Chapter 2
Materials and methods

THE AREA
Location and topography
The physiographic setting of Calcutta (22° 34’ north latitude and 88° 24’ east longitude), from the dawn of its foundation until at present, is dominated by the meandering river Hugli (Ganga). The Hugli now forms the westernmost limit of the Gangetic delta, the largest delta in the world, built up by the clay bed and thick pile of alluvial sediment deposition in recent geological period (the upper 300 m. of this alluvial pile clearly belong to the Quaternary age (Dasgupta, 1990). Hence, Calcutta is a typical riverine city and due to topographical characteristics i.e. situation of river in west and low mangrove swamp wetlands in east, the habitation centres of Calcutta city extends towards north and south, from the very beginning. Although some 25 years back the reclamation of Salt Lake area in north-eastern fringe also included as the spatial expansion of the city (though not administratively). The principal suburbs of city limits of Calcutta are Baranagar and Belgharia in north, Dum Dum and Salt Lake area in east, Garia and Behala in South and westwords the city life is extended across the river in Howrah, on the west bank of the Hugli river, as a twin city of Calcutta. Since January 1, 2001 the name of the city is officially changed into ‘Kolkata’.

Climate
Calcutta has a subtropical climate (hot and humid), except for the three months of winter (mid-November to mid-February). The maximum temperature reaches 42°C during summer months and the minimum about 7°C during winter. In Calcutta, the monsoon comes during mid-June and continues upto mid-September (Chakraborti, 1990). The average annual rainfall is 1625 mm.

Flora and fauna
Within the city, the vegetation in parks, and open spaces is hopelessly disproportionate to the sprawling built-up area. The city harbours a surprising variety of common birds: the
pariah kite, blue rock pigeon, spotted dove, house swift, ‘Myna’, ‘Bulbul’, etc. Among the mammals, there are rodent, jackal, mongoose, etc. (Mookherjee, 1990).

Calcutta - a brief history

During the early days of British rule in India, Calcutta was the capital of the country, but later the British rulers shifted the capital to Delhi, the present capital of India. Calcutta is now the capital of the state of West Bengal (Chatterjee, 1990).

It is well circulated that Job Charnok, a British tradesman is the founder of this city and in August 24, 1690, he found this place as a good landing place to set up an outpost of the East India Company. However, very recently in an attempt to rewrite the history of this city under the verdict of Honourable Calcutta High Court, the leading historians are of the opinion that no such colonial settlers can be treated as the founder or the key person for establishing an old and prosperous settlement of Calcutta. The then villages of Sutanuti, Gobindapur and Kalikata provided the high land needed for massive business houses, residential quarters, villas (sometimes truly palacial) and other establishments needed for the administrative and commercial activities. But at the same time, it is true that the political and economic importance of Calcutta was grown manifold with the association of the East India Company and the growing British Raj (Dasgupta, 1990) and it is comparatively a new city, than other Indian cities like Agra, Delhi, Allahabad or Varanasi, which seems to be much older than Calcutta (Ray, 1986).

Before the advent of British, Portuguese traders commenced operation in Bengal, mainly in Chattagram (now in Bangladesh) and in Saptagram (a village, northwest of Chunchura in Hoogly district of West Bengal) in the 16th century. In the late 16th century, the merchant princes of Saptagram began to seek fresh markets as their original seat declined owing to the caprices of the river. The great majority settled at Hooghly, a Portuguese settlement since the late 15th century, dominated from the 1630s by the Dutch, the leading European traders in Bengal at that time. However, four families of Basaks and one of the Seths came further downstream to found the village of Gobindapur on the east bank. Northwards, they proceeded to set up the Sutanuti Hat for cotton and yarn market. In between Sutanuti and Gobindapur was a lesser settlement, namely Kalikata. These
three villages became the site of the British holdings that eventually grew into the city of Calcutta (Chatterjee, 1990).

The three villages were parts of an estate belonging to the Mughal Emperor himself whose Zamindari rights were held by the Sabarna Chowdhury family of Barisha-Behala. Gradually the East India Company increased their territory of occupancy and ultimately in the year 1765, Shah Alam - I, the then Mughal Emperor, granted the right to the East India Company to collect land revenue and administer justice to the Bengal province (including the present day Bihar and Orissa) (Nair, 1990).

“Since the days of its inception, the city of Calcutta continued to expand its limit slowly but steadily. At the dawn of the 18th century, 41 villages along with Sutanuti, Kalikata and Gobindapur gave the first shape of Calcutta Municipal area” (Mitra, 1990). In 1794, governor-general Lord Cornwallis fixed the boundaries of Calcutta for municipal and judicial purposes: north, Marhatta Ditch; east, Circular Road; west, the Hugli river; and south, Lower Circular Road to Khidderpore Bridge (Nair, 1990).

“The town continued to grow steadily throughout the 18th and 19th centuries and the first 50 years of the present century marked an unprecedented rate of expansion. In 1701 the physical extension of the city was 1,682 acres and in 1953 it went upto 23,629 acres” (Mitra, 1990). At present the city proper, i.e. the area under the Calcutta Municipal Corporation, covers no less than 100 sq. km. with a population of 3.3 million (1981). With the addition of three erstwhile municipal areas in 1984, the total area of the Calcutta Municipal Corporation is now 187.33 sq. km. The greater Calcutta Metropolis is now covering 1380 sq.km. and have a large sum of 11.83 million (with a population density of 33000 /sq.km.) population (Census, 1991).

Calcutta was basically a commercial city, a port town where both Europeans and Bengalis had made fortunes in the late 18th and early 19th centuries. Ever since the 18th century, this city had evolved into an urban agglomeration – a commercial, administrative, residential and military complex - from an area initially restricted to a few hundred acres. The emergence of an industrial infrastructure along with the proliferation
of commercial activities gave Calcutta an area of importance which no other town or city in the whole eastern region experienced. Thus, by the first half of the present century, the population of Calcutta evolved into a heterogeneous entity (Mitra, 1990).

Throughout the 19th century, the city area expanded in conformity with its rapidly increasing population, but in the first half of the 20th century, it witnessed an unprecedented growth in both size and population. According to 1901 census, 68.15% of the total city population comprised immigrants. Of them, 52.2% came from interior districts of Bengal, 14.8% from other parts of India, and the remaining 1.1% from outside the country. In the census of 1951, the total number of Bengalee immigrants to the city was 1,163,718, while those from the rest of India was 673,007. These figures clearly establish the fact that majority of the inhabitants consisted of immigrants, and they had a tendency to concentrate in the city proper rather than the suburbs. Apart from this general inflow of immigrants from different parts of the state, the bulk came from East Bengal in the 1930s and 1940s. A large proportion of the inhabitants of Calcutta were non-Bengalees and their numbers steadily increased throughout the period. Of these immigrants, the majority came from the neighbouring provinces of Bihar, Orissa and Uttar Pradesh and also from other states like Punjab and Rajasthan (Mitra, 1990).

"Centuries ago, colonial and trading interests gave birth to the city of Calcutta and this made it the focal point of intensive economic activities. The infrastructure of the city, together with its vast hinterland, attracted multiple industries which enhanced the scope of employment" (Mitra, 1990). Calcutta had long been the second capital of the British Empire and its primacy in the Eastern Hemisphere obviously had a great impact on its socioeconomic growth. Gradually the city of Calcutta became a job centre. This pulled the job-seekers from the nearby districts and states to it in various occupational categories. In 1911, there were 624,000 workers, accounting for three-fifth of the total city population. The extent of predominance of immigrant earners in Calcutta's occupational structure remained unchanged throughout the first six decades of the 20th century. In 1961, the percentages of workers among resident and migrant groups were 29.72% and 70.25%, respectively (Mitra, 1990).
A majority of the immigrants came from the districts of Bengal, mostly from 24 Parganas (North and South), Howrah, Hooghli, Midnapore, etc. The Bengali immigrants to Calcutta accounted for 341,000 persons in 1911 and their number steadily increased to 11,63,716 in 1951, excluding the refugees from Bangladesh. As the bulk of Bengali migrants came from the neighbouring districts, they naturally moved into the city with their families, considerably enhancing the number of dependants among these immigrants (Mitra, 1990).

The Bengali Hindus make up half of the total population of the present day Calcutta. They, in general dominate the middle income group of the city. From the hinterland stretching beyond the state limits and encompassing such adjoining regions as Bihar, Orissa, Uttar Pradesh, etc., a substantial inflow of non-Bengalees occurred for long. In 1911, their number was 343,689 for Calcutta and suburbs; while in 1951, the city alone contained as many as 673,00 non-Bengali immigrants" (Mitra, 1990). Furthermore, the migrant groups have built up separate residential concentrations of their own, enlightening the typical characteristics of orthogenous city like a premature metropolis (Bose, 1965).

THE POPULATION
The lower limb amputee person of Calcutta and its surrounding area has been chosen as the study population. To our knowledge there is no databank of disabled people in any cities of India. Therefore, it was difficult to locate a large number of amputated persons (with the aforesaid criteria) randomly from the population, especially from Calcutta. In view of the lack of proper data bank for amputees, we had to depend on those organizations (especially rehabilitation centres) where there is a fair scope of getting information and/ or address of a large number of amputees. To do this, the addresses of the subjects were collected from two national level rehabilitation centres of Calcutta namely National Institute for the Orthopedically Handicapped (from North Calcutta) and Mahavir Seva Sadan (from South Calcutta). It was presumed that fairly large number of amputees usually come to these centres to get their prosthesis. However, this endeavour hardly covers an exhaustive number of amputees especially who do not have prosthesis. The addresses of the individuals were collected from the list of the centres. It is worth
mentioning that both the rehabilitation centres maintain official records of the subjects whom they had provided the prosthesis free of cost, which is due to poor economic condition of the subjects. Therefore, it is the first step to minimize the socio-economic heterogeneity between/among subjects. Every subject was communicated about the purpose of the study and requests were made for participation in the study, via surface mail and personal communication. The subjects, who volunteered themselves and sent written consent for participation, were included in the study sample. All subjects were Bengali speaking Hindus, (numerically dominant group in Calcutta). No preference on genetic or ethnic background (such as caste or clan) was made, as the responses of the subjects were very less than the expected (out of 1000 it was 109).

Selection of study population and area:
Adult male unilateral lower extremity amputees of Calcutta and adjoining areas were chosen as the study population. The reasons behind such choice were:
1. The disables with locomotor disability are relatively easier to approach and also easier to collect data for the study compared to sensory and/or mentally disabled individual.
2. Amputation is one of the leading causes of locomotor disability due to trauma. Usually, traumatic disability affects lifestyle of the individual, which may further affects health status of the amputees.
3. It is well documented that the frequency of amputation in adult males are high compared to the adult females (NSSO, 2003).
4. Generally the lower extremity amputees are significantly more in number than the upper extremity.

The study area (Calcutta) was selected in view of the following
1. The rate of accidents leading to amputation of lower extremity is presumably much more in a city rather than a rural area, where the industries and vehicles are very less. Therefore, there are higher chances of getting traumatic patients in urban centres like Calcutta.
2. To our knowledge there is no rehabilitation centres outside Calcutta in the state of West Bengal, who make arrangements for prosthesis for the amputees. Therefore,
those who intend to get prosthesis free of cost, enroll their names in the above-mentioned rehabilitation centres.

3. It is also obvious that the amputees, in a large number, residing in and around Calcutta as there are fair opportunities of getting jobs in any form.

4. Therefore, it was convenient to conduct studies in and around Calcutta area. Beside these, the present approach is a holistic study therefore, intensive fieldwork is essential for data collection. The fieldwork was done in several installments over a quite long time period because it was necessary to establish good rapport with the subjects in order to get good quality data. The communication with the subject was renewed through frequent visits to their respective homes for data collection.

The data were collected between November 1999 and December 2001 by visiting the homes of the amputees distributed throughout the city. The distribution of the household has been shown in Figure 2.

SAMPLE
A total of 1000 adult, male, lower limb amputees were approached for participation in the study, unfortunately, 109 individuals responded. However, there were some dropouts in between the time of data collection due to death or severe illness or migration. Therefore, it was not possible to resample the data following statistical procedure because of obvious reasons e.g. paucity of respondent.

Data on demography, socio-economic condition and functional outcome were collected from 109 participants, the remaining data sets mostly include 102 individuals. All types of data were collected by the single investigator and the data collection were done through home visits.

TYPES OF DATA
Demography
Demographic data were collected from 109 families of amputees. Data have been collected using pre-tested and standard household schedule. Generally the household data were collected from the subjects. In case, the subject is not a head of the household, then
household data were collected from elderly and responsible members of the household along with the subject. The household schedule was completed using information on family size, number of living rooms in the family, name, age, sex and occupation of all the family-members. Age estimation is always a problem in anthropological researches especially in the context of third World population. The age was estimated by reference to some important local events, and cross-checked from the age of individual having better documentation of their age.

**Anthropometry**

So far the literature review is concerned, there is no standard list of anthropometric measurements for survey on amputees. Anthropometric measurements were collected following International Biological Programme (IBP) basic list of measurements (Weiner and Lourie, 1981). However, in fulfilling the objectives of the present study, some inevitable changes have been made in the list of measurements i.e. some additional measurements have also been taken from other list of anthropometric measurements, which have been also used in other published literatures (e.g. Goswami, 1987; Jarosz, 1994; Das and Kozy, 1994) on amputees. A total of 24 measurements were taken on subjects wearing light apparel and wearing their respective prosthesis. The following measurements were taken:

1. Stature (cm)
2. Body weight (Kg)
3. Acromial Height (cm)
4. Sitting Height (cm)
5. Biacromial diameter (cm)
6. Biiliocristal diameter (cm)
7. Bicondylar humerus (cm)
8. Bicondylar femur (cm)
9. Antero posterior chest (cm)
10. Transverse chest (cm)
11. Chest circumference (inhaled) (cm)
12. Chest circumference (exhaled) (cm)
13. Upper arm circumference (cm)
14. Waist circumference (cm)
15. Calf circumference (cm)
16. Biceps skinfold (mm)
17. Triceps skinfold (mm)
18. Subscapular skinfold (mm)
19. Suprailiac skinfold (mm)
20. Medial calf skinfold (mm)
21. Knee Height (cm)
22. Buttock knee length (cm)
23. Weight of the prosthesis (kg)
24. Length of the stump (cm)

Measurements No. 23 and 24 seems to be uncommon in anthropological literatures therefore, a little explanation is required. ‘Stump’ here denotes the remaining portion of the amputated limb from its nearest distal bone-joint (hip joint in case of above knee amputee and knee joint in case of below knee amputee). These measurements are
necessary for estimation of body weight and the body mass index as well for the amputees. Therefore, these 2 measurements have been specially considered for the amputees of the present study. It is worthwhile to note that measurements like - knee height and buttock knee length have been taken from the limb, which is intact (not amputated) assuming bilateral symmetry.

The subjects (amputees) were instructed to wear prosthesis before taking stature and body weight measurements (if required supported against a wall and precautions were taken against bending of the trunk and knees). Later on the weight of the prosthesis were subtracted to get the actual body weight (post-amputation) of the amputees.

It was necessary to calculate BMI of the amputees in order to assess the nutritional status of the individual. But the conventional method of BMI calculation seemed inappropriate for this specific case because, it was difficult to measure the weight of the lower extremity amputees. Therefore, a new method of BMI calculation was developed for the amputees (Mozumdar and Roy, 2004) to calculate BMI correctly. The corrected body mass index (BMI) was derived using estimated body weight for the amputees. The body weight for the amputees were estimated using the weight proportions of the different limb segments of the body (Osterkamp, 1995) with the help of following equations

\[ WE = W_O / (1 - \Delta W / W_E) \]
\[ \Delta W / W_E = 1.5 + 4.4 (1 - L_{Sp} / L_{Kn}) \] (used for below knee amputees)
\[ \Delta W / W_E = 1.5 + 4.4 + 10.1 (1 - L_{Sp} / L_{Bk}) \] (used for above knee amputees)

Where, \( W_O \) is the observed body weight, \( W_E \) is the body weight to be estimated, \( \Delta W = (W_E - W_O) \), \( L_{Sp} \) is the length of the stump (remaining portion of the limb from its nearest distal bone-joint), \( L_{Kn} \) is the knee height and \( L_{Bk} \) is the buttock knee length.

**Perceived health status and reported ailment symptoms**

Data on individual health perception, health problems and /or ailment symptoms were recorded using a pretested questionnaire/ schedule from the amputees. The questionnaire/schedules were completed using information on ailment symptoms affecting the individual during three months prior to the present survey. Some deficiency symptoms were recorded through observation.
Cardiorespiratory traits
Data on the following cardiorespiratory traits were taken. The total cardiorespiratory traits considered in the study have been clubbed into two groups (1) data on lung function traits and (2) data on cardiovascular system.

Lung function traits:
1. Forced expiratory volume (lit) (FVC)
2. Forced expiratory volume in one second (lit) (FEV$_{1.0}$)
3. Forced expiratory volume % (FEV% = $\frac{FEV_{1.0}}{FVC}$ * 100)
4. Peak expiratory flow rate (lit/ min) (PEFR)

Lung function was assessed by an automatic electronic digital display ventilometer (Manufactured by Clement Clarke International Ltd., Model: VM1). The subjects were instructed to stand firmly on the floor and take a deep breadth and exhale with maximum force of his capacity (maximum expiration) into a mouthpiece attached to the instrument. The subjects were also instructed to close their nose with left hand in order to avoid leakage of expiration through nose. The readings of the lung function tests were recorded, at least after 2 practice attempts the highest value among 3 technically satisfactory efforts for each case, from the display panel of the Ventilometer. The mouthpiece was disinfected each time after each use.

Cardiovascular traits:
1. Systolic blood pressure (mm Hg) (SBP)
2. Diastolic blood pressure (mm Hg) (DBP)
3. Pulse rate (bits/ min) (RHR)

Blood pressure measurements were taken after 15 minutes’ rest period, in a sitting position on the left hand by the auscultatory method using mercury blood pressure instrument (Sphygmomanometer) and stethoscope. Pulse rate was measured on radial pulse points by counting pulse for thirty seconds.

Haematology and blood lipids
The following blood parameters were taken for the present study
1. Oxyhaemoglobin (mg/ dl)
2. Haematocrit/ Packed cell volume (PCV%)
3. Blood glucose (mg/dl)
4. Total cholesterol (mg/dl)
5. Total triglycerides (mg/dl)

The blood samples were collected by finger pricking following standard techniques. All the blood parameters were analyzed immediately after taking the blood samples from the subjects on the spot i.e. in the field itself following different standard methods for each parameter.

The haemoglobin level was estimated by using oxyhaemoglobin method following standard techniques as described by Dacie (1958) using Hellige’s square tube and Hellige-Sahli haemoglobinometer.

The packed cell volume (PCV) was measured after collecting blood in heparinized microcapillary tubes and spinning them down shortly after collection in a haematocrit centrifuge machine (M 1100 manufactured by Compure, 1990). Thereafter, the PCV percentages were recorded by reading them in the built-in reader of the centrifuge machine.

The blood glucose and blood lipids (cholesterol and triglycerides) were analyzed with a dry autoanalyzer (Accutrend-GCT manufactured by Borhinger-Mannheim, 1999). The blood samples were placed in different strips meant for the respective parameter and the respective results were recorded from the display panel of the GCT meter after some stipulated time.

Dietary intake

One-day, semi-quantitative dietary intake data were collected using recall method from the individual subjects. The findings presented in this study refer to individual calorie intake only, cooked food items consumed the previous day as staple diet (the major sources of calorie i.e. ‘rice’ and ‘chapati’ -- hand made cake out of wheat). To avoid gross underestimation, protein and fat intake data were not computed from cooked food items. Standard conversion tables prepared by the National Institute of Nutrition (1989) were used to compute the calories provided by various cereals.
Mental health

Mental health of the disabled individuals was assessed by measuring the degree of depression using ‘Beck Depression Inventory’ (BDI). Beck depression inventory is documented to be a very sensitive tool to screen the depression case. It is generally used to measure depression especially of the medical patients and is also used in the general population as well (Beck, 1985). Beck Depression Inventory is a 21-item questionnaire with three to five multiple-choice answers for each item. The subjects were asked to answer the questions by selecting any one or more than one answers from the list of multiple answers. Every multiple answers of each questions, has a score, which ranges from 0 to 3. After completing total questionnaire the scores of all 21 answers are summed up. Therefore, the total score varies from 0 to 63 (theoretically an individual may score 3 for each item or questions and have possibilities of scoring 63 at the maximum and the vice versa is also possible). If, in any case, a person answer more than one answer for any item or question, then the highest score was considered for that specific question. It is presumed that higher the scoring is meant for higher the degree of depression (Appendix 1).

Functional outcome

Functional outcome scales are generally used to measure the mobility and personal independence of the locomotor disabled persons and ‘Locomotor Index’ is one of the best tools to measure functional outcome. ‘Locomotor index’ was used in the present study to measure the mobility and personal independence of the subjects. The scale has widely been used for its reliability and sensitiveness (Condie et al. 1996; Treweek and Condie, 1998). This scale is a 14-item questionnaire with 4-multiple choice answers, regarding nature and extent of dependency in movement as well as of the daily activities (Appendix 2). The scale ranges from 0 to 3 for each item/ questions. There is scope of scoring 0 to 42 for all 14 items/ questions, therefore, '0' scoring indicates fully independent and '42' scoring indicates fully dependent. The subjects interviewed in the present study are using rehabilitative aids in any form e.g. prosthesis or crutch. The intention of the locomotor index is to know how much independent the individual is, after using the rehabilitative aid. The higher is the score the higher is the dependency.
Social discomfort
The social discomfort is related to the problems in social interaction of an amputee with other normal individuals due to amputation and/or disability. In the present study, the social discomfort was measured using 'Social Discomfort Scale'. Social Discomfort Scale' is a 3-item questionnaire with 3-multiple choice answers regarding nature and extent of social discomfort and associated issues specific to an amputee person (Rybarezyk et. al. 1995) (Appendix 3). The score ranges from 1 to 3 for each item / question. There is scope of scoring 3 to 9 for all 3 items / questions, therefore, scoring of '3' indicates absence of any social discomfort and scoring of '9' indicates the highest degree of social discomfort. The higher is the score the higher is the degree of social discomfort.

Study design
The study was designed in the following way so as to fulfil the objectives of the study:
1. Comparisons were made between the amputees with normal controls in respect of different health traits (eg. anthropometric traits, haematological traits, cardiorespiratory traits).
   The normal controls are normal adult male individuals matched for age and socio-economic status (preferably similar type of occupation) with specific disable individual, which means case control. This has been done in order to see the difference in health traits with the disabled.
2. Comparisons were made between amputees and controls in regard to mental health trait.
3. Comparisons were made between/among amputees in terms of social discomfort.
4. Comparison was made between amputees in terms of functional outcome.

Comparisons of health traits were also made between / among:
A. Types of disability
B. Socio-economic categories of amputees
C. Amputees using different types of rehabilitative aid
D. Age categories of the amputees
E. Dietary categories of the amputees
F. Duration of the disability
Statistical analysis:
1. Descriptive statistics of different health traits were calculated for normal controls and amputees. Furthermore, descriptive statistics were also calculated for different groups of amputees.
2. ‘Paired t-test’ was calculated for different health traits in order to compare the difference between normal controls and amputees.
3. One way analysis of variance (ANOVA) was calculated for different health traits in order to compare difference between/ among different groups of amputees. However, in case of comparisons between 2 groups, ‘t-test’ was calculated for the different health traits.
4. ‘Scheffe test’ was calculated for different health traits between/ among groups of amputees, in order to determine which group or groups significantly differ from others.

Scheffe test is one of the post hoc tests, which is done after ANOVA in different statistical analysis. Post hoc tests are used for stabilising ‘type I’ error (the chance of rejecting a true hypothesis i.e. 1 out of 20 = 0.05) in statistical analysis. Among different post hoc tests, the significance level of Scheffe’s test is designed to allow all possible linear combinations of group means to be tested, not just pairwise comparisons available in this feature. Scheffe test is known to be the most conservative i.e. it less likely to produce ‘type I’ error, which means a larger difference between groups is necessary to get a significant result.

5. The qualitative data were analysed by calculating percentages for each category and contingency chi-square for homogeneity was calculated to test the significance of difference between/among different categories.

Classification of subjects
Disability types: The classification is mainly based on presence or absence of knee joint as the functional outcome varies between the groups. The very common term used in many literatures of the amputees are above knee (transfemoral amputation) and below
knee (transtibial amputation) amputation. Out of total number of 102 amputees, 32 individuals are above knee and 70 individuals are below knee individuals.

Socio-economic condition: The subjects were classified into 3-socio-economic classes i.e. Low, Medium and High. Socio-economic data were collected from the respondent exclusively on their monthly family expenditure. However, there may have some unavoidable errors of under or over-reporting. Therefore, an alternative and more objective technique was followed in classifying the data. The technique is to calculate the ratio between the number of living rooms in the household and number of family members (household size) (i.e. number of living rooms in the household/ household size). This classification has widely been used by Bhattacharaya et al (1987) and Chattopadhyay (1990) in many published literatures. If the ratio is 0.5 or more i.e. a room is shared at most by two persons or in most cases by a couple of a family or less than that, this was considered as high socio-economic group. In the similar way, if the ratio is less than 0.5 to 0.25 i.e. a single room is shared at most by four persons or in general by a couple with their children was considered medium socio-economic group. However, if the ratio is less than 0.25 i.e. the room is shared by more than 4-individuals then it was considered as low socio-economic group. Out of 102 amputees, 29 individuals belong to high socio-economic group, 36 individuals belong to medium socio-economic group and rest 37 individuals belong to low socio-economic group. It is worth mentioning that the classification was also done on the basis of monthly per capita expenditure and was not found any significant difference with the above classification. Therefore, the classification as described above was followed in the study.

Types of prosthesis: Prosthesis is one of the rehabilitative aids generally used by the amputees. The materials and get-up of prosthesis generally varies and were available to the present amputees (study group) free of cost from two rehabilitation centres. However, the weight, durability and appearance of the prosthesis depend on the material used for making prosthesis. In the present study, two major types of prosthesis were found and the classification was made accordingly. Out of total 102 amputees, 9 individuals do not use prosthesis (although they have procured the prosthesis) because of some personal difficulties. 49 individuals use exo-skeletal prosthesis made out of pipes (made of
aluminum / plastic) with Jaipur foot (a rubber made semi-flexible foot piece having a human foot like appearance here referred as type 1. Rest 44 amputees use endo-skeletal prosthesis (a prosthesis, which is modeled out of wood or hard fiber and covered by skin color plastic sheets) with a wooden foot piece here referred as type 2.

Age categories of the amputees: The subjects were classified into 10 yearly age groups, because of the small number of samples in 5 yearly age cohorts. Therefore, 102 amputees were divided into 5 age categories. Group 1 (20 – 29 years) includes 23 amputees, group 2 (30 – 39 years) includes 16 amputees, group 3 (40 – 49 years) includes 32 amputees, group 4 (50 – 59 years) includes 13 amputees, and the rest 18 amputees in group 5 (60 + years).

Dietary categories: The subjects were classified into two categories i.e. low and high calorie intake group. The calorie requirement for the disabled individuals especially the locomotor disables are debatable. The dietary recommendation for the disabled individuals should be made in accordance with disability type, level of locomotion, morbid condition, socio-economic condition etc. To our knowledge there is no standard literature on recommended daily dietary allowance for the locomotor disabled individuals. In view of this, the subjects were classified into two groups on the basis of the median values of calorie intake. One group designated as 'low calorie intake group' (calorie intake < 1303 Kcal, below median value) and the other 'high calorie intake group' (calorie intake ≥ 1303 Kcal, above median value). Subsequent analysis was made using this classification of dietary intake of the amputees. Data on dietary intake was available from 100 amputees, each group includes 50 amputees.

Duration of disability: The amputees were classified into three groups based on duration of disability in years. The groups are ≤ 5 years, > 5 - 15 years and > 15 years. On subsequent analysis, the classification was used for comparisons in regards to different health traits to study the possible differences if any. Out of total 102 amputees, ≤ 5 years group includes 32 amputees, > 5 – 15 years group includes 38 amputees and > 15 years group includes remaining 32 amputees.
Figure 2 The map of Calcutta city and adjoining areas showing the locations of the households of amputees

- Location of the household of amputated person

★ Location of the rehabilitation centres [NIOH = National Institute for the Orthopedically Handicapped, MSS = Mahavir Seva Sadan]

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