).

The study of energy expenditure in various activities began to increase sharply during the world war II, when the nutrition requirement of individuals and energy cost of various industrial and household activities were determined for the British workers (Whedon, 1959). In addition to, its well established role in nutritional studies, the estimation of energy expenditure is a valued tool of researchers and practitioners in other fields (Andrews, 1971).

The total energy expenditure of an individual is the sum total of the energy expenditure for the basal metabolism and the physical activities. Since energy expenditure for

basal metabolism forms a considerable proportion of total daily calories expenditure it deserves special consideration. (De Negchaudri, 1976).

Energy expenditure of different occupations have been studied in the years that followed the world wars. But few detailed study on occupations involving sedentary work has been conducted. This study is an endeavour to determine the energy expenditure of women. Women engaged in different occupations were chosen because the physical activities vary with different occupations.

II REVIEW OF LITERATURE

The literature pertaining to this study is given under the following headings:

1. Historical review on energy metabolism
2. Energy at rest and factors affecting BMR
3. Energy expenditure during various activities
4. Relation between food intake and energy metabolism

1. Historical Review:

History gives meaning to the present. Through knowledge of the past, we gain understanding of what is happening today. History has more than a utilitarian purpose, it is the record of the progress of man's endeavours and work, his ideas, visions, failures and achievements.

The current knowledge on energy metabolism, its complex and intricate processes, that are well understood this day, has been achieved only by patient study through centuries.

Sanctorius (1561-1636), an Italian Physician, probably was the first man to do nutrition studies on humans.

to solve the problem of differences between his body weight and what he ate and excreted. One hundred years passed before the next steps were taken (Lowenberg, et al, 1970).

Lavoisier (1743-1794), was the first to discover the importance of oxygen gas and to enunciate the principles of combustion both outside and within the body.

In 1762, Lavoisier stated, "Respiration is only a slow combustion of carbon and hydrogen." G. Von Lickig's studies published 1842 showed that it was not carbon and Hydrogen which burned in the body but carbohydrates, fats and protein (Swift and Fisher, 1964).

Voit demonstrated that oxygen is not the cause of metabolism but, instead, the amount of cellular metabolism determines oxygen consumption (Pyke and Brown, 1970).

... Atwater (1844-1907) after spending a year in Voit's laboratory returned to America and with the physicist Rosa, constructed the first human respiration calorimeter, which could be used for studying the energy exchange of man. In 1899, Atwater and Bryant, published

a compilation of the composition of a large number of foods (Watt and Merrill, 1963).

The Douglas bag was introduced by Douglas in 1911. It is an instrument in which all the air expired by a subject could be collected and kept for subsequent analysis and for the measurement of volume. A different type of instrument, known as the Integrating Motor Pneumoto-Chograph was developed by Wolff for use over long periods (Hutchison, 1969). Another instrument is the Kofranyi - Michaelis respirometer which is on vogue today.

British workers were the first to enlarge the technique to cover the whole 24 hours and to include assessments of the energy cost of recreational activities (Edholm et al, 1955).

2. Energy at rest and factors affecting BMR:

Apfebaun (1971), Fulton (1972) and Delhuzman et al (1973) explain that energy needed by body when it is at complete rest is known as the basal metabolism.

Fulton (1972) determined the BMR of women and found it to be 32.63 k.cal/m²/hr for the age group 20-24 and 31.65 k.cal/m²/hr for the age group 25-44^{year}. These results compare favourably with those of Richardson and MacCracken (1960). Studies on the BMR of Indians have been carried out in the different parts of the country and the values reported have been found lower by 7 to 25% than the Western Standard Sen and Banerjee (1958), Shivkumar et al (1961)^{and} Banerjee (1962).

Many factors influence the internal work of the body even when at rest. Body composition, shape and size, age, and growth, specific dynamic, action, physiological state, experimental temperature, food intake and subtleties such as the degree of muscle tension are a few examples, Degley et al (1972), Haisman (1972) and Nadel et al (1972).

Banerjee et al (1959) Dakshayani et al (1962), Shunmugam (1972)^{and} Nutrition reviews (1973), state that the ratio of surface area to weight increase as size diminishes and consequently more energy is needed to meet heat losses from a relatively large surface.

Thus a tall, thin person has a greater surface area than an individual of the same weight who is short and fat and the former therefore will have a higher basal metabolism (Robinson, 1972).

Florence Langford (1961) in her doctoral thesis has stated that though statistical analysis of the experimental findings indicated that basal metabolism of the subjects was influenced by age and by body weight, the metabolic cost of physical activity apparently was not influenced by age apart from the effect associated with the concomitant increase in body weight.

BMR is highest per square metre during the first one and half to two years of life, decreases in early childhood, and increase slightly at puberty, thereafter BMR decline steadily. The reason for these age differences, is not well understood. It is clear, however that BMR is highest during periods of rapid growth and undoubtedly is associated with the increased biosynthetic activity of growth (Pyke and Brown, 1970).

Durnin and Passmore (1967), Gopalan and Narasingarao (1971) and Antia (1975) state that the expenditure of energy per unit of body weight decrease slowly after the early twenties in the basal metabolic state. The decline with age is largely due to a reduction in the proportion of metabolically active tissue in the body.

Basal metabolism measurements made on young men were repeated after 19 years. Basal metabolism was measured over a period of 22 years on men initially 44 to 56 years old. In the younger men the basal metabolic rate decreased by an average of only 3% in 19 years, during which the men had an average body weight gain of 10.6 kg., so there was a decrease of 9% in average BMR per unit body weight. In the older men, average weight gain over 22 years was only 1kg and there was no significant decrease in individual oxygen consumption with age (Laboratory of physiological Hygiene 1973). ^{Oshima et al (1972) state that BMR decline abruptly} after the age of 40 years, and gradually in women after age of 20 years, but the extent of the decline differed between persons.

Mason and Jacob (1972) studied the responses of the BMR of European and Indian men and women of age range 19-72 to climate change and found that the BMR varied with ^a change to a fall of 24% on moving the tropics.

Yoshimura et al (1966) in their study of seasonal variations in BMR of Japanese and Canadians residing in Japan state the seasonal variation in the BMR of larger subjects is less. Cold et al (1969) did not find a correlation between surface area and seasonal response in energy expenditure at rest and exercise. Lewis et al (1961) found no change in BMR in 29 subjects on a polar expedition. The study of Consolazio et al (1961) indicated no effect of excessively hot climates on the basal metabolism.

Banerjee (1961) ^{found} no variation in the BMR of 35 nurses residing in the hills and 35 residing in the plains, of Assam. The BMR in the hills was 33.4 kcal/m²/hour and the body surface was 1.38 m². In the plains the BMR was 35.4 kcal/m²/hour and the body surface was 1.40m².

3. Energy expenditure during various activities

Gopalan (1970), Holmer (1972) and Howard and Bengt (1972) have shown that the energy cost of a physical activity is related to three factors - the amount of work done, the intensity of the work performed and the body size of the individual.

Bullen et al (1964)^{and} Durnin (1966) state that energy expenditure is known to be increased in groups of people who are heavy, ^{because} they have large amounts of adipose tissue. A heavier man doing the same work as a lighter man expends more energy, but his total energy expenditure may be influenced by a reduction in his physical activity in leisure, for fat people are often less active than thin people.

Banerjee et al (1961) in his studies on 24 healthy women, found that the energy expenditure when sitting at rest increased one hour after meal and decreased by about 0.6 k cal/min after 4 hours, Elliot and Patton (1963) found that the energy spent on standing ranges from 1.06 to 1.348 kkal/min. Mekawa (1961) in his study on the energy metabolism of household activities found that the cost of cooking, setting the table and dishwashing and of sweeping and mopping given as relative metabolic rate were 0.8-3.09, 0.92-1.78, 1.47-4.56 units respectively.

Weaver and Elliot (1961) opine that more energy is required for climbing stairs and more energy for faster climbing than slow.

DeGuzman et al (1974) studied the energy expenditure of housewives and shoemakers and classified the shoemakers as belonging to moderately active group and the housewives studied as sedentary. In another study DeGuzman et al (1974) determined the energy expenditure of jeepney drivers and classified as lightly active to moderately active.

The energy expenditure in coastal fishing off Lofoten was studied by Astrend et al (1973). They found that oxygen uptake was least when the hand lines were used, sitting, about 0.6 litre/min and greatest for pulling in the Danish seine with power block, peak value 2.2 litres/min.

The energy expenditure of airline cabin crew was estimated by Barnes (1973) and found that the energy expenditure of the activities at high altitude was only slightly increased than at ground level, but the heart beat increased.

The daily energy expenditure for the Ama (women divers) in Wagin of Shima area was estimated to be 2800 ± 300 k.cal. while their daily food intake was 1780 ± 520 kcal for the day they made divers. The loss in body weight during the diving season is 5.37 ± 0.83 kg. The Ama consumes 780 ml of oxygen for a dive (Yokoyama, 1975).

Energy expenditure during training was measured by indirect calorimeter in young Alma-Ata swimmers 15 to 16 or 12 to 14 years old boys and girls. (Zhumabacca et al, 1976) Energy intake of the older boys and girls was 3588 and 3126 kcal/day and for the younger 2500 and 2000 kcal per day. The older group expended 38 to 40% and the younger upto 35% of total energy during training which lasted 3.5-2.5 hours.

The energy expenditure of women working in a cotton mill was found to be 1.370 to 4.728 k cal/min and the work was thus classed as from light to moderately heavy. (Soutic and Bevc, 1976).

Davies et al (1976) determined the average energy expenditure during cane cutting was 1.66 ± 0.33 litre/min (34.3 KJ/min) which represents about 60% of the predicted maximum.

4. Relation between food intake and energy metabolism:

Food has an imporgant effect on energy expenditure in that when taken by an individual at rest, there is an

increase in the production of energy (Joint FAO/WHO Committee, 1973). Determination of the basal metabolic rate requires that the subject be in the post absorptive state, that is, without food for atleast 12 hours prior to the test. The reason for withholding food is that following ingestion of food, heat production increases above the resting state. This effect was first was recognised by Rubner in 1902 and was called ^{of} the specific dynamic effect of food or the specific dynamic action (SDA) of food. (Pike and Brown 1970).

Hampton (1960) opines that there is some suggestion of possitive correlation of daily energy expenditure with the energy intake of either of the previous 2 days, but not on the same day's intake.

The rate of weight loss when an individual is consuming a restricted diet is constant, but decreases with time. Appelbaum et al (1971) studied the effect of food intake on energy expenditure in 3 group of subjects. (one group was the control, the second group of subjects over ate and the ^{of} group was on restricted diet). The group which over ate showed an increase in energy expenditure

of 12-29%. whereas for the group which ate less, the energy expenditure decreased by 12 to 17%. Energy expenditure adapts according to increase or decrease in energy intake resulting in limited effects on energy stores.

(Bray (1969), Apfelbaum et al (1969) and Bradhan (1974).

III EXPERIMENTAL PROCEDURE

The experimental procedure for the study included the following steps.

1. Selection of the subjects
2. Observation and recording of activities
3. Determination of BMR
4. Recording of food intake
5. Determination of energy content of the food by analysis
6. Determination of energy content of food by calculation
7. Measurement of energy expenditure
 - a. For occupational activities
 - b. For non-occupational activities
8. Total energy expenditure
9. Comparison of energy intake and energy expenditure.

1. Selection of subjects:

Women subjects of age group 21-30 years working as typists, bank officers, house-surgeons, nurses and saleswomen were selected. Six subjects were chosen from each category. Typists working in the office of Sri Avinashilingam Home

Science College were chosen. Probationary Officers were chosen from Syndicate Bank, residing nurses and housesurgeons from Coimbatore Medical College Hospital were selected. The nurses were so selected from the different wards, where workload was approximately the same, saleswomen of different departments of Chinthamani Super Market were selected for the study. All these subjects were chosen after establishing rapport and explaining the experiment and enlisting their co-operation. The subjects were selected after ensuring that they were in normal state of health and they had no respiratory troubles.

2. Observation and recording of activities:

The activities of the subjects during the occupational hours were recorded for 3 days by observation by the investigator. The mean time spent at each activity for 3 days was noted. The activities performed at home was recorded for 3 days by interview methods mean time spent at each activity was noted. (Montoye 1971).

3. Determination of BMR:

The BMR was determined for three consecutive days that were chosen to record the activities. The BMR of the subjects were taken in the morning before breakfast and in

post absorptive stage using, Benedict Roth apparatus adopting the procedure given by Oser (1976).

To ensure success, the procedure and discipline involved was explained to the subjects.

Height and weight of the subjects were noted to find the body surface area using the nomogram for Indian females given by Banerjee (1962).

4. Recording of food intake:

The food intake of the subjects was recorded on the three days when BMR was taken. One tenth of the food consumed by the subjects was taken every day for 3 days for determination of energy content. The mean daily food intake of the subjects in each occupation was compared with the RDA from the food composition tables of Gopalan (1976).

5. Determination of energy content of the food:

The collected food sample of the three days was kept in cold storage. On the third day of the collection of food sample, all the collected food sample of each subject was homogenised, weighed and a small amount of it was dried in an oven at a temperature of about 80°C. The

dried sample was powdered and one gram of the dried sample was analysed for energy using the Parr-Oxygen calorimeter.

6. Determination of energy content of ^{food} by calculation

The energy content of foods consumed was calculated by using the food composition tables of Gopalan (1976).

7. Measurement of energy expenditure

a. For occupational activities

The energy expenditure for the activities during working hours was measured using Kofranyi - Michaelis respirometer Fig. 1, 2 and 3 illustrate the same. The expired air was analysed using the Beckman Analyser. Appendix I gives the formula for conversion of the respirometer data to oxygen units.

The oxygen consumption for each activity per minute was calculated. The Oxygen consumption was converted to energy cost per minute using the formula given by Bratton (1959).

$$\frac{\text{Cubic centimeters of Oxygen per minute}}{1000} \times 4.86 = \text{Calories per minute}$$



FIGURE I
MEASUREMENT OF ENERGY EXPENDITURE
WHILE TYPING (TYPISTS)



FIGURE II
MEASUREMENT OF ENERGY EXPENDITURE
WHILE WRITING (BANK OFFICERS)



FIGURE XII

MEASUREMENT OF ENERGY EXPENDITURE WHILE
TAKING AN ARTICLE FROM THE SHELF
(SALESWOMAN)

b. For non-occupational activities

The energy expenditure for non-occupational activities was calculated using the tables of Banerjee (1962).

8. Total energy expenditures

The energy expenditure for occupational activity which was measured and non occupational activity which was computed from the tables of Banerjee 1962 were added and the total energy expenditure was determined using the factorial method (Wilson et al 1965). The energy expenditure for activities performed like bus travelling was not determined due to inconvenience that would be caused to the subject and the public. The apparatus is not suited to measure energy expenditure when a person eats or talks.

9. Comparison of energy intake and energy expenditure

The total energy intake and energy expenditure (calculated by Factorial Method) was compared.

IV RESULTS AND DISCUSSION

The results of the study are discussed under the following headings:

1. Activities of the selected subjects in the different occupations
2. Mean basal energy expenditure of the selected subjects of different occupational groups
3. Mean daily food intake of the different occupational groups
4. Mean daily energy intake of the selected subjects of different occupations
5. Mean daily expenditure of energy by the selected subjects on activities performed during the occupational hours.
6. Mean daily energy expenditure of the selected subjects during non occupational hours
7. Mean daily total energy expenditure of selected subjects and comparison with total energy intake.

1. Activities of the selected subjects in different occupations:

The activities of all the subjects were observed for three days. The activities out of office hours were recorded by the investigator by interview method (Montoye, 1971).

The activities are discussed here. Typists work for 7½ - 8 hours a day and performed activities like

typing, writing and walking during office hours. Personal activities like eating, talking etc. were also recorded but were not taken into account for measurement of energy.

subjects from Syndicate bank work for 8½-9 hours . They did counter work during which they were either standing or standing and writing. They also sit and write, and walk when necessary, (to carry official papers to colleagues). They have a break of 20-30 minutes at 12 pm and interval for lunch from 2-3 pm. The selected subjects did not go home during lunch break. They in fact started working earlier than 3 pm.

House surgeons work for about 6½ to 7½ hours a day. They have to again go for duty when memorandum is sent and may have to work 1-2 hours extra.

Nurses work for about 8-9½ hours a day. They did activities like standing and writing, sitting and writing, reading case sheets, giving medicines and giving instructions to the probationary nurses. During hours they get a break of thirty minutes for breakfast. On alternate days they work for one hour extra.

Saleswomen work for about 8½-9 hours a day. They did activities like taking articles from the shelves, standing and writing, sitting and writing, sitting or standing at rest when there are no customers. They have a break of 50-60 minutes a day (morning 30 minutes and evening 30 minutes).

Nurses, housesurgeons and typists who are residing in hostels within the campus did not spend time in travelling. Houseurgeons, though they resided in a hostel did self cooking. Irrespective of occupation, the personal activities are nearly the same like walking, reading, eating, dressing, personal cleanliness and washing clothes. Household work like cooking was done by bank officers, housesurgeons and saleswomen.

2. Mean basal energy expenditure of the selected subjects:

Mean basal metabolic rate and basal metabolism of the selected subjects is given in Table I.

TABLE I

MEAN BASAL METABOLIC RATE AND BASAL METABOLISM OF THE SELECTED SUBJECTS

Subjects	Age (years)	Weight (kg)	Height (cm)	Body surface area (M ²)	BMR (k.cal/m ² /hr.)	Basal metabolism (k.cal.)
<u>Typists</u>						
1	27	52	153	1.64	31.2 ± 0.30	1228
2	24	39	153.5	1.46	29.9 ± 0.65	1047
3	25	46	156.5	1.60	31.08 ± 0.71	1193
4	24	47	162	1.64	31.4 ± 0.14	1236
5	25	45	157	1.58	30.5 ± 0.58	1157
6	29	43	160	1.58	30.01 ± 0.35	1138
<u>Bank Officers</u>						
1	25	45	163.4	1.62	30.60 ± 0.59	1190
2	26	43	165	1.62	29.82 ± 0.67	1159
3	25	50	161.8	1.70	29.30 ± 0.51	1195
4	26	52	161.8	1.72	31.38 ± 0.32	1295
5	25	47	158.1	1.64	29.65 ± 0.12	1167
6	25	49	156.5	1.62	29.58 ± 0.32	1150

cont....d

Subjects	Age (years)	Weight (kg)	Height (cm)	Body surface area (M ²)	BMR (k.cal/m ² /hr.)	Basal metabolism (k.cals.)
<u>Housewives</u>						
1	25	45	150	1.52	30.82 ± 0.10	1124
2	25	44	159	1.50	30.10 ± 0.35	1084
3	25	37	148	1.42	29.11 ± 0.63	992
4	25	45	151.5	1.54	30.21 ± 0.20	1117
5	25	48	156.5	1.62	31.72 ± 0.25	1233
6	23	40	158.8	1.52	31.65 ± 0.33	1155
<u>Nurses</u>						
1	29	58.8	156	1.74	31.98 ± 0.35	1335
2	28	44.1	153	1.54	31.90 ± 0.18	1179
3	27	55	157.2	1.72	32.10 ± 0.15	1325
4	25	51	158.8	1.62	31.42 ± 0.68	1222
5	27	58	159	1.76	32.08 ± 0.06	1355
6	30	48.4	152	1.58	30.76 ± 0.15	1166
<u>Saleswomen</u>						
1	21	41.7	158	1.52	30.97 ± 0.20	1130
2	20	45	156.2	1.58	31.43 ± 0.20	1192
3	26	42	158	1.54	30.80 ± 0.64	1138
4	24	41.5	149.5	1.46	31.80 ± 0	1114
5	27	59	156.4	1.74	31.95 ± 2.3	1334
6	19	41	151.3	1.48	32.32 ± 0	1148

Table I indicates the age, height, weight, body surface area, mean BMR for 3 days (individual values in Appendix II) and Basal metabolism of the subjects. The surface area of the typists and house-surgeons were found to be in the range of 1.46 to 1.64 m². These values were in tune with those values reported in the studies of Banerjee (1962) and Prabhavathi (1974) who found the body surface area to range from 1.43 to 1.64 m² and 1.38 to 1.54 m² respectively in their adult women subjects.

The mean body surface area of the saleswomen, nurses and bank officers exceeded the range given by the above authors as few subjects in each of the occupations were taller and heavier, hence surface area exceeded 1.64 sq.m.

The mean basal metabolic rate of the typists and the Bank officers were found to range from 29.9 ± 0.65 to 31.4 ± 0.14 k.cal/m²/hour and 29.3 ± 0.51 to 31.38 ± 0.32 kcal/m²/hour respectively, which were slightly lower than the value of 31.64 k.cal/m²/hour given by Banerjee (1962) for adult women.

The mean BMR of the house surgeons, nurses and saleswomen were found to range from 29.11 ± 0.63 to 31.72 ± 0.25 cal/m²/hour, 30.76 ± 0.15 to 32.1 ± 0.15 k.cal/m²/hour and 30.8 ± 0.64 to 32.32 k.cal/m²/hour respectively. It is found^{kcal} the upper limit of the range exceeds the range given by Banerjee (192).

3. Mean daily food intake of the different occupational groups:

The mean daily food consumption of the selected subjects is given in Table II. The daily food consumption $\frac{1}{2}$ for 3 days is given in Appendix III.

TABLE II

MEAN DAILY FOOD INTAKE OF THE DIFFERENT OCCUPATIONAL GROUPS

Foodstuffs	R.D.A.* for Sedentary vegetarian	Typists	Bank Officers	R.D.A. for Sedentary Non-vegetarian	Bank officers	R.D.A. for Moderate Non- vegetarian	House surgeons	Nurses	Sales women
Cereals(g)	300	332	312	300	292	350	287	314	323
Pulses (g)	60	67	55	48	40	55	35	58	55
Green leafy vegetables(g)	125	18	8	125	52	125	18	20	9
Other vege- tables (g)	75	71	51	75	75	75	58	92	38
Roots and tubers (g)	50	51	59	50	59	75	71	54	58
Fruits (g)	30	13	94	30	68	30	59	47	86
Milk (g)	200	171	171	100	93	100	173	104	66
Fats and oils (g)	30	12	35	35	38	40	20	29	19
Sugar and jaggery (g)	30	26	55	30	58	30	36	29	26
Meat and fish (g)	-	-	-	30	10	30	9	12	-
Eggs (g)	-	-	-	30	5	30	17	11	3
Spices and condiments(g)	-	3	16	-	23	-	10	10	12
Nuts and oil seeds (g)	-	20	10	-	22	-	11	12	17
Miscellaneous (g)	-	-	13	-	35	-	-	35	10

RDA - Recommended Daily Allowance

Table II gives the mean food intake of different occupation groups.

All the typists and four of the bank officers are vegetarians. Two of the bank officers, all the house-surgeons, nurses and saleswomen were non vegetarians. The mean cereal intake of typists and four bank officers found to be more than the allowance recommended by ICMR (1968). The mean cereal intake of the other groups did not meet the recommended allowance. The mean pulse intake of typists, nurses and saleswomen meet the recommended allowance. The mean intake of green leafy vegetables is found to be very low. So also the mean intake of other vegetables is lower than the RDA for all the groups except nurses. The mean intake of roots and tubers and for bank officers exceeded the RDA, whereas for the others it was low. The mean fruit intake of all the groups, except the typists, was found to be more than the RDA. The mean intake of milk of all the groups is found to be lower than the RDA. The mean intake of fats and oils by the bank officers alone is found to meet the RDA, of the RDA for sugar and jaggery is met by the mean intake of the bank officers and house surgeons. The mean intake of meat and fish, and egg of the two bank officers, all the house-surgeons, nurses and saleswomen did not meet the RDA.

4. Mean daily energy intake of the selected subjects of different occupations

The mean daily energy intake, both analysed and calculated value of the selected subjects is given in Table III. The daily energy intake is given in Appendix IV.

TABLE III

MEAN ENERGY INTAKE - CALCULATED AND ANALYSED VALUES

Subjects	Calculated Value		Analysed Value	
	K.cal.	MJ	K.cal.	MJ
<u>Typists</u>				
1	1686	7.05	1681	7.03
2	1704	7.13	1698	7.10
3	1764	7.38	1752	7.33
4	1805	7.55	1795	7.51
5	1791	7.49	1783	7.46
6	1848	7.73	1739	7.27
<u>Bank Officers</u>				
1	2010	8.41	2003	8.38
2	2245	9.39	2239	9.36
3	2241	9.38	2234	9.34
4	2234	9.35	2226	9.31
5	2196	9.19	2186	9.14
6	2154	9.01	2147	8.98
RDA	1900	7.94	1900	7.94

cont...d

Subjects	Calculated Value		Analysed Value	
	K.cal.	MJ	K.cal.	MJ
<u>House Surgeons</u>				
1	1886	7.89	1880	7.87
2	1925	8.05	1919	8.03
3	2017	8.43	2006	8.39
4	1840	7.70	1832	7.66
5	1768	7.40	1761	7.36
6	1662	6.95	1653	6.92
<u>Nurses</u>				
1	1947	8.15	1938	8.11
2	2218	9.28	2209	9.24
3	1983	8.30	1977	8.27
4	1991	8.33	1980	8.28
5	2022	8.46	2015	8.43
6	2100	8.79	2094	8.76
<u>Sales women</u>				
1	1832	7.67	1823	7.63
2	1907	7.98	1900	8.32
3	1764	7.38	1758	7.35
4	1776	7.43	1769	7.40
5	1624	6.79	1619	6.77
6	2034	8.51	2027	8.48
RDA	2200	9.20	2200	9.20

It is observed that the analysed mean energy intake value was lesser than the calculated value for all the subjects. The mean energy intake of the typists did not meet the RDA whereas the mean energy intake of all the bank officers exceeded the allowance recommended by ICMR (1900 K.cal.) This may be due to their high income.

The energy intake of all the house surgeons and saleswomen did not meet the allowance recommended by ICMR (2200 kcal) for women who did moderate work. Among nurses the energy intake of only one nurse met the recommended daily allowance of 2200 K cal for energy.

5. Mean daily expenditure of energy on activities performed during occupational hours

The mean energy cost per minute for different activities of the selected subjects during the occupational hours is given in the Table IV.

TABLE IV

ENERGY COST PER MINUTE FOR THE OCCUPATIONAL ACTIVITIES
OF THE SUBJECTS (in Kcals)

S.No.	Type of activities	1	2	3	4	5	6
1	Typing	1.496	1.531	1.526	1.503	1.511	1.498
2	Writing	0.901	0.915	0.910	0.901	0.908	0.906
3	Walking	2.754	2.798	2.791	2.717	2.789	2.751
<u>Bank Officers</u>							
1	Counter work	1.212	1.211	1.208	1.241	1.201	1.201
2	sitting and writing	0.977	0.978	0.983	0.998	0.974	0.973
3	sitting (during break)	0.728	0.739	0.743	0.747	0.744	0.734
4	walking	2.783	2.785	2.793	2.798	2.782	2.785
<u>House surgeons</u>							
1	sitting	0.708	0.701	0.680	0.707	0.703	0.710
2	sitting and writing	0.967	0.963	0.946	0.965	0.970	0.969
3	standing and writing	1.038	1.032	1.024	1.037	1.041	1.039
4	standing	0.898	0.896	0.870	0.888	0.892	0.889
5	walking	2.788	2.781	2.769	2.780	2.793	2.786
6	Climbing stairs	3.381	3.376	3.362	3.383	3.370	3.365
7	Examining patients	1.018	1.016	0.998	1.019	1.014	1.025
8	Descending stairs	2.093	2.088	2.070	2.091	2.086	2.095

cont...d

S.No.	Type of activities	1	2	3	4	5	6
1	<u>Nurses</u>						
	Sitting	0.688	0.689	0.691	0.685	0.694	0.686
2	Sitting and writing	0.966	0.981	0.959	0.957	0.963	0.955
3	standing	0.881	0.877	0.873	0.870	0.884	0.879
4	standing	1.035	1.029	1.025	1.021	1.031	1.029
5	Reading the case sheets	0.883	0.879	0.873	0.870	0.884	0.880
6	Giving medicine	0.889	0.882	0.879	0.876	0.890	0.885
7	Ascending the stairs	3.358	3.350	3.348	3.353	3.362	3.357
8	Decending the stairs	2.043	2.039	2.035	2.038	2.045	2.042
9	Walking	2.610	2.615	2.617	2.614	2.620	2.618
	<u>Sales women</u>						
1	sitting rest (when there is no customer)	0.680	0.686	0.681	0.689	0.620	0.701
2	standing rest	0.880	0.886	0.876	0.865	0.887	0.888
3	Taking from the 3rd shelf	1.503	1.496	-	1.498	-	1.509
4	Taking from the 1st and 2nd shelf	1.011	1.019	1.023	1.116	1.123	1.290
5	Sitting and writing	0.946	0.931	0.949	0.959	0.958	-

cont....d

S.No.	Type of activities	1	2	3	4	5	6
6	Standing and writing	1.017	1.023	1.015	-	1.021	1.028
7	Break (sitting and having coffee and talking)	0.678	0.685	0.684	0.691	0.705	0.708
8	walking	2.578	2.582	2.586	2.588	2.581	2.590
9	Unfolding & folding sari	-	-	-	1.108	-	-
10	Ascending stairs	-	-	-	3.362	-	-
11	Decending stairs	-	-	-	2.098	-	-

When the energy cost of the activities of typists was estimated, it was found that typing consumed maximum energy (1.496-1.531 K.cal/minute). Writing consumed the least energy (0.901-0.915 K.cal/min.).

Bank officers spent the most energy per minute while walking briskly here and there carrying official papers to their colleagues (2.782-2.799 kcal/min), as they just sit and relax during the break hour, the energy expenditure was found to be the least (0.728-0.746 kcal/min.)

House surgeons spent the most energy when climbing stairs, when going to the wards (3.362-3.83 k.cal/min). The least energy spent was while sitting: (0.680-0.710 k.cal/min.).

Nurses expended more energy while ascending stairs (3.48-3.362 k.cal/min) and expended the least while sitting (0.688-0.693 k.cal/min).

Saleswomen spent the most energy while walking (2.578-2.590 kcal/min) followed by the activity of taking articles from the third shelf (1.496-1.509 kcal/min). One subject among the saleswomen worked on the first floor of the supermarket, hence she was found to expend the most energy for ascending stairs (3.362 k.cal/min). In a study conducted by Devadas *et al* (1977) on energy expenditure of adolescent girls, it was found that ascending stairs required the most energy (2.090-3.881 k.cal/min.). Total calories spent for each activity is given in Appendix V.

The mean total time spent in the occupational activities and the mean total energy expended expressed as energy cost/min is given in Table V.

TABLE V

MEAN TOTAL TIME SPENT IN OCCUPATIONAL ACTIVITY AND THE
MEAN ENERGY EXPENDED

Subjects	Mean total time (minutes)	Mean total energy expended (kcal)
<u>Typists</u>		
1	480	748
2	483	738
3	485	763
4	490	739
5	490	748
6	495	748
<u>Bank Officers</u>		
1	545	676
2	555	704
3	510	634
4	530	708
5	530	659
6	565	697
<u>House surgeons</u>		
1	480	590
2	463	581
3	530	632
4	497	596
5	510	622
6	476	599

cont....

subjects	Mean total time (minutes)	Mean total energy expended (kcal)
<u>Nurses</u>		
1	545	711
2	530	682
3	505	671
4	540	691
5	535	605
6	540	697
<u>Saleswomen</u>		
1	585	593
2	555	556
3	540	523
4	540	543
5	565	558
6	530	553

The mean total energy spent during the occupational hours by the typists was in the range of 738 to 763 k calories, by the bank officers in the range of 634-708 k. calories, by the house surgeons in the range of 581 to 599 k.calories, by the nurses in the range of 605 to 711 k. calories and by saleswomen in the range of 523 to 583 k. calories.

7. Mean daily expenditure of energy by selected subjects during non-occupational activities

The mean daily energy expenditure per minute for the activities performed during the non-occupational hours was computed from the tables of Banerjee (1962) after grouping the activities in a similar manner as those in the Banerjee tables.

Since the energy cost per minute for various activities computed from the same table for an adult women does not differ, it has not ^{been} tabulated here.

Table VI gives the mean daily energy expenditure during non occupational hours. The total energy spent on each activity is given in Appendix VI.

TABLE VI

TOTAL ENERGY EXPENDITURE DURING NON-OCCUPATIONAL HOURS

Subjects	Time spent in (minutes)	Energy expenditure (k.cal)
<u>Typists</u>		
1	400	478
2	392	481
3	388	453
4	378	462
5	380	462
6	380	459
<u>Bank officers</u>		
1	355	492
2	300	466
3	360	448
4	370	498
5	400	678
6	335	489
<u>House surgeons</u>		
1	420	599
2	402	594
3	360	470
4	380	497
5	345	483
6	404	610

con...d

Subjects	Time spent in (minutes)	Energy expenditure (k.cal)
<u>Nurses</u>		
1	300	361
2	330	402
3	370	480
4	325	410
5	330	442
6	320	387
<u>Saleswomen</u>		
1	320	420
2	375	741
3	345	681
4	335	484
5	325	489
6	350	620

The total energy expenditure expended at home depended on time spent for various activities. The total energy expenditure of typists, bank officers, house surgeons, nurses and saleswomen during non-occupational hours ranged from 459-481 k.calories, 448-678 k.calories, 470-510 k.calories, 361-480 k.calories and 420-471 k.calories.

8. Mean daily total energy expenditure of selected subjects and comparison with total energy intake

Table VIII gives the mean total energy expenditure of the subjects was based on occupational and non occupational activities and was calculated by Factorial Method (Appendix VII).

TABLE VII

COMPARISON OF TOTAL ENERGY INTAKE AND TOTAL ENERGY
EXPENDITURE OF THE SELECTED SUBJECTS

Subjects	Energy intake analysed value k.cal.	Energy expenditure	Deficit k.cal
<u>Typists</u>			
1	1681	2542	-861
2	1698	2362	-664
3	1752	2505	-753
4	1795	2535	-740
5	1783	2462	-679
6	1739	2441	-702
<u>Bank Officers</u>			
1	2003	2457	-454
2	2039	2374	-335
3	2034	2362	-328
4	2226	2612	-386
5	2186	2610	-424
6	2147	2429	-282
<u>House Surgeons</u>			
1	1880	2408	-528
2	1919	2349	-430
3	2006	2186	-180
4	1832	2296	-464
5	1761	2428	-667
6	1653	2466	-813

S.No.	Energy intake analysed value k.cal.	Total energy expenditure k.cal.	Deficit k.cal.
<u>Nurses</u>			
1	1938	2490	-552
2	2209	2352	-143
3	1977	2568	-591
4	1980	2410	-430
5	2015	2486	-471
6	2094	2335	-241
<u>Saleswomen</u>			
1	1823	2222	-399
2	1900	2598	-698
3	1758	2440	-682
4	1769	2227	-458
5	1619	2466	-847
6	2027	2418	-391

The table indicates deficit of energy, that is the energy expenditure being greater than energy intake, for all subjects irrespective of occupation, though there were individual differences in each group (which may be due to difference in non-occupational activities). Though it was discussed earlier that the energy intake of only Bank officers met the allowance recommended by ICMR (1976), the energy expenditure exceeded the

intake in their case.

Devadas et al (1975) found that there was a deficit in energy for seven adolescent labourers when energy intake and expenditure was compared. In another study conducted by Devadas et al (1977) they found energy deficit when energy intake and expenditure of twelve adolescent girls doing Home Science Course was studied.

V SUMMARY AND CONCLUSION

The energy intake and expenditure of thirty adult women from five different occupational groups were selected for the study. Six subjects from each occupational group, namely, typists, bank officers, house surgeons, nurses and saleswomen were selected.

The energy intake of the selected subjects was found to be lesser than the allowances recommended by ICMR, except for the bank officers and one nurse.

21 out of 30 of the selected subjects was found to have ~~less~~ BMR than reported by Banerjee (1962). The energy expenditure for occupational activities for the subjects was studied. Typists were found to expend maximum energy during the occupational hours and saleswomen spent the least energy during occupational hours.

When the energy expenditure for non occupational activities was computed from tables of Banerjee (1962), it was found that sitting and working consumed maximum energy. In the case of typists climbing stairs consumed maximum energy.

Among all activities, climbing stairs consumed the maximum energy and sitting consumed the least.

Irrespective of the occupation all the typists were found to have energy deficit, that is energy expenditure being greater than energy intake.

Recommendation for further research:

1. Further research is needed on energy expenditure of women for different household activities.
2. Also energy expended while travelling in different vehicles may be ^{also} studied.

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APPENDICES

APPENDIX I

FORMULA FOR CONVERSION OF THE RESPIROMETER DATA TO OXYGEN UNITS

The data are to be converted to the amounts of oxygen consumed in terms of cubic centimeters per minute using the following formula.

1. Corrected volume of air = Gasometer reading X correction factor (in litres)

$$\frac{\text{Corrected volume of air at normal temperature and pressure (NTP) of air}}{\text{Corrected volume} \times \frac{273}{160} \times \text{atmosphere pressure in mm Hg}}$$

2. Correction for Oxygen consumption (K) = $\frac{\text{Number of minutes the expired air was kept in the rubber bladder} \times 0.04}{\text{Corrected volume of air at NTP} \times \text{Rate at which the expired air was collected.}}$

3. Corrected volume of Oxygen = Percentage of Oxygen in the expired air - K

4. Volume of oxygen consumed = $\frac{\text{Percentage of oxygen in the atmospheric air-corrected volume of oxygen.}}{\text{Corrected volume of air at NTP} \times \text{Volume of oxygen used.}}$

5. Total oxygen used per minute = $\frac{\text{Number of minutes the expired air was kept in the rubber bladder} \times 100}{\text{Corrected volume of air at NTP} \times \text{Volume of oxygen used.}}$

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7. Cubic centimeters of Oxygen = Total oxygen used per minute \times 1000

Conversion to calories

Cubic centimeter of oxygen per minute \times 4.86 = calories/minute
1000

Note: Correction factor for the reading of the respirometer is 1.024

Rate at which the expired air is collected is 0.6% or $\frac{3}{50}$ of the total air.

Percentage of oxygen in the atmospheric air = 20.97

APPENDIX II

BASAL METABOLIC RATE OF THE SUBJECTS FOR THREE CONSECUTIVE DAYS

Subjects	Basal metabolic rate K. Cal/m ² /hour			Mean ₃ K. Cal/m ² /hour
	1st day	2nd day	3rd day	

Typists				
1	31.20	31.60	30.80	31.20 ± 0.30
2	30.70	29.10	29.90	29.90 ± 0.65
3	31.20	30.80	31.30	31.10 ± 0.71
4	31.60	31.10	31.50	31.40 ± 0.14
5	31.30	29.90	30.30	30.50 ± 0.35
6	29.70	30.50	29.80	30.00 ± 0.35
Bank Officers				
1	30.80	31.20	29.80	30.60 ± 0.39
2	30.00	30.50	28.90	29.82 ± 0.67
3	29.50	29.80	28.60	29.30 ± 0.51
4	31.31	31.29	31.54	31.38 ± 0.32
5	29.50	29.80	29.65	29.65 ± 0.12
6	29.70	29.49	29.55	29.58 ± 0.32

Subjects	Basal metabolic rate K. Cal/m ² /hour			Mean
				K. Cal/m ² /hour
	1st day	2nd day	3rd day	
House Surgeons				
1	30.96	30.70	30.80	30.82 ± 0.10
2	29.80	29.90	30.60	30.11 ± 0.35
3	30.50	38.50	28.50	29.11 ± 0.65
4	30.50	29.90	30.45	30.21 ± 0.20
5	31.35	31.92	31.89	31.72 ± 0.25
6	32.10	31.55	31.50	31.65 ± 0.35
Nurses				
1	31.60	31.88	32.46	31.98 ± 0.35
2	31.70	31.85	32.15	31.90 ± 0.18
3	32.20	31.90	32.20	32.10 ± 0.15
4	31.38	32.28	30.60	31.42 ± 0.68
5	32.11	32.15	32.00	32.08 ± 0.06
6	30.60	30.80	30.88	32.70 ± 0.15

Subjects	Basal metabolic rate			Mean ₂
	K. Cal/m ² /hour			
	1st day	2nd day	3rd day	
Sales				
Women				
1	31.00	31.20	30.71	30.97 ± 0.20
2	31.70	31.20	31.39	31.43 ± 0.20
3	29.90	31.20	31.30	30.80 ± 0.64
4	31.70	31.90	31.60	31.80 ± 0
5	32.10	31.88	31.87	31.95 ± 2.3
6	32.28	32.32	32.36	32.32 ± 0

APPENDIX XII DAILY FOOD INTAKE OF THE
I FOOD INTAKE OF TYPISTS SELECTED SUBJECTS

Subject I

Food Staff	RDA	Actual Intake			Mean
		1st day	2nd day	3rd day	
	g	g	g	g	g
Cereals	300	350	295	308	317
Pulses	60	120	60	120	100
Green leafy vegetables	125	-	-	40	15.3
Other Vegetables	75	140	90	79	105
Roots and tubers	50	-	100	24	41.5
Fruits	30	5	-	80	28.5
Milk	200	70	150	258	152.6
Fats and Oils	30	15	10	15	12.6
Sugar and Jaggery	30	20	40	25	27.0
Spices and Cordiments	-	-	-	-	-
Nuts and oil seeds	-	-	64	-	21.5

Subject: 2

Food Stuff	RDA g	Actual Intake			Mean g
		1st day g	2nd day g	3rd day g	
Cereals	300	329	342	284	318.3
Pulses	60	125	62	113	100
Green leafy vegetables	125	30	-	83	37.6
Other vegetables	75	73	95	98	88.6
Roots and tubers	50	-	119	25	44.6
Fruits	30	-	-	-	-
Milk	200	40	248	160	149.3
Fats and oils	30	5	10	18	11
Sugar and jaggery	30	58	20	20	32.6
Spices and condiments	-	-	-	10	3.3
Nuts and oilseeds	-	-	20	-	6.6

Subjects: 3

Food Stuff	EDA	Actual Intake			Mean
		1st day	2nd day	3rd day	
	g	g	g	g	g
Cereals	300	342	338	313	331
Pulses	60	83	51	120	84.6
Green leafy vegetables	125	-	-	107	35.6
Other vegetables	75	119	78	70	89
Roots and tubers	50	10	66	-	25.3
Fruits	30	-	-	-	
Milk	200	96	250	55	133.67
Fats and oils	30	20	16	15	30.3
Sugar and jaggery	30	20	20	20	20
Spices and condiments	-	16	-	16	10.67
Nuts and oil seeds	-	-	20	-	6.67

Subject: 4

Food Stuff	RDA	Actual Intake			Mean
		1st day	2nd day	3rd day	
	g	g	g	g	g
Cereals	300	379	295	310	328
Pulses	60	33	39	53	41.67
Green leafy vegetables	125	-	-	-	
Other vegetables	75	25	100	48	67.67
Roots and tubers	50	-	115	18	44.5
Fruits	30	-	27	-	9
Milk	200	210	230	206	215.3
Fats and oils	30	20	20	40	26.67
Spices and condiments -		10	-	-	3.3
Nuts and oil seeds -		40	22	20	27.3

Subject: 5

Food Stuff	RDA	Actual Intake			Mean
		1st day	2nd day	3rd day	
	g	g	g	g	g
Cereals	300	322	296	309	335.67
Pulses	60	30	55	22	35.67
Green leafy vegetables	125	-	15	-	5
Other vegetables	75	29	110	20	53
Roots and tubers	50	10	122	62	64.67
Fruits	30	-	-	-	
Milk	200	168	235	250	217.67
Fats and oils	30	5	5	5	5
Sugar and jaggery	30	15	22	20	19
Spices and condiments	-	-	-	-	
Nuts and oil seeds	-	36	25	41	34

Subjects 6

Food Stuff	RDA	Actual Intake			Mean
		1st day	2nd day	3rd day	
	g	g	g	g	g
Cereals	300	394	289	406	363
Pulses	60	33	33	36	41.3
Green leafy vegetables	125	-	-	-	-
Other vegetables	75	15	30	38	27.67
Roots and tubers	50	-	84	-	28
Fruits	30	-	125	-	41.67
Milk	200	210	220	50	160
Fats and oils	30	5	5	5	5
Sugar and jaggery	30	20	40	35	31.67
Spices and condiments	-	10	-	-	3.3
Nuts and oil seeds	-	40	40	20	33.3

II FOOD INTAKE OF BANK OFFICERS

Subject: I

Food Stuff	RMA	Actual Intake			Mean
		1st day	2nd day	3rd day	
	g	g	g	g	g
Cereals	350	263	288	280	277
Pulses	70	49	50	102	67
Green leafy vegetables	125	-	-	-	
Other vegetables	75	120	26	35	61
Roots and tubers	75	80	188	58	109
Fruits	50	35	-	68	34
Milk and milk products	200	280	100	200	193
Fats and oils	35	38	38	28	35
Sugar and jaggery	30	50	50	60	53
Meat and Fish	-	-	-	-	-
Egg	-	-	-	-	-
Spices and condiments	-	20	25	-	15
Nuts and oil seeds	-	-	25	-	8

Subject: 2

Food Stuff	RDA	Actual Intake			Mean
		1st day	2nd day	3rd day	
	g	g	g	g	g
Cereals	350	291	338	328	390
Pulses	70	80	50	90	73
Green leafy vegetables	125	-	-	50	17
Other vegetables	75	-	55	-	18
Roots and tubers	75	-	70	20	12
Fruits	30	200	-	99	100
Milk	200	100	100	100	100
Fats and oils	35	35	30	40	35
Sugar and jaggery	30	46	48	40	45
Meat and Fish	-	-	-	-	-
Egg	-	-	-	-	-
Spices and condiments	-	15	55	31	34
Nuts and oil seeds	-	70	30	-	33

Subjects: 3

Food Stuff	RDA g	Actual Intake			Mean g
		Ist day g	2nd day g	3rd day g	
Cereals	350	278	280	288	282
Pulses	70	84	133	96	104.3
Green leafy vegetables	125	-	-	50	16.7
Other vegetables	75	70	80	49	66.3
Roots and tubers	75	50	80	48	59.3
Fruits	30	130	60	80	90
Milk and milk products	200	210	160	270	213.3
Fats and oils	33	36	20	38	38
Sugar and jaggery	30	50	70	66	62

Subject: 4

Food Stuff	RDA	Actual Intake			Mean
		1st day	2nd day	3rd day	
		g	g	g	g
Cereals	350	296	280	322	299.3
Pulses	70	79	110	70	86.3
Green leafy vegetables	125	-	-	-	-
Other vegetables	75	10	120	55	61.7
Roots and tubers	75	68	75	20	54.3
Fruits	30	150	150	150	150
Milk	200	180	180	180	180
Fats and oils	35	20	35	35	30
Spices and condiments	-	20	20	-	13.3
Sugar and Jaggery	30	60	60	60	60

Subjects: 5

Food Stuff	RDA	Actual Intake			Mean
		1st day	2nd day	3rd day	
	g	g	g	g	g
Cereals	350	297	280	326	301
Pulses	55	70	45	-	38.3
Green leafy vegetables	125	-	-	-	-
Other vegetables	75	45	-	150	64.3
Roots and tubers	75	25	185	-	70
Fruits	30	-	200	-	66.7
Milk	100	80	120	120	106.7
Fats and oils	40	38	40	38	38.7
Sugar and jaggery	30	40	60	50	50
Meat and Fish	30	-	-	-	-
Egg	30	-	-	30	10
Spices and condiments	-	30	40	15	28.3
Nuts and oil seeds	-	40	-	50	30

Subjects: 6

Food Stuff	RDA	Actual Intake			Mean
		Ist day g	2nd day g	3rd day g	
Cereals	350	280	276	290	282
Pulses	55	55	33	35	41
Green leafy vegetables	125	-	260	50	103.3
Other vegetables	75	150	105	-	85
Roots and tubers	75	75	55	15	48.3
Fruits	30	-	55	150	68.3
Milk	100	80	80	80	80
Fats and oils	40	35	40	40	38.3
Sugar and jaggery	30	60	60	30	66.7
Meat and Fish, Egg	30	-	-	60	20
Miscellaneous	30	80	-	-	26.7
Spices and condiments	-	-	10	40	16.7
Nuts and oil seeds	-	-	-	40	13.3

III FOOD INTAKE OF HOUSE SURGEONS

Subjects 1

Food Stuff	RDA	Actual Intake			Mean
		1st day	2nd day	3rd day	
	g	g	g	g	g
Cereals	350	315	280	318	304.5
Pulses	55	60	58	15	44.5
Green leafy vegetables	125	-	60	-	20
Other vegetables	75	105	-	-	35
Roots and tubers	75	-	-	40	10.5
Fruits	30	-	-	-	-
Milk	100	225	250	150	201.6
Fats and oil	40	15	15	18	16
Sugar and jaggery	30	50	50	30	36.6
Meat and fish	30	-	-	60	20
Egg	30	-	30	-	10
Spices and condiments	-	-	-	10	3.5

Subjects 2

Food Stuff	RDA	Actual Intake			Mean
		1st day	2nd day	3rd day	
	g	g	g	g	g
Cereals	350	266	320	330	305
Pulses	55	67	25	25	39
Green leafy vegetables	125	-	29	-	9.6
Other vegetables	75	206	50	90	115.3
Roots and tubers	75	20	10	50	26.6
Fruits	30	-	56	60	38.6
Milk	100	220	260	160	213.3
Fats and oils	40	15	20	20	18.3
Sugar and jaggery	30	30	40	40	36.6
Meat and Fish	30	-	-	-	-
Eggs	30	-	30	30	20

Subject: 3

Food Stuff	RDA	Actual Intake			Mean
		Ist day	2nd day	3rd day	
	g	g	g	g	g
Cereals	350	315	322	280	305.6
Pulses	55	50	20	45	38.3
Green leafy vegetables	125	-	-	50	16.6
Other vegetables	75	65	110	90	88.3
Roots and tubers	75	40	100	55	65
Fruits	30	70	-	-	23.6
Milk	100	100	80	80	86.6
Fats and oils	40	30	15	20	21.6
Sugar and jaggery	30	30	30	30	30
Meat and fish	30	-	-	-	-
Eggs	30	30	-	30	20
Nuts and oil seeds	-	-	15	20	11.6
Spices and condiments	-	20	20	20	20

Subject: 4

Food Stuff	RDA	Actual Intake			Mean
		Ist day	2nd day	3rd day	
	g	g	g	g	g
Cereals	350	268	332	290	276.6
Pulses	55	25	25	26	25.3
Green leafy vegetables	125	50	-	-	16.6
Other vegetables	75	-	18	20	12.6
Fruits	30	200	50	280	176.6
Milk	100	70	220	240	176.6
Fats and oils	40	30	32	35	32.3
Sugar and jaggery	30	30	30	30	30
Meat and fish	30	-	-	-	-
Eggs	30	-	30	30	20
Spices and condiments	-	5	10	10	8.3
Nuts and oil seeds	-	65	38	-	34.3

Subject: 5

Food Stuff	RDA	Actual Intake			Mean
		Ist day	2nd day	3rd day	
		g	g	g	
Cereals	350	258	331	258	282.3
Pulses	55	31	-	40	23.6
Green leafy vegetables	125	-	-	50	16.6
Other vegetables	75	20	-	-	6.6
Roots and tubers	75	-	80	50	43.3
Fruits	30	30	60	78	56
Milk group	100	66	100	70	78.6
Fats and oils	40	20	35	10	21.6
Sugar and jaggery	30	80	60	50	63.3
Meat and fish	30	50	-	-	16.6
Eggs	30	-	30	30	20
Spices and condiments	-	20	10	10	13.3
Nuts and oil seeds	-	-	-	30	10

Subject, G

Food Stuff	Actual Intake				
	RDA g	1st day g	2nd day g	3rd day g	Mean g
Cereals	350	250	266	263	253
Pulses	55	48	22	60	43.3
Green leafy vegetables	125	-	-	35	11.6
Other vegetables	75	20	-	30	11.6
Roots and tubers	75	70	15	-	31.6
Fruits	30	60	30	80	56.6
Milk	100	300	250	300	283.3
Fats and oils	40	-	22	15	12.3
Sugar and jaggery	30	30	30	-	20
Meat and fish	30	-	60	-	20
Eggs	30	30	-	-	10
Spices and condiments	-	15	30	-	15
Nuts and oil seeds					

IV FOOD INTAKE OF NURSES

Food Stuff	RDA	Actual Intake			Mean
		1st day	2nd day	3rd day	
	g	g	g	g	g
Cereals	350	347	292	320	319.6
Pulses	55	57	20	-	25
Green Leafy Vegetables	125	-	-	-	-
Other Vegetables	75	96	130	-	15.33
Roots and tubers	75	50	40	106	58.76
Fruits	30	-	-	150	50
Milk	100	100	100	100	100
Fats and Oils	40	30	38	40	38
Sugar and Jaggery	30	36	30	35	33.60
Meat and fish	30	-	60	-	20
Egg	30	30	-	-	10
Spices and condiments	-	10	35	28	24
Nuts and oil seeds	-	20	20	20	20

Subject: 2

Food Stuff	RDA	ACTUAL Intake			Mean

		1st day	2nd day	3rd day	
	g	g	g	g	g
Cereals	300	320	292	288	300
Pulses	60	38	80	67	61.6
Green leafy vegetable	125	-	-	-	-
Other Vegetables	75	20	105	41	53.3
Roots and tubers	50	68	30	50	49.53
Fruits	30	150	-	120	90
Milk group	200	145	170	200	171
Fats and oils	30	30	33	35	32.6
Sugar and Jaggery	30	50	30	40	40
Spices and condiments	-	-	-	-	-
Nuts and oils seeds	-	35	28	40	34.33
Miscellaneous	-	-	70	-	23.33

Subject: J

Food Stuff	RDA	Actual Intake			Mean
		Ist day	2nd day	3rd day	
	g	g	g	g	g
Cereals	350	309	390	302	335.67
Pulses	55	95	70	80	81.67
Green leafy vegetables	125	100	-	-	33.3
Other Vegetables	75	195	45	145	128.33
Roots and tubers	75	-	130	24	53.0
Fruits	30	10	-	-	3.3
Milk	100	150	50	195	125
Fats and Oils	40	20	25	30	25
Sugar and Jaggery	30	25	25	25	25
Meat and Fish	30	-	-	-	25
Egg	30	-	-	-	10
Spices and condiments	-	-	-	-	-
Nuts and Oils seeds	-	-	-	-	-

Subjects: 4

Food Staff	RDA	Actual Intake			Mean
		1st day	2nd day	3rd day	
	g	g	g	g	g
Cereals	300	288	322	290	300
Pulses	60	84	36	74	64.6
Greens leafy vegetable	125	38	-	-	12.6
Other Vegetables	75	30	40	105	58.3
Roots and tubers	50	28	75	35	46
Fruits	30	-	2.10	-	70
Milk	200	100	130	170	133.3
Fats and oils	30	30	-	35	21.6
Sugar and Jaggery	30	40	40	-	26.6
Spices and condiments	-	20	-	-	6.6
Nuts and Oil seeds	-	20	20	209	20
Miscellaneous	-	-	-	60	20

Subject: 5

Food Stuff	RDA	Actual Intake			Mean
		1st day	2nd day	3rd day	
	g	g	g	g	g
Cereals	350	308	288	338	311.5
Pulses	95	95	65	40	66.6
Green leafy vegetables	125	-	-	-	-
Other vegetables	75	80	250	100	143.5
Roots and tubers	75	-	240	50	92.6
Fruits	30	25	-	30	18.5
Milk	100	100	50	100	83.5
Fats and Oils	40	30	30	30	30
Sugar and Jaggery	30	30	-	35	21.6
Meat and fish	30	-	-	-	30
Egg	30	-	30	30	30
Spices and condiments	-	-	-	-	-
Nuts and oils seeds	-	-	-	-	-
Miscellaneous	-	-	-	50	166

Subject : 6

Food Stuff	RRA	Actual Intake			Mean
		Ist day	2nd day	3rd day	
	g	g	g	g	g
Cereals	300	288	334	335	319
Pulses	60	20	64	33	46.3
Green leafy vegetables	125	-	-	-	-
Other vegetables	75	100	135	100	111.6
Roots and tubers	50	75	35	-	36
Fruits	30	-	-	-	-
Milk	200	60	50	100	70
Fats and oils	30	38	25	33	32
Sugar and condiments	-	40	10	15	21.6
Nuts and oil seeds	-	20	36	-	18.6
Meat and fish	30	60	-	40	33.3
Egg	30	-	30	-	10

V FOOD INTAKE OF SALESWOMEN

Subject: 1

1. Food stuff	R.D.A. g	Actual Intake			Mean g
		Ist day g	2nd day g	3rd day g	
Cereals	350	314	342	280	312
Pulses	55	65	99	78	80.67
Green leafy vegetables	125	-	-	-	-
Other vegetables	75	50	72	38	53.3
Roots and tubers	75	15	61	20	32
Fruits	30	-	130	110	80
Milk	100	50	50	50	50
Fats and oils	40	20	20	15	18.3
Sugar and Jaggery	30	30	30	25	28.3
Meat and fish	30	-	-	-	-
Egg	30	-	-	-	-
Spices and condiments	-	13	15	15	14.2
Nuts and Oil seeds	-	-	-	28	9.3

Subjects 2

2. Food stuff	R.D.A. g	Actual Intake			Mean g
		1st day g	2nd day g	3rd day g	
Cereals	250	283	321	276	293.3
Pulses	55	55	79	102	78.67
Green leafy vegetables	125	-	-	-	-
Roots and tubers	75	63	30	98	63.67
Fruits and tubers	30	120	-	40	90
Milk	100	60	110	120	96.67
Fats and Oils	40	20	20	20	20
Sugar and Jaggery	30	30	30	30	30
Meat and fish	30	-	-	-	-
Egg	30	-	-	-	-
Spices and condiments	-	20	10	-	10
Nuts and oilseeds	-	30	25	-	18.3

Subjects 3

3. Food stuff	R.D.A g	Actual Intake			Mean g
		Ist day g	2nd day g	3rd day g	
Cereals	350	310	695	293	432.76
Pulses	55	26	29	32	29
Green leafy vegetables	125	-	-	-	-
Other vegetables	75	48	80	65	64.33
Roots and tubers	75	56	83	-	46.3
Fruits	30	80	208	100	129.3
Milk	100	50	40	60	50
Fats and Oils	40	20	20	26	22
Sugar and Jaggery	30	20	25	20	21.67
Meat and fish	30	-	-	-	-
Egg	30	30	-	30	20
Spices and condiments	-	16	35	-	17
Nuts and oil seeds	-	32	-	16	16

Subject: 4

4. Food stuff	R.D.A. g	Actual Intake			Mean g
		Ist day g	2nd day g	3rd day g	
Cereals	350	346	273	296	305
Pulses	58	32	59	26	39
Green leafy vegetables	125	-	60	-	20
Other vegetables	75	70	120	52	80.76
Roots and tubers	75	150	30	45	75
Fruits	30	-	180	-	60
Milk	100	60	80	70	70
Fats and oils	40	10	20	25	18.3
Sugar and Jaggery	30	20	20	20	20
Meat and Fish	30	-	-	-	-
Egg	30	-	-	-	-
Spices and condiments	-	-	-	-	-
Nuts and oilseeds	-	10	15	15	8.3
Miscellaneous	-	-	-	180	60

Subjects 5

5. Food stuffs	R.D.A. g	Actual Intake			Mean g
		1st day g	2nd day g	3rd day g	
Cereals	350	266	278	288	277.3
Pulses	55	25	58	47	43.3
Green leafy vegetables	125	-	-	-	-
Other vegetables	75	83	-	29	37.3
Roots and tubers	75	-	170	50	73.3
Fruits	30	60	30	180	90
Milk	100	100	100	100	100
Fats and Oils	40	15	-	10	8.3
Sugar and Jaggery	30	25	28	30	27.76
Meats and fish	30	-	-	-	-
Egg	30	-	-	-	-
Spices and condiments	-	-	-	-	-
Nuts and Oilseeds	-	28	20	26	24.76

Subjects 6

6. Food stuff	R.D.A g	Actual Intake			Mean g
		1st day g	2nd day g	3rd day g	
Cereals	350	289	360	296	315
Pulses	55	71	67	55	64.3
Green leafy vegetables	125	-	110	-	36.76
Other vegetables	75	-	-	-	-
Roots and tubers	75	74	20	-	31
Fruits	30	98	78	180	118.76
Milk	100	30	30	30	30
Fat and oils	40	30	28	30	29.3
Sugar and Jaggery	30	20	28	38	27.6
Meat and fish	30	-	-	-	-
Egg	30	-	-	-	-
Spices and condiments	-	30	28	38	30.3
Nuts and Oilseeds	-	36	-	40	25.3

MEAN FOOD COMPOSITION OF TYPISTS AND BANK OFFICERS

	Cereals	Pulses	Green leafy vegetables	Other vegetables	Roots and tubers	Fruits	Milk and milk products	Fats and oils	Sugar and Jaggery	Meat and fish	Egg	Soyas and condiments	Nuts and oil seeds
RDA	300	60	125	75	30	30	200	30	30	-	-	-	-
Actual intake subjects													
Typists 1.	317	100	13.3	103	42.3	28.3	152.6	12.6	27.6	-	-	-	21.3
2.	318.3	100	37.6	88.6	44.6	-	149.3	11	32.6	-	-	3.3	6.6
3.	331	84.6	35.6	89	25.3	-	133.67	30.3	20	-	-	10.67	6.67
4.	328	41.67	-	67.67	44.3	9	215.3	8.3	26.67	-	-	3.3	27.3
5.	335.67	35.67	5	53	64.67	-	217.67	5	19	-	-	-	34
6.	363	41.3	-	26.67	28	41.67	160	5	31.67	-	-	3.3	33.8
Bank officer													
1.	277	67	-	61	109	34	193	35	53	-	-	15	8
2.	390	73	17	18	12	100	100	35	45	-	-	34	33
3.	282	104.3	16.7	66.3	59.3	90	213.3	38	62	-	-	-	-
4.	299.3	86.3	-	61.7	54.3	150	180	30	60	-	-	13.3	-
5.	300	45	125	75	50	30	100	35	30	30	30	-	-
RDA	300	45	125	75	50	30	100	35	30	30	30	-	-
5.	301	38.3	-	64.3	70	66.7	106.7	38.7	50	35	30	30	30
6.	282	41	103.3	85	48.3	68.3	80	38.3	66.7	20	-	16.7	13.3

MEAN FOOD COMPOSITION OF HOUSE SURGEONS NURSES AND SALESWOMEN

	Cereals	Pulses	Green leafy vegetables	Other vegetables	Roots & tubers	Fruits	Milk & milk products	Fats & oils	Sugar & Jaggery	Meat & Fish	Eggs	Spices & condiments	Nuts & oils	Miscellaneous
RDA	350	55	125	75	75	30	100	40	30	30	30	-	-	-
Actual Intake of subjects														
House surgeons														
1.	304.3	44.3	20	35	10.3	-	201.6	16	36.6	20	10	3.3	-	-
2.	305.	39	9.6	115.3	26.6	38.6	213.3	18.3	36.6	-	20	10.3	-	-
3.	305.6	38.3	16.6	88.3	65	23.3	86.6	21.6	30	-	20	11.6	20	-
4.	276.6	25.3	16.6	86.6	12.6	176.6	176.6	32.3	30	-	20	8.3	34.3	-
5.	282.3	23.6	16.6	6.6	43.3	56	78.6	21.6	63.3	16.6	20	13.3	10	-
6.	253	43.3	11.6	16.6	31.6	56.6	283.2	12.3	20	20	10	15	-	-
Nurses														
1.	319.6	25.6	75.2	58.6	50	100	38	33.6	20	10	24.3	20	-	-
2.	300	61.6	-	53.3	49.3	90	171.6	32.6	40	-	-	-	34.3	23.3
3.	333.6	81.6	33.3	128.3	6.3	3.3	125	25	25	-	-	10	-	-
4.	300	64.6	12.6	58.3	46	70	133.3	21.6	26.6	-	-	6.6	20	20
5.	311.3	66.6	-	143.3	92.6	18.3	83.3	30	21.6	30	30	-	-	166
6.	319	463	-	111.6	36	-	70	32	36.6	33.3	10	21.6	18.6	-
Saleswomen														
1.	312	80.6	-	53.3	32	80	50	18.3	28.3	28.3	-	14.3	9.3	-
2.	293.3	78.67	63.6	73.6	90	96.6	20	20	30	-	-	10	18.3	-
3.	432.7	29	-	64.3	46.3	129.3	50	22	21.6	-	20	17	16	-
4.	305	39	20	80.7	75	10	70	18.3	20	-	-	-	8.3	60
5.	277.3	43.3	-	37.3	73.3	90	100	8.3	27.7	-	-	-	24.7	-
6.	315	64.3	36.7	-	31	118.7	30	29.3	27.6	-	-	30.3	25.3	-

APPENDIX IV

DAILY ENERGY INTAKE OF
THE SELECTED SUBJECTS

I ENERGY INTAKE OF TYPESTS

Subjects	R.D.A.	Actual Intake			Mean k.cals
		1st day k.cals	2nd day k.cals	3rd day k.cals.	
1	1900	1619	1722	1716	1686 ± 33.2
2	1900	1739	1788	1685	1737 ± 54.1
3	1900	1668	1742	1883	1764 ± 95.6
4	1900	1823	1617	1974	1805 ± 142.1
5	1900	1894	1644	1834	1791 ± 100.3
6	1900	1881	1740	1924	1848 ± 86.1

II ENERGY INTAKE OF BANK OFFICERS

Subjects	R.D.A. k.cals.	Actual Intake			Mean k.cals
		1st day k.cals.	2nd day k.cals.	3rd day k.cals.	
1	1900	1937	2190	2104	2077 ± 105
2	1900	2306	2285	2145	2245 ± 81.3
3	1900	2147	2268	2309	2241 ± 78.9
4	1900	2093	2382	2228	2234 ± 124.2
5	1900	2119	2228	2196	2181 ± 45.8
6	1900	1874	2202	2387	2154 ± 215.5

III ENERGY INTAKE OF HOUSE SURGEONS

Subjects	R.D.A. k.cals.	Actual Intake			Mean K.cals.
		1st day k.cals	2nd day k.cals	3rd day k.cals	
1	2200	1986	1728	1943	1886 ± 107.1
2	2200	1969	1914	1992	1925 ± 50.8
3	2200	1995	2221	1997	2071 ± 106
4	2200	1942	1736	1783	1840 ± 401
5	2200	1969	1939	1670	1768 ± 125.9
6	2200	1551	1701	1735	1662 ± 86.5

IV ENERGY INTAKE OF NURSES

Subjects	R.D.A. k.cals	Actual Intake			Mean K.cals.
		1st day K.cals.	2nd day K.cals.	3rd day K.cals	
1	2200	2010	1866	1965	1947 ± 60.2
2	2200	2090	2079	2484	2218 ± 184.5
3	2200	1912	2080	1957	1983 ± 71
4	2200	1953	2035	1986	1991 ± 49.6
5	2200	1957	2066	2044	2022 ± 59.7
6	2200	2010	2090	2202	2100 ± 94.6

V ENERGY INTAKE OF SALESWOMEN

Subjects	R.D.A k.cals	Actual calorie Intake			Mean k.cals
		1st day k.cals.	2nd day k.cals	3rd day k.cals	
1	2200	1651	2055	2792	1832 ± 174.6
2	2200	1861	1954	1898	1907 ± 66
3	2200	1740	1874	1678	1764 ± 81
4	2200	1687	1826	1816	1776 ± 72.1
5	2200	1533	1664	1678	1624 ± 64.5
6	2200	1980	2131	1993	2034 ± 85.9

APPENDIX V
ENERGY EXPENDITURE BY THE SELECTED
SUBJECTS FOR THE OCCUPATIONAL ACTIVITIES

Subjects	Activities	Minute	Vol. of oxygen cc	Cal./mts	Total cal.	M.J.
I	Typing	425	307.82	1.496	655.8	2.66
	Writing	25	185.39	0.901	22.55	0.094
	Walking	30	556.66	2.754	82.62	0.345
	Total	480			740.95	3.1
II	Typing	450	315	1.531	688.95	2.88
	Writing	25	188.27	0.915	21.05	0.088
	Walking	10	575.72	2.798	27.98	0.12
	Total	485			737.98	3.088
III	Typing	430	313.99	1.526	656.18	2.75
	Writing	25	187.25	0.910	22.75	0.095
	Walking	30	574.28	2.791	83.73	0.35
	Total	485			762.66	3.195
IV	Typing	465	309.26	1.503	698.90	2.92
	Writing	15	155.39	0.901	13.15	0.055
	Walking	10	559	2.717	27.17	0.11
	Total	490			739.22	3.085

Con....d.

Subjects	Activities	Minute	Vl. of oxygen cc	Cal/mts	Total cal.	M.J.
IV	Typing	485	310.91	1.511	687.91	2.88
	Writing	20	186.83	0.908	18.16	0.075
	Walking	15	573.87	2.789	41.84	0.18
	Total	490			747.51	3.135
VI	Typing	460	308.23	1.498	689.08	2.88
	Writing	20	186.42	0.906	18.12	0.075
	Walking	15	566	2.751	41.27	0.17
	Total	495			748.47	3.125



ENERGY EXPENDITURE FOR THE OCCUPATIONAL ACTIVITIES OF BANK OFFICERS

Subject	Activities	Minutes	Vol. of oxygen cc	Cal./mts.	Total cals	M.J.
I	Counter Work	365	249.38	1.212	442.58	1.85
	Sitting and Writing	125	201	0.977	122.125	0.51
	Sitting (During break)	20	149.79	0.728	14.56	0.06
	Walking	35	181.11	2.785	97.40	0.407
	Total	545			676.465	2.827
II	Counter work	365	249.18	1.211	442.01	1.85
	Sitting and Writing	125	201.25	0.978	122.25	0.51
	Sitting (during break)	20	152	0.759	14.78	0.06
	Walking	45	161.52	2.785	125.52	0.52
	Total	555			704.56	2.92
III	Counter Work	375	248.56	1.208	453.0	1.89
	Sitting and Writing	60	202.26	0.983	78.84	0.34
	Sitting (during break)	25	152.88	0.743	18.57	0.077
	Walking	20	574.69	2.793	83.79	0.35
	Total	510			634.2	2.627

Subject	Activities	Minutes	Vol. of oxygen cc	Cal./mts.	Total cal.	Mr. J.
IV	Counter work	555	255.53	1.241	440.55	1.84
	Sitting and writing	95	205.35	0.998	94.81	0.39
	Sitting (during break)	25	153.49	0.746	18.65	0.07
	Walking	55	675.72	2.798	153.69	0.64
	Total	530			707.9	2.55
V	Counter work	325	247.12	1.201	390.32	1.63
	Sitting and writing	105	200.43	0.974	146.1	0.61
	Sitting (during break)	15	153	0.744	11.166	0.04
	Walking	40	572.43	2.782	11.28	0.46
	Total	530			658.866	2.74
VI	Counter work	355	247.12	1.201	426.55	1.78
	Sitting and writing	145	200.21	0.973	147.085	0.59
	Sitting (during break)	25	151	0.734	18.55	0.07
	Walking	40	573	2.785	111.4	0.46
	Total	565			697.185	2.81

ENERGY EXPENDITURE FOR THE OCCUPATIONAL ACTIVITIES OF HOUSE SURGEONS

Subject	Activities	Minutes	Vol. of oxygen	Cals/mts.	Total cals	M.J.
I	Sitting	65	145.68	0.708	46.02	0.19
	Sitting and writing	90	198.98	0.967	87.03	0.36
	Standing and writing	45	213.58	1.038	46.71	0.195
	Standing	105	184.77	0.898	94.29	0.39
	Walking	65	573.66	2.788	181.22	0.76
	Climbing stairs	7	693.68	3.381	23.68	0.09
	Decending stairs	6	430.66	2.093	12.56	0.05
	Examining patients	97	209.46	1.018	68.75	0.41
	Total	480		590.26	590.26	2.485
	II	Sitting	73	144.24	0.701	51.17
Sitting and Writing		85	198.13	0.963	81.86	0.34
Standing & Writing		50	212.35	1.032	51.6	0.215
Standing		95	184.36	0.896	85.12	0.36
Walking		75	572.22	2.781	208.58	0.87
Climbing stairs		5	694.65	3.376	16.88	0.07
Decending stairs		4	429.63	2.088	8.35	0.03
Examining patients		76	209	1.016	77.22	0.32
Total		530			631.71	2.636

Cont....d

Subjects	Activities	Minutes	Vol. of oxygen	Cals./mts.	Total cala	M.J.
III	Sitting	85	139.91	0.680	57.8	0.24
	Sitting and writing	95	194.65	0.946	89.87	0.38
	Standing and writing	78	210.69	1.024	73.73	0.308
	Standing	110	179	0.170	95.7	0.40
	Walking	70	569.75	2.769	193.83	0.810
	Climbing stairs	7	691.77	3.362	23.53	0.098
	Descending stairs	6	425.93	2.070	12.42	0.05
	Examining patients	85	205.35	0.998	84.83	0.35
	Total	530			651.71	2.636
	IV	Sitting	85	145.47	0.707	60.09
Sitting and writing		90	198.56	0.965	86.85	0.36
Standing and writing		55	213.37	1.037	57.04	0.24
Standing		105	182.72	0.888	93.24	0.39
Walking		66	372	2.78	183.48	0.77
Climbing stairs		5	696	3.833	16.92	0.07
Descending stairs		4	430.25	2.097	8.36	0.03
Examining patients		87	209.67	1.019	88.65	0.37
Total		497			594.63	2.48

Subjects	Activities	Minutes	Vol. of oxygen cc	Calcs./mts.	Total calcs	M.J.	
V	Sitting	80	144.62	0.703	56.24	0.24	
	Sitting writing	85	199.59	0.970	82.45	0.34	
	Standing & writing	70	214.19	1.041	72.87	0.304	
	Standing	105	183.54	0.892	93.66	0.39	
	Walking	70	574.69	2.793	193.51	0.82	
	Climbing stairs	6	693.42	3.370	20.22	0.08	
	Decending stairs	5	429.22	2.086	10.43	0.04	
	Examining patients	89	208.64	1.014	90.25	0.38	
	Total	510			621.63	2.594	
	VI	Sitting	75	146	0.710	53.25	0.22
Sitting and writing		85	191.38	0.969	82.37	0.34	
Standing and writing		50	213.79	1.039	51.95	0.22	
Standing		95	182.92	0.889	84.46	0.45	
Walking		75	573.23	2.786	208.95	0.87	
Climbing stairs		6	692.39	3.365	20.19	0.08	
Decending stairs		5	431	2.095	10.48	0.04	
Examining patients		85	210.95	1.025	87.13	0.36	
Total		476			598.78	2.48	

ENERGY EXPENDITURE FOR THE OCCUPATIONAL ACTIVITIES OF NURSES

Subjects	Activities	Minutes	Vol. of oxygen cc	Cals./mts.	Total cals	H.J.
I	Sitting	35	141.56	0.688	24.08	0.100
	Sitting of writing	135	198.76	0.966	130.41	0.55
	Standing	65	181	0.881	57.26	0.239
	Standing and writing	105	212.96	1.035	108.68	0.45
	Reading the casesheet	55	181.69	0.883	48.57	0.203
	Giving medicine	30	182.92	0.889	29.67	0.111
	Ascending the stairs	6	690.95	3.358	20.15	0.08
	Descending the stairs	5	420.57	2.043	10.22	0.04
	Walking	109	557	2.610	284.49	1.190
	Total		545		710.53	3.235
II	Sitting	35	141.77	0.689	24.115	0.100
	Sitting and writing	125	201.85	0.981	122.63	0.51
	Standing	60	180.45	0.877	52.62	0.22
	Standing and writing	115	211.73	1.029	118.34	0.455
	Reading the case sheet	45	180.86	0.879	39.55	0.17
	Giving medicine	40	181.48	0.882	35.28	0.15
	Ascending the stairs	7	689.3	3.350	23.45	0.098
	Descending the stairs	6	419.55	2.039	12.23	0.05
	Walking	97	538	2.615	253.66	1.06
	Total		530		681.875	2.853

contd..

Subjects	Activities	Minutes	Vol. of oxygen cc	Calcs/mts.	Total calcs	M.J.
III	Sitting	40	142.18	0.691	27.64	0.12
	Sitting and writing	82	197.33	0.939	78.64	0.33
	Standing	60	179.63	0.873	82.38	0.22
	Standing and writing	93	210.91	1.025	97.38	0.407
	Reading the casesheet	60	179.63	0.873	52.38	0.22
	Giving medicine	45	180.86	0.879	39.55	0.17
	Ascending the stairs	7	688.89	3.348	23.44	0.098
	Descending the stairs	6	418.72	2.035	12.198	0.05
	Walking	110	538.48	2.617	287.87	1.20
	Total	503	-	-	671.478	2.815
IV	Sitting	40	140.93	0.685	27.4	0.11
	Sitting and writing	120	196.91	0.957	114.84	0.48
	Standing	63	179	0.870	56.55	0.24
	Standing and writing	103	210	1.021	107.205	0.43
	Reading the casesheet	55	179	0.870	47.85	0.20
	Giving medicine	40	180.25	0.876	33.04	0.15
	Ascending the stairs	5	689.92	3.353	16.77	0.07
	Descending the stairs	4	419.32	2.038	8.152	0.03
	Walking	106	537.86	2.614	277.08	1.16
	Total	540	-	-	690.887	2.89

Subjects	Activities	Minutes	Vol. of O_2	Oxygen calcs/mts.	Total calcs	M.J
V	Sitting	55	142.59	0.693	24.255	0.101
	Sitting and writing	155	198.15	0.963	53.705	0.141
	Standing	60	181.89	0.884	53.04	0.22
	Standing and writing	95	212.14	1.051	97.95	0.41
	Reading the case sheet	50	181.89	0.884	44.2	0.18
	Giving medicine	40	183.13	0.890	35.6	0.15
	Ascending the stairs	6	691.77	3.362	20.17	0.08
	Descending the stairs	5	420.78	2.045	10.23	0.04
	Walking	109	539	2.620	285.58	1.19
	Total	555	-	-	604.75	2.512
	VI	Sitting	30	141.15	0.686	20.58
Sitting and writing		115	196.5	0.955	109.85	0.46
Standing		65	180.86	0.879	57.14	0.24
Sitting and standing		115	211.75	1.029	118.54	0.495
Reading the case sheet		55	181	0.880	48.4	0.20
Giving medicine		45	182	0.885	39.83	0.17
Ascending the stairs		5	690.74	3.357	16.79	0.07
Descending the stairs		4	420.16	2.042	8.17	0.03
Walking		106	538.68	2.618	277.508	1.16
Total		540	-	-	696.588	4.911

ENERGY EXPENDITURE FOR THE OCCUPATIONAL ACTIVITIES OF SALES WOMEN

Subjects	Activities	Minutes	Vol. of oxygen CC	Calcs/mts.	Total calcs.	M.J.
I	Sitting rest (when there is no customer)	30	139.92	0.680	20.4	0.085
	Standing rest	35	181	0.880	30.8	0.13
	Taking from the 3rd shelf	25	308.86	1.505	37.58	0.16
	Taking from the 1st and 2nd shelf	45	208	1.011	45.495	0.19
	Sitting and writing	55	194.65	0.946	52.05	0.22
	Standing and writing	325	209.26	1.017	330.53	1.38
	Break (sitting and having coffee and talking)	60	159.51	0.678	40.68	0.17
	Walking	10	550.45	2.578	25.78	0.107
	Total	585			583.295	2.442
	II	Sitting rest (when there is no customer)	25	141.15	0.686	17.15
Standing rest		35	182.5	0.886	31.01	0.13
Taking from the 3rd shelf		15	307.82	1.496	22.44	0.09
Taking from the 1st and 2nd shelf		35	209.87	1.019	35.67	0.15
Sitting and writing		60	195.68	0.951	57.06	0.24
Standing and Writing		315	210.49	1.023	322.25	1.35
Break (sitting and having coffee, talking)		58	140.95	0.685	39.73	0.17
Walking		12	591.28	2.582	30.98	0.13
Total		555			556.29	2.53

Subjects	Activities	Minutes	Vol. of oxygen cc	Cals./mts.	Total Cals.	M.J.
V	Sitting rest (when there is no customer)	35	142.18	0.691	24.19	0.101
	Standing rest	50	182.51	0.887	44.35	0.19
	Taking from the 3rd shelf					
	Taking from the 1st and 2nd shelf	40	251	1.123	44.92	0.19
	Sitting and writing	50	197.12	0.958	47.9	0.20
	Standing and writing	52.5	210	1.021	531.83	1.39
	Break (sitting and having coffee and talking)	55	155	0.705	38.78	0.16
	Walking	10	531	2.581	25.81	0.108
	Total	565			557.78	2.338
	VI	Sitting rest (when there is no customer)	35	144.24	0.701	24.54
Standing rest		45	182.72	0.888	39.96	0.17
Taking from the 3rd shelf		25	310.49	1.509	37.73	0.16
Taking from the 1st and 2nd shelf		65	265.43	1.290	83.85	0.35
Sitting and writing						
Standing and writing		290	211.52	1.028	296.12	1.25
Break (sitting and having coffee and talking)		60	145.67	0.708	42.48	0.18
Walking		10	532.92	2.590	25.90	0.108
Total		530			552.58	2.32

Subjects	Type of activities	Minutes	Cal/m ²	Total M.J Cal		
I ¹	Standing (Personal cleanliness)	40				
	Standing (Bathing)	25	0.952	90.44		
	Standing (Dressing)	30		0.38		
	Sitting (Eating)	25				
	Sitting (Prayer)	35	224	0.862	193	
	Sitting (Reading)	164			0.80	
	Household activities (Washing)		25	2.209	55.23	0.23
	Walking		35	2.914	101.99	0.43
	Ascending stairs		7	3.656	25.59	0.11
	Descending stairs		6	2.386	14.32	0.06
	Total		392	480.57	2.01	

Subjects	Type of activities	Minutes	Cal/m	Total Cal	M.J
III	Standing (Personal cleanliness)	40			
	Standing (Bathing)	20	0.952	85.68	0.36
	Standing (Dressing)	30			
	Sitting (batting)	25			
	Sitting (Prayer)	35	0.862	201.71	0.84
	Sitting (Reading)	174			
	Household activities (washing)	20	2.203	44.16	0.18
	Walking	30	2.914	87.42	0.37
	Ascending stairs	6	3.556	21.94	0.09
	Descending stairs	3	2.366	11.93	0.05
	Total	393		452.86	1.89

Cont

Subjects	Type of activities	Minutes	Cal/mt	Total Cal	M.L.J
IV	Standing (Personal cleanliness)	35			
	Standing (Bathing)	25	0.952	95.2	0.40
	Standing (Dressing)	40			
	Sitting (Eating)	25			
	Sitting (Prayer)	35	0.862	175.85	0.74
	Sitting (Reading)	144			
	Household activities (washing)	25	2.209	55.23	0.23
	Walking	35	2.914	101.99	0.43
	Ascending stairs	6	3.656	21.94	0.09
	Descending stairs	5	2.386	11.93	0.05
	Total	375		462.14	1.94

Cont....d

Subjects	Type of activities	Minutes	Cal/mt	Total Cal	M.S	
V	Standing (Personal cleanliness)	35				
	Standing (Bathing)	15	0.952	76.16	0.32	
	Standing (Dressing)	30				
	Sitting (Bathing)	35				
	Sitting (Prayer)	35	0.862	199.98	0.84	
	Sitting (Reading)	162				
	Household activities (Washing)					
	Walking	20	2.209	44.18	0.18	
	Ascending stairs	38	2.914	101.99	0.43	
	Descending stairs	7	3.656	25.59	0.11	
			6	2.386	14.32	0.06
	Total	380		462.22	1.94	

Cont 6

Subjects	Type of activities	Minutes	Cal/mt	Total Cal	M.J
VI	Standing (Personal cleanliness)	35			
	Standing (Bathing)	20	0.952	85.68	0.36
	Standing (Dressing)	35			
	Sitting (Eating)	30			
	Sitting (Prayer)	35	0.862	193	0.81
	Sitting (Reading)	139			
	Household activities (Walking)	20	2.209	44.18	0.18
	Walking	35	2.914	101.99	0.43
	Ascending stairs	6	3.656	21.94	0.29
	Descending stairs	5	2.386	11.93	0.09
		<u>380</u>		<u>458.72</u>	<u>2.02</u>

Cont d

EMERGENCY EXPENDITURES FOR NON OCCUPATIONAL ACTIVITIES OF BANK OFFICERS

Subject	Type of activities	Minutes	Calcs/mt	Total Calcs	M.J	
I	Standing (Bathing)	20	50	0.952	47.6	0.20
	Standing (Dressing)	30				
	Sitting (Bathing)	40				
	Sitting (Praying)	30	120	0.862	103.44	0.43
	Sitting (Feeding & Resting)	50				
	Helping in household activities		115	2.209	254	1.06
	Walking		30	2.914	87.42	0.37
	Bus travelling		40			
	Total		<u>355</u>		<u>492.46</u>	<u>2.06</u>

Cont.....

Subjects	Type of activities	Minutes	Cal/mt	Total Cals	M.J
II	Standing (Bathing)	15	0.952		
	Standing (Dressing)	30		42.04	0.18
	Sitting (Eating)	40	0.907	81.63	0.34
	Sitting (Resting or reading)	50		254	
	Helping in household activities	115	2.209	254	1.06
	Walking	30	2.914	87.42	0.37
	(Car) Travelling	20	"	"	"
	Total	300		465.89	1.95

Subject	Type of activities	Minutes	Cals/mt	Total Cals	M ₂ J	
III	Standing (Bathing)	25	61	0.952	58	0.24
	Standing (Dressing)	36				
	Sitting (Bathing)	40				
	Sitting (Prayer)	24	199	0.907	144.21	0.60
	Sitting (Reading)	95				
	Household activities		68	2.209	143.59	0.60
			35	2.914	101.99	0.43
	Total		360		447.79	1.87

Cont d

Type Subject	Type of activities	Minutes	Calorimt	Total Cals	M. J
IV	Standing (Bathing)	25 60	0.952		
	Standing (Dressing)	35		57.12	0.24
	Sitting (Eating)	35 105	0.907	95.24	0.40
	Sitting (Reading & resting)	70			
	Household activities	130	2.20	257.17	1.20
	Walking	20	2.914	58.28	0.24
	Travelling	55	"	"	"
	Total	<u>370</u>		497.81	2.08

Cont..... d

Subject	Type of activities	Minutes	Cal/mt	Total Cals	M.J
F	Standing (Personal activities)	55	0.952	52.36	0.22
	Sitting (Eating)	35	0.907	58.95	0.25
	Sitting (Reading or resting)	30			
	Household activities	250	2.209	508	2.12
	Walking	20	2.914	58.28	0.24
	Travelling	30	"	"	"
	Total	<u>400</u>		677.59	2.83

Cont. see d

Subject	Type of activities	Minutes	Cal/mt	Total Cals	M.J
VI	Standing (Bathing)	25	0.952	57.12	0.24
	Standing (Dressing)	35			
	Sitting (Bathing)	35			
	Sitting (Prayer)	20	0.862	90.51	0.38
	Sitting (Reading or Resting)	50			
	Household activities	115	2.209	254	1.06
	Walking	30	2.914	87.42	0.36
	Travelling	25			
		<u>375</u>		<u>489</u>	<u>2.04</u>

Cont d

ENERGY EXPENDED BY THE HOUSE SUBJECTS FOR NON-OCCUPATIONAL ACTIVITIES

Subject	Type of activity	Minutes	Cal/m	Total Cal	M.J
I	Standing (Personal cleanliness)	40			
	Standing (Bathing)	30	0.952	95.2	0.39
	Standing (Dressing)	30			
	Sitting (Eating)	20			
	Sitting (Prayer)	30	0.862	154.29	0.64
	Sitting (Reading)	129			
	Household activities (Cooking)	70			
	Household activities (Washing)	20	2.209	198.81	0.83
	Walking	42	2.914	122.38	0.51
	Ascending stairs	5	3.656	18.3	0.08
	Descending stairs	4	2.386	9.54	0.04
	Total		420	598.52	2.49

Subject	Type of activity	Minutes	Cal/mt	Total Cal	M.J
II	Standing (Personal cleanliness)	40			
	Standing (Bathing)	35	0.952	95.2	0.39
	Standing (Dressing)	25			
	Sitting (Eating)	30			
	Sitting (Prayer)	20	0.862	144.81	0.61
	Sitting (Reading)	118			
	Household activities (Cooking)	34			
	Household activities (Washing)	20	2.209	119.26	0.49
	Walking	75			
	Ascending stairs	3	3.656	10.96	0.05
Descending stairs		2	2.386	4.77	0.02
		<u>402</u>		<u>593.57</u>	<u>2.57</u>

Subject	Type of activities	Minutes	Cal/mt	Total Cal	M.J
III	Standing (Personal cleanliness)	40			
	Standing (Bathing)	20	0.952	80.92	0.34
	Standing (Dressing)	25			
	Sitting (Eating)	32			
	Sitting (Prayer)	20	0.862	153.43	0.64
	Sitting (Reading)	125			
	Household activities (Cooking)	40			
	Household activities (Washing)	27			
	Walking	30	2.2914	87.42	0.36
			360	469.77	1.96

Cont.....

Subject	Type of activities	Minutes	Cal/mt	Total Cal	M.J
I	Standing (Personal cleanliness)	40			
	Standing (Bathing)	20	0.952	80.92	0.34
	Standing (Dressing)	25			
	Sitting (Eating)	20			
	Sitting (Prayer)	15	0.862	163.78	0.69
	Sitting (Reading)	155			
	Household activities (Cooking)	50			
	Household activities (Washing)	28	2.209	172.3	0.72
	Walking	20	2.914	58.28	0.24
	Ascending stairs	4	3.656	14.62	0.06
Descending stairs	3	2.386	7.15	0.03	
		<u>380</u>	<u>497.05</u>	<u>2.07</u>	

Cont next p

Subject	Type of activities	Minutes	Cal/mt	Total Cal	M.J
V	Standing (Personal cleanliness)	30			
	Standing (Bathing)	20	0.952	71.4	0.30
	Standing (Dressing)	25			
	Sitting (Eating)	21			
	Sitting (Prayer)	25	0.862	134.47	0.56
	Sitting (Reading)	110			
	Household activities (Cooking)	60			
	Household activities (Washing)	20	2.209	176.72	0.74
	Walking	25	2.914	72.85	0.30
	Ascending stairs	5	3.656	18.28	0.08
	Descending stairs	4	2.396	9.54	0.04
	Total	345		483.26	2.02

Cont d

Subject

Type of activities

Minutes

Cal/m²

Total
Cal

M.J

VI

Standing (Personal cleanliness)

40

Standing (Bathing)

25

0.952

90.44

0.38

Standing (Dressing)

30

Sitting (Bathing)

25

Sitting (Prayer)

25

0.862

135.334

0.57

Sitting (Reading)

107

Household activities (Cooking)

62

2.209

187.765

0.79

Household activities (Washing)

23

Walking

60

2.914

174.84

0.73

Ascending stairs

4

3.656

14.624

0.06

Descending stairs

3

2.386

7.158

0.08

610.161

2.55

ENERGY EXPENDITURE FOR THE NON-OCCUPATIONAL ACTIVITIES OF THE NURSES

Subject	Type of activities	Minutes	Cal/mt	Total Cal	K.J
I	Standing (Personal cleanliness)	35	0.952	80.92	0.34
	Standing (Dressing)	50			
	Sitting (Eating)	30	0.862	124.99	0.52
	Sitting (Praying)	20			
	Sitting (Reading) or resting	95			
Household activities (Washing)		35	2.209	77.32	0.32
	Walking	35	2.914	77.67	0.32
Total		300		360.9	1.50

Cont 6

Subject	Type of activities	Minutes	Cal/mt	Total Cal	M.J
II	Standing (personal cleanliness)	40			
	Standing (Dressing)	95	0.952	90.44	0.38
	Sitting (Ketting)	35			
	Sitting (Praying)	150	0.862	146.54	0.61
	Sitting (Reading) or resting	120			
	Household activities (Washing)	35	2.209	77.32	0.32
	Walking	30	2.914	87.42	0.37
	Total	330		401.72	1.68

Cont..... d

Subject	Type of activities	Minutes	Cal/mt	Total Cal	M.J	
III	Standing (Personal cleanliness)	35	85	0.952	80.92	0.34
	Standing (Dressing)	50				
	Sitting (Eating)	40				
	Sitting (Praying)	20	200	0.862	172.4	0.72
	Sitting (Reading or resting)	35				
	Sitting (Stitching)	105				
	Household activities (Washing)	30	2,209	66.27	0.28	
	Walking	55	2,914	160.27	0.67	
	total	370		479.86	2.01	

Cont.....d

Subject	Type of activities	Minutes	Cal/mt	Total Cal	M.J
SV	Standing (Personal cleanliness)	35			
		85	0.952	80.92	0.34
	Standing (Dressing)	50			
	Sitting (Eating)	30			
	Sitting (Praying)	25			
	Sitting (Reading or Resting)	115	0.862	146.54	0.61
	Household activities (Washing)	30	2.209	66.27	0.28
	Walking	40	2.914	116.56	0.48
	Total	325		410.29	1.71

Cont

Subject	Type of activities	Minutes	Cal/m ²	Total Cal	M.J
V	Standing (Personal cleanliness)	35	0.952	85.68	0.36
	Standing (Dressing)	55			
	Sitting (Bathing)	30			
	Sitting (Praying)	15			
	Sitting (Reading or Resting)	20	0.862	133.61	0.36
	Sitting (Sitting)	90			
	Household activities (Washing)	35	0.2.209	77.32	0.32
	Walking	50	2.914	145.7	0.61
	Total	330		442.31	1.85

Continued

Subject	Type of activities	Minutes	Cal/mt	Total Cal	M.J
VI	Standing (Personal cleanliness)	45	0.952	95.2	0.39
	Standing (Dressing)	55			
	Sitting (Eating)	30			
	Sitting (Praying)	15	0.862	157.92	0.58
	Sitting (Reading or resting)	115			
	Household activities (Washing)	30	2.209	66.27	0.28
	Walking	30	2.914	87.42	0.36
	Total	320		386.81	1.61

Cont.....

ENERGY EXPENDITURE OF NON-OCCUPATIONAL ACTIVITIES OF SALESWOMEN

Subjects	Type of activities	Minutes	Calorific	Total	M.J
				Calories	
I	Standing (Personal cleanliness)	45	0.952	42.84	0.18
	Standing Sitting (Eating)	30 105			
	Sitting (Eating and Reading)	75	0.862	90.51	0.38
	Household activities (Washing)	25			
	Household activities (Cooking)	65	2.209	198.81	0.83
	Walking	30	2.914	87.42	0.37
	Travelling	50	"	"	"
		<u>320</u>		<u>419.58</u>	<u>1.76</u>
	Total				

Cont.....

Subject	Type of activities	Minutes	Calo/mt	Total Calories	M.g
II	Standing (Personal cleanliness)	50	0.952	47.6	0.20
	Sitting (Eating)	25			
		60			
	Sitting (Resting or reading)	35	0.862	51.72	0.22
	Household activities (Washing)	30			
		185			
	Household activities (Cooking)	155	2.209	408.66	1.70
	Walking	80	2.914	233.12	0.98
	Travelling				
	Total	375		741.1	<u>3.13</u>

Cont.....

Subject	Type of activities	Minutes	Cal/mt	Total Calories	K.J
III	Standing (Personal cleanliness)	45	0.952	42.84	0.18
	Sitting (Eating)	25			
	Sitting (Resting or reading)	30	0.862	47.41	0.20
	Household activities (Washing)	30			
	Household activities (Cooking)	145	2.209	386.58	1.61
	Walking	70	2.914	203.98	0.85
	Travelling	-	-	-	-
	Total	345		680.81	2.84

Cont....d

Subject	Type of activities	Minutes	Calo/mt	Total Calories	M.J
IV	Standing (Personal cleanliness)	45	0.952	42.84	0.18
	Sitting (Eating)	30	0.862	107.75	0.45
		95			
	Household activities (Washing)	45	2.209	187.76	0.78
		40			
	Household activities (Cooking)	85			
Walking	50	2.914	145.7	0.60	
Travelling		30			
	Total	335		484.05	2.01

Cont.....

Subject	Type of activities	Minutes	Calcs/mt	Total Calories	M.J
V	Standing (Personal cleanliness)	40	0.952	38.08	0.16
	Sitting (Eating)	30			
	Sitting (Eating or reading)	55	0.862	73.27	0.31
	Household activities (Washing)	30			
	Household activities (Cooking)	95	2.209	276.13	1.15
	Walking	35	2.914	101.99	0.42
	Travelling	40	"	"	"
		<u>325</u>		<u>489.47</u>	<u>2.04</u>
	Total				

Out

Subject	Type of activities	Minutes	Cal/m	Total Calories	K.J
VI	Standing (Personal cleanliness)	40	0.952	38.08	0.16
	Sitting (Waiting)	30	0.862	25.86	0.34
	Sitting (Resting or reading)	65			
	Household activities (Washing)	55			
	Household activities (Cooking)	124	2.209	273.91	1.65
	Walking	36	2.914	104.9	0.44
	Travelling				
		<u>350</u>		<u>620.23</u>	<u>2.59</u>

APPENDIX VII

MEAN (DAILY) TOTAL ENERGY EXPENDITURE BY FACTORIAL METHOD

SUBJECTS: TYPISTS

		Mean daily total energy expenditure	
		K. Cal	Sum of K. Cals
1.	a. Basal Metabolism	1228	
	b. Correction for sleep (0.1X weight in kg. x mean hours of sleep)	-49	1179
	c. Total energy expenditure for activities	1219	2398
	d. Allowance for SDA (0.06 x 2398)	+144	2542
<hr/>			
2.	a. Basal Metabolism	1347	
	b. Correction for sleep (0.1 x weight in kg. x mean hours of sleep)	-36.69	1010.31
	c. Total energy expenditure for activities (Occupational and non- occupation)	1210	2229
	d. Allowance for SDA (0.06 x 2219.66)	+ 133.19	2362

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Mean daily fat as energy expenditure

K.Cal Sum of K.Cal

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3. a.	Basal metabolism	1195	
b.	Correction for sleep (0.1 x weight in kg x mean hours of sleep)	-43.7	1149.3
c.	Total energy expenditure for activities (Occupational and non-occupational)	1215	2364
d.	Allowance for SDA (0.06 x 2364)	+141	2505

4. a.	Basal metabolism	1236	
b.	Correction for sleep (0.1 x weight in kg. x mean hours of sleep)	-45	1191
c.	Total energy expenditure for activities (Occupational and non-occupational)	1201	2392
d.	Allowance for SDA (0.06 x 2392)	+143	2535

5. a.	Basal metabolism	1157	
b.	Correction for sleep (0.1 x weight in kg x mean hours of sleep)	-43	1114
c.	Total energy expenditure for activities (Occupational and non-occupational)	1209	2323
d.	Allowance for SDA (0.06 x 2323)	+139	2462

Cont....&

	Mean daily expenditure	total energy
6. a. Basal metabolism	1138	
b. Correction for sleep (0.1 x weight in kg. x mean hours of sleep)	-42	1096
c. Total energy expenditure for activities. (Occupational and non-occupational)	1207	2305
d. Allowance for SDA (0.06 x 2305)	+138	2441

MEAN (DAILY) TOTAL ENERGY EXPENDITURE BY FACTORIAL METHOD

Subjects: BANK OFFICERS

		Mean, Daily,	Total expenditure
1.	a. Basal Metabolism	1190	
	b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	-40.5	1149.5
	c. Total energy expenditure (Occupational and non- occupational)	1168.9	2318.4
	d. Allowance for SDA (0.06 x 2318.4)	+ 139.1	2458
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2.	a. Basal Metabolism	1199	
	b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	41.71	1117
	c. Total energy expenditure (Occupational and non- occupational)	1170	2287
	d. Allowance for SDA (0.06 x 2287)	+ 137	2374
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3.	a. Basal metabolism	1195	
	b. Correction for sleep (0.1 x weight in kg. x mean hours of sleep)	48	1147

Cont....d

Mean (daily) total energy Energy expenditure		
	K. Cal	Sum of K. Cal
<hr/>		
c. Total energy expenditure for activities (Occupational and non occupational)	1082	2229
d. Allowance for SDA (0.06 x 2229)	+133	2362
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4. a. Basal metabolism	1295	
b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	-47	1248
c. Total energy expenditure for activities (Occupational and non-occupational)	1205	2453
d. Allowance for SDA (0.06 x 2453)	+159	2612
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3. a. Basal metabolism	1167	
b. Correction for sleep (0.1 x weight in kg x mean hours for sleep)	-40	1127
c. Total energy expenditure for activities (Occupational and non-occupational)	1336	2463
d. Allowance for SDA (0.06 x 2463)	+147	2610

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Mean (daily) total energy
Energy expenditure

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6. a.	Basal metabolism	1150	
b.	Correction for sleep (0.1 x weight in kg. x mean hours of sleep)	-44	1106
c.	Total energy expenditure (Occupational and non occupational)	1186	2292
d.	Allowance for SDA (0.06 x 2292)	+137	2429

MEAN (DAILY)TOTAL ENERGY EXPENDITURE BY FACTORIAL METHOD

Subjects: House surgeons

	Mean daily expenditure (K.cal.)	Total energy sum of K.cal
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1. a. Basal Metabolism	1124	
b. Correction for sleep (0.1xweight in kg x mean hours of sleep)	40.5	1083.5
c. Total energy expenditure for activities (occupational and non-occupational)	1193.78	2272
d. Allowance for SDA (0.06 x 2272)	+136	2408
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2. a. Basal Metabolism	1084	
b. Correction for sleep (0.1x weight in kg. x mean hours of sleep)	- 42	1042
c. Total energy expenditure for activities (Occupational and non occupational)	1174	2216
d. Allowance for SDA	+ 133	2349
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3. a. Basal Metabolism	992	
b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	+34	958
c. Total energy expenditure for activities (Occupational and non-occupational)	1104	2062
d. Allowance for SDA (0.06 x 2062)	+124	2186
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		Mean daily exp nditure (K.cal)	Total energy sum of K.cal.
4.	a. Basal metabolism	1117	
	b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	-42	1075
	c. Total energy expenditure for activities (Occupational and non-occupational)	1091	2166
	d. Allowance for SDA (0.06 x 2166)	+130	2296
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5.	a. Basal Metabolism	1233	
	b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	-47	1186
	c. Total energy expenditure (Occupational and non-occupational)	1105	2291
	d. Allowance for SDA (0.06 x 2291)	+137	2428
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6.	a. Basal Metabolism	1155	
	b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	-37	1118
	c. Total energy expenditure (Occupational and non-occupational)	1208	2326
	d. Allowance for SDA (0.06 x 2326)	+140	2466

MEAN(DAILY) TOTAL ENERGY EXPENDITURE FACTORIAL METHOD

Subjects: Three

		Mean daily expenditure K.cal.	Total energy sum of K.cal.
1.	a. Basal Metabolism	1335	
	b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	-57	1278
	c. Total energy expenditure for activities (occupational and non- occupational)	1071	2349
	d. Allowance for SDA (0.06 x 2349)	+141	2490
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2.	a. Basal Metabolism	1179	
	b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	-43	1136
	c. Total energy expenditure for activities(Occupational and non occupational)	1083	2219
	d. Allowance for SDA (0.06 x 2219)	+133	2352
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3.	a. Basal Metabolism	1325	
	b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	-53	1272
	c. Total energy expenditure (Occupational and non- occupational)	1191	2463
	d. Allowance for SDA (0.06 x 2323)	+145	2608

		Mean daily expenditure (K.cal)	Total energy sum of K.cal.
4.	a. Basal Metabolism	2222	
	b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	-49	1173
	c. Total energy expenditure (Occupational and non-occupa- tional)	1101	2274
	d. Allowance for SDA (0.06 x 2274)	+ 136	2410
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5.	a. Basal Metabolism	1355	
	b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	57	1298
	c. Total energy expenditure (Occupational and non- occupational)	1047	2345
	d. Allowance for SDA (0.06 x 2345)	+147	2492
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6.	a. Basal Metabolism	1166	
	b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	-46	1120
	c. Total energy expenditure (Occupational and non- occupational)	1083	2203
	d. Allowance for SDA (0.06 x 2203)	+132	2335

MEAN (DAILY) TOTAL ENERGY EXPENDITURE OF FACTORIAL METHOD

Subjects: Saleswomen

		Mean daily expenditure K.cal.	Total energy sum of K.cal.
1.	a. Basal Metabolism	1130	
	b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	-37	1093
	c. Total energy expenditure for activities	1003	2096
	d. Allowance for SDA (0.06 x 2096)	+126	2222
2.	a. Basal Metabolism	1192	
	b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	-38	1154
	c. Total energy expenditure for activities (Occupational and non occu- pational)	1297	2451
	d. Allowance for SDA (0.06 x 2451)	147	2598
3.	a. Basal Metabolism	1138	
	b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	-39	1099

contd.....

	Mean daily expenditure k.cal	Total energy sum of k.cal

e. Total energy expenditure (Occupational and non occupational)	1203	2302
d. Allowance for SDA (0.06 x 2302)	+138	2440
4. a. Basal Metabolism	1114	
b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	- 39	1075
c. Total energy expenditure (Occupational and non occupational)	1026	2101
d. Allowance for SDA (0.06 x 2101)	+ 126	2227
5. a. Basal Metabolism	1334	
b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	-54	1280
c. Total energy expenditure for activities	1047	2327
d. Allowance for SDA (0.06 x 2327)	+ 139	2466
6. a. Basal Metabolism	1148	
b. Correction for sleep (0.1 x weight in kg x mean hours of sleep)	- 38	1110
c. Total energy expenditure for activities (Occupational and non occupational)	1172	2282
d. Allowance for SDA (0.06 x 2282)	+136	2418
