



CHAPTER II

LITERATURE REVIEW

WHO stated in the introduction of the World Health Report 1998 “The 21st century offers a bright vision of better health for all. It holds the prospect not merely of longer life, but superior quality of life, with less disability and disease. As the new millennium approaches, the global population has never had a healthier outlook. Weighing the evidence of the past and the present, the World Health report 1998 shows that humanity has many good reasons for hope in the future.” (The World Health Report 1998). The reality is that the as a whole the world is failed to achieve the goals of ‘HEALTH FOR ALL’ by 2000 and it failed to achieve health for it’s majority of population by 2000. To get a good future and to achieve the goals of ‘HEALTH FOR ALL’ the health care delivery system must be cost effective, efficient and also sustainable. Because most of the developing countries facing severe constrains of financial resources for public sector specially health sector management. Many of them are not able to provide basic health needs for their citizens. So the proper management and utilization of scarce resources is one of the top most important issues in the health sector. So the cost of resources in health care service is a very much important factor which needs proper attention, treatment, identification, analysis, measurement and valuation for various purposes.

2.1 Cost- Concepts and Definitions

According to “Cost Accounting” by Deakin and Maher (1991) a cost is a sacrifice of resources. There are two major categories of costs; out lay costs and opportunity costs. An outlay cost is a past, present, future cash outflow. It’s known as financial cost. Opportunity cost is the return that could be realized from best-foregone alternative use of a resource.

In “ A methodology for the calculation of health care costs and their recovery” Carrin and Evlo (1995) define the cost of goods or services as the value of the resources that spent for the acquisition of those goods or services, which may be expressed as a monetary or

The concept of opportunity cost is fundamental the economist's view of costs. Since resources are scarce relative to needs, the use of resources in one way prevents their use in other ways (Gold and others 1996). The opportunity cost of investing in a health care intervention is best measured by the health benefits (life year saved, quality adjusted life years(QALYs) gained) that could have been achieved had the money been spent on the next best alternative intervention or healthcare program (Russell, 1992).Resources used in economic evaluations should be valued at opportunity cost, but doing this is difficult especially in healthcare , where there is no perfect market, so unit costs tend used instead, based on the costs of the various inputs(Robinson, 1993).Valuation of resources for which no market exists, such as informal care, or patient time costs, requires methods to derive what economists call "shadow prices"--the true social value (or opportunity cost) of non-market resources, such as time and informal care (Stiglitz, 1986).

Economic costs can be thought of as a measure of the total cost to society for providing a health program (Creese and Parker 1994). The total cost to the society for providing health care service is classified in to three main categories, these are health care sector, patient & family and other sectors costs (Drummond et al. 1998).

In many studies on cost analysis have given importance on the cost of producer or provider and many books been published on Provider's or producer's costs. For example Analysis of hospital costs: A manual for managers (Shepard, Hodgkin and Anthony 1995), Recurrent costs in health sector (edited by Abel-Smith and Creese 1995), Cost Accounting: A Managerial Emphasis (Horngren and Foster), A methodology for the calculation of health care costs and their recovery (Carrin and Kodjo 1998), Unit cost of laboratory tests at the out-patient department of Chulalongkorn Hospital (Kmamolratanakul et al. 1996), Unit cost of diagnostic imaging tests at the out-patient department of Chulalongkorn Hospital (Dhanamun et al. 1996) these books and studies are biased to provider/government perspective. These show the importance of cost from providers' perspective. But in economic analysis health care, the cost of the patient is also very important, because health care system involves cost from patient side also (Begum 1994). From the perspective of society as a whole, the cost of obtaining health care and

other services are just as patient as the costs of producing services. The patients' costs are due to travel time, waiting time loss of wages. Not only patients but also other members of the households are likely to be involved spending time for carrying patients or accompanying them to the place where care is delivered and also includes ones time spends for medication or treating oneself or one's children (e.g. preparing and giving ORS diarrhoea) .Cost of time is important. A study of treatment for malaria in Thailand found that about 90% of estimated costs of patient were time costs. Other cost items are transportation costs, consultation, medicine etc (Creese and Parker 1994). In Bangladesh a study on "Cost analysis of childhood diarrhoea in patient" in a district hospital(Begum 1994) costs patients sides includes the costs borne directly by the patients for hospital registration, bed (if paying bed), drug, diagnostic test, food, transportation to hospital and indirectly the loss of wages for time that spent for travelling, waiting and treatment and further included the costs borne by the attended of patient directly for their food, shelter, transportation and indirectly the loss of wages i.e. time cost. But at district hospital and THC only for dental care only OPD service is provided. So, usually some of the above mentioned costs will not incurred to patient's and his attendant (if any) viz. bed/ shelter cost, food cost.

2.2 Economic versus Financial Cost Concepts

The economist's concept of profit differs from that of the accountant. Both consider profit as the excess of revenues over costs, but they regard costs differently. The accountant subtracts from revenues only the costs that are actually incurred plus an allowance for depreciation of some of the previously incurred one-time expenditures. Profits thus represent the net income to the owners of the firm; profits are their reward for having invested time and capital in the venture. The economist, on the other hand, is concerned with the wider of efficient allocation of resources and is thus concerned that all resources are employed where they will earn maximum for their owners. A means of ensuring this is to consider the opportunity cost of each resource (Douglas 1992). Although financial and economic costs are distinct concepts, the procedures for calculating them, and some times their actual value, are similar. It is to employ sub-categories for both. These sub-categories may be different specified. The important principle is that the sub-categories should include all costs, and the same costs should not be included in different sub

categories (Philips, Mills and Dye 1993). The following table shows the differences between financial and costs.

Table 2.1: Differences between Financial Cost and Economic Cost

	Financial Costs	Economic Costs
Description	Expenditure on the intervention (the usually use of the term "cost").	Value of the opportunities lost in employing resources in the intervention.
Costs included	Inputs purchased.	All resources employed in the intervention including voluntary labor. Excludes money transfers (Taxes and subsidies) which do not reflect resource consumption: e.g. social security payments to Chagas disease victim represent a financial but not an economic cost.
Valuation	Market price of purchased goods.	" Shadow price" are employed if market price do not reflect the "opportunity cost" of resources. Particularly likely for salaries (especially where minimum wage legislation exists) and imports (especially where fixed exchange rate operate). For example the shadow price of employing unskilled labors is the value of other work forfeited.
Perspective	Can be any defined individual or organization.	Usually a social perspective. Ideally consumer costs should also be included (e.g. the time or money employed in adopting control measures, cleaning the local environment, making and modeling mosquito nets, cleaning houses for insecticide spray teams).
Purpose	Show the funds required to cover costs and whether the intervention is affordable.	Shows (together with measures of effectiveness) whether the intervention is efficient.

(Source: Burt and Eklund 1992).

2.3 View Point of Analysis

In economic analysis it is essential to specify the view point since an item may be a cost from one point of view, but not cost a from another. For example, patients' travel costs are a cost from the patients' point of view and from the point of view of the society, but not a cost from the Ministry of Health's point of view. Workers compensation payments are a cost to cost to the paying government, a gain to the patient (recipient), and neither a cost nor a gain to society. These money transfers, which do not reflect resource consumption, are called transfer payments by economists (Drummond et al. 1998). Some other authors further argue that before economic evaluation begins, the perspective of the

study should be determined and in evaluation of health interventions the perspective commonly taken is that of the health service. Because in welfare economics, however, health economics is concerned with society's welfare. It therefore argues that that an economic evaluation should include the impact of an intervention on the welfare of the whole society. It may not always be possible for all the relevant costs and benefits to be included in an economic evaluation because funding or time constrains. For example a clinical directorate faced with difficult decision with in a tight budget may take may take directorate perspective. In turn requiring the wider organization act to prevent cost shifting or other undesirable effects.(Bayford and Raftery 1998).

2.4 Usefulness of Cost Data or Information about Cost

Creese and Parker (1994) also mentioned in 'Cost analysis in primary health care' that, the collection and analysis of data on program costs can provide considerable useful information on primary health services of all kinds. It is also mentioned that, when cost data can be related to existing or readily existing available information on program performance useful assessments of efficiency input/output sense can be made.

According to 'Analysis of hospital costs: A manual for managers' by Shepard, Hodgkin and Anthony (1998), as financial management techniques, cost finding and analysis help to furnish the necessary data for making more informed decisions concerning operation and infrastructure investments. Structured cost data can provide in formation on operational performance by cost center. This information can be compared to budgeted performance exception in order to identify problem areas that require immediate attention. These data gives management the material to evaluate and modify operations if necessary. Moreover, knowledge of costs (both unit and total) can assist in planning for future budgets (as an indicator of efficiency) and to established a schedule of charges for patients services. A hospital can not set rates and charges, which are realistically related to costs unless the cost finding system accurately allocates both direct and indirect costs to the appropriate cost center. Cost finding analysis are also of value to management in ensuring that costs do not exceed available revenue and subsidies

According to "Measuring Public Hospital Costs: Empirical Evidence from the Dominican Republic" by Lewis, La Forgia and Sulvetta(1996), effective analysis of hospital performance requires the existence of accurate cost and out put data. They also mentioned that the lack of information regarding, resource allocation within hospital costs and output make effective hospital management and accountability impossible.

2.5 Classification of Costs

According to the 'Guideline for Cost Effectiveness Analysis of Vector Control' by Philips, Mills and Dye (1993) explained that, the different types costs are analyzed during the time of cost analysis like capital costs, recurrent costs, fixed costs, variable costs, total costs, unit costs/average costs, marginal costs etc. Capital costs are the costs of employing capital goods and recurrent costs are the costs, that recur, they are the costs of inputs that purchased regularly and also known as operating cost. Fixed costs are the costs which lasts longer than one year and do not vary with the level of output in a given period of time and variable costs that vary with the level of out put and used up within a year. Total cost means the value of resources necessary for an activity in a given period of time. Unit cost/Average cost means the total cost divided by the total number of units of output. Marginal cost is the cost of the additional unit of output.

Regarding the classification of costs Creese and Parker (1994) mentioned in their above mentioned book that, to estimate a program's costs classification of their components is necessary. A good classification scheme depends on the needs of the particular situation or problem, but three requisites apply: it must be relevant to the particular situation, the classes or categories must not overlap and the classes chosen must cover all the possibilities. They have mentioned different criteria of costs classification viz.: Classification by Inputs (e.g. capital costs, recurrent costs etc), Classification by Function/Activity(e.g. training, supervision, logistics/ transport etc),Classification by Level e.g. households, village, thana or district level where resources are used),Classification by Sources(the sources of resources i.e. who provides them e.g. the Ministry of Health, local government bodies, international donors etc) and Classification by Currency (i.e. what type of currency needed to procure the resources).

There are many other way of classification of costs and its depends on the objective and perspective of the classification.

2.6 Assignment and Allocation of Costs

In hospital cost analysis one can gather information about hospital's total costs and the sources of their payment and that information may provide useful insights even before start computing unit costs. However, to compute unit costs on must proceed to the step: assigning costs from each line item to the relevant cost centers. Some inputs can be assigned directly to certain cost centers. More often, inputs are used by several cost centers, and analyst must seek to assign spending for an input across those centers. Correct assignment is most important for those inputs, which account for a large share of costs, such as staff time and drugs (Shepard, Hodgkin and Anthony 1998).

The next step is to reallocate all indirect costs to the final cost centers. In this way, the unit costs will include overhead costs incurred in producing an admission, day or visit, not just direct costs. Indirect cost will include all cost, which could not be allocated directly to final cost centers at an earlier stage (Shepard, Hodgkin and Anthony 1998). The term 'overhead costs' is an accounting term for those resources that serve many different departments and programs, e.g. hospital administration, power etc. If individual programs are to be costed, these shared costs may need to be attributed to programs. A number of methods can be used to determine a more accurate cost of a program in a hospital or other setting where shared costs are involved (Drummond et al. 1998). Where each department's use of an indirect costs center is unknown one must devise some rule to allocate the indirect costs across departments. The rule is called an 'allocation basis', and is intended to reflect whatever factors determine each department's use of indirect (i.e. overhead and intermediate) cost center. The factor may differ depending on the center. For example cleaning services are often allocated according to each department's floor area, since more specious departments cost more to clean. Knowledge of one's own hospital may lead him to devise an allocation basis which predicts costs accurately, even if it has not been used elsewhere, and there is example of using number of air-

conditioning units to allocate water and electricity costs (Shepard, Hodgkin and Anthony 1998). The best way to allocate shared costs on a pro rata basis by using units of quantity that relate to that particular input and there is another way to allocate shared is to employ some proxy measure which indirectly indicates the relative importance of the cost of the intervention or activity in the total costs. For example, there are data on the total costs of electricity but the building is shared by several projects. Total electricity costs can be allocated in proportion to the ratio of vector control staff to total staff, or their share of total floor area (Philips, Mills and Dye 1993). There are examples of use of different allocation basis for allocating overhead and ancillary costs by different previous studies in different countries i.e. estimated actual use, air conditioning units, beds, days care, direct costs, floor area, personnel numbers, personnel costs, telephones, admission and/or OPD visits, days of care and/or OPD visits, estimates by employees, number of surgeries. A more rough and ready approach is to allocated all indirect costs based on a department's percentage share of direct costs. Recommended for use of this approach only when order data are not available for allocating indirect cost (Shepard, Hodgkin and Anthony 1998).

If detail consideration of costs is required, various methods for allocating costs are available, namely,

- 1) Direct allocation (ignores interaction of overhead departments). Each overhead cost (e.g. central administration) is allocated directly to final cost centers.
- 2) Step down allocation (partial adjustments for interaction of overhead departments). The overhead departments are allocated in a stepwise fashion to all of the remaining overhead departments and to final cost centers.
- 3) Step down with interaction (full adjustment for interaction of overhead departments). The overhead departments are allocated in a stepwise fashion to all of the remaining overhead departments and to final cost centers. The procedure is repeated a number of times (about three) to eliminate residual unallocated amounts.

- 4) Simultaneous allocation (full adjustment for interaction of overhead departments). This method uses the same data as (2) or (3) but it solves a set of simultaneous linear equations to give the allocations. It gives the same answer as method (3) but involves less work.

(Drummond et al. 1998)

Besides those methods Drummond et al.(1998) also mentioned about a simpler a but cruder approach of allocation. It can explained as follows:

- i) identify those hospital costs unambiguously attributable to the treatment or program in question. Allocate these directly and immediately to the program, then;
- ii) deduct, from total hospital operating expenses, the cost of departments already allocated above and departments known not to service the program being costed, then;
- iii) then allocate the remainder of hospital operating expenses on the basis of number of patient days.
- iv) finally, undertake a sensitivity analysis.

2.7 Output

Shepard, Hodgkin and Anthony (1998), further mentioned in their book 'Analysis of hospital costs: A manual for managers' that the computing of unit costs and analysis of costs depends on two key questions purpose of the analysis and types of data available. Ability to compute will be constrained by how aggregate or desegregate the available data are for both costs and utilization. For each final cost centers one must define unit of output (e.g. inpatient day, admission, visit). For inpatient care, the usual choices are inpatient day or admissions. For out patient care, number of visit is the unit of output. Within cost center, the unit of output must be readily counted and reasonably homogenous. Regarding data period thy mentioned that, one can analyze unit cost based on data for a single month, a quarter, or a year The data period chosen will depend first upon how the available data are organized. Sometimes important data such as utility (e.g. fuel, water, and electricity etc.) are only available on an annual basis, and to do a

quarterly analysis, one would have to make assumption use pattern within the year. In such situation, it may make more sense to analyze data for a whole year rather than for each quarter.

In their study ‘ Measuring Public Hospital Costs: Empirical Evidence from the Dominican Republic’ Lewis, La Forgia and Sulvetta (1996), have used unit of outpatient cost as the cost per visits.

In the study “ Methods of evaluating dental care costs in the Swedish public dental health care sector” Oscarson, Kallestal and Karlson (1998) have used average time cost as unit cost. They also mentioned that “ Choosing a method to calculate costs in economic evaluations of dental care is more question of purpose, availability of data, from what perspective the study is undertaken, and resources are measured. If only treatment time is known and there are no accurate data of which dental professional provided the dental care, average treatment time is preferred. If economic evaluation includes data on treatment time and the provider of dental care, this must be taken into consideration when choosing unit cost.”

2.8 Dental Care & WHO

The World Health Organization is giving priority and importance to dental care besides other important health problems. The WHO Oral Health Program is aimed at developing of standard data based planning, standard prevention of common oral diseases, complementary affordable treatment systems and production of appropriate personnel. During last several years emphasis has been given to collection for planning and monitoring of epidemiological data using WHO standards, and dissemination of data analysis results; promotion at all levels of the WHO oral health policy has been supported by five WHA resolutions recommending prevention and recognizing oral health as an integral component of primary health care (WHO, 1999).

2.9 Utilization of Health Care

Anderson (1968) mentioned the factors that influence persons to become patients and utilize a health care system can be classified into five broad categories. These are health status and need, demographic characteristics, physician availability, organizational characteristics of health care services and financing mechanism.

About utilization of health care Kawne and Killingsworth, (1995) mentioned that, other than price there are multiple factors to be taken into account that affect utilization, these are:

- i. the variable impact of illness in different age groups,
- ii. the effect of illness within the population,
- iii. the severity of illness and its variable impact, and
- iv. the combination of these factors

Prontep (1998) classified the factors affecting the utilization of health care by insured into four groups: firms that the insured belong to, socioeconomic factors, knowledge of the insured and satisfaction with services. There are many standard measures of utilization. Some experts listed more than one hundred different indexes or independent variables of measurement (Mauran and Eichhorn, 1978 cited by Hulka and Wheat, 1985). Gilson (1988) classified the factors influencing utilization into two main group: user characteristics and provider features and further mentioned that clearly they interact and their separate influences are often difficult to distinguish.

2.9.1 User characteristics

2.9.1.1 Socio-economic characteristics

Higher income status is possibly associated with greater demand for health care. Demand for medical care is relatively inelastic with respect to household income. The proportional change in demand is less than the proportional in income. Low income per capita is barrier to access to medical care. The association of higher income status with higher health care expenditures may reflect two things: the facts that the private care preferred by the rich is often more expensive than other forms of care and /or that higher

income status is associated with greater use of all providers. Utilization decision depends on socio-economic status associated with a mixture of influences of education, age, size of household, urbanization. It seems clear that differences in patterns of health care utilization by socio-economic group reflect both differences in economic status and attitudes.

2.9.1.2 Personal characteristics

Sex - in many Asian countries there is a documented bias against women in allocation of household resources which also influences utilization of health care by women and girls. In some countries there may be bias against men and boys.

Age- despite the bias against girls, children seem to be generally favored in utilization patterns.

2.9.2 Provider features

2.9.2.1 The price of care

Among other things, that cash price has little impact on the demand for health care. It was found that the charges were not a significant factor influencing the probability of visiting any facility. Utilization is based on the relative costs of services to the consumer and on the consumer's socio-economic status and limited service availability, relatively high cash price and low household income reduce utilization. Utilization differences between income groups and the range of treatment choices at different prices indicate that levying fees might prevent some groups from seeking government care. Increase in fees can lead to a reduction in utilization. The influence of cash prices on utilization will differ with the nature of service. The general impression that preventive is less popular than curative services with communities, low use of preventive services was associated with low-income level.

2.9.2.2 Physical access

Poor access to health care generates costs additional to the price of care. There may be transport costs, if transport facilities are available and used, and there will be time costs, possibly including a loss of income resulting from the time taken to seek care. Other time

costs waiting and consulting times represents one aspect of the quality of care offered by facilities. All the costs of care are assessed in choosing which provider to use. Poor access is often associated with lower use of care. Lower socio-economic groups have least access to transport facilities and so will travel less far for care. Where access is easier, it seems likely that all socio-economic groups will use services more. Access can be more important than price in determining utilization.

2.9.2.3 The perceived efficiency and quality of care

Overall, utilization will be influenced by the perceived efficiency and quality of care, especially where:

- the user is wealthy and price is determined by illness-causation beliefs
- the user is faced with a choice between a range of cash-priced and equally (in) accessible services
- the user knows from experience that there are substantial differences in quality between available providers and opts for high quality care despite its expense.

2.10 Utilization of Dental Services

Need for dental care can be defined as that quantity of dental treatment which expert opinion judges ought to be consumed over a certain time period for people to achieve the status of being dentally healthy (Spencer, 1980 cited by Burt and Eklund 1992). This definition establishes that dental need is a professional determination, it implies that "dental health" is also professionally determined and which is some times referred to in the literature as normative need. Need for an individual or population can be expressed as (a) individual items of care required; (b) total professional time needed for treatment; (c) the number of professionals needed for a particular time: or (d) of such care. Perceived need, also referred to as subjective need or felt need, is need determined by a patient or the public. Perceived need can often differ considerably from normative need: a dentist thinks the patient needs a root canal treatment followed by a crown when the patient wants the tooth extracted.(Burt and Eklund 1992). Demand for dental care is the expression by a patient or the public of a desire to receive dental care to attend their perceived needs (Jeffers, Bognanno and Bartlett, 1971 cited by Burt and Eklund 1992).

Utilization is the actual attendance by members of the public at dental treatment facilities to receive dental care. Utilization is expressed as the proportion of a population who attended a dentist within a given time, usually a year, or as the average number of visits per person made over a year. The later measure usually uses the whole population as denominator, so it is weighted by people who did not visit the dentist at all over the time in question (Burt and Eklund 1992).

2.10.1 Factors influencing the Use of Dental services

Burt and Eklund (1992) mentioned that the use of dental services is not spread over the population. In USA the profile of the most frequent user of dental services is of a white, female, income bracket, who enjoys good general health and has dental insurance. The factors that influence the utilization of dental services are : gender, age, socioeconomic status, race and ethnicity, geographic location, general health and dental insurance.

2.10.1.1.1 Gender

The statistics shows that in USA women using dental services more than men. This finding is so consistent over time, and so constant in all countries that have studied the issue (Gift, 1984 cited by Burt and Eklund 1992), that it seems virtually universal. But it is not easy to say why women use dental services more; numerous attempts to explore the issue have not come up with convincing explanations (Burt and Eklund 1992).

2.10.1.1.2 Age

The peak ages for dental visits have traditionally been the late teenage years and early adulthood, with gradual tailing-off with increasing age. Service use has always been relatively low in preschool years.

2.10.1.1.3 Socioeconomic Status

Socioeconomic status (SES) in the United States is usually measured by years of education and annual income, both of which are closely correlated. SES is directly related to use of dental services; higher the SES, greater the use of dental services. The close association between use of dental services and educational levels is obvious, and the

difference in the older age groups, is especially marked. The majority of edentulous people are in the lower educational attainment groups. Values and attitudes about dental care are naturally different among different socio-economic groups, and many of the poor are from backgrounds in which dental care was virtually nonexistent. More obviously, lower-SES groups are less able to afford care when it does exist, and since there are fewer dentists in lower-SES areas, care is usually less available. Dental insurance has made some difference to problem of affording care, but experience from a number of countries has long shown that even when the cost barrier is completely removed there are still marked differentials in use of dental services among the different socioeconomic groups.

2.10.1.1.4 Race and Ethnicity

In USA it was found that, there were 59.2% of white (non-Hispanic) Americans who reported visiting a dentist in 1986, compared to 43.6% of African-American and 47.1% of Hispanic Americans. Among the Hispanic groups, 40.3% of Mexican-Americans reported a visit within the last year, fewer than the 54.7% of other Hispanics [US Public Health Service, 1986]. It is likely that SES influences this differential seen among the different Hispanic populations. Continuing with that same theme, utilization data are not easy to interpret because race and ethnicity in the United States are inextricably related to wealth and poverty, education, cultural values, and residential location. Hispanics and African-American and have also suffered historically from deliberate exclusion from many care facilities, and there have been very few providers from these groups down the years. It seems most probable that SES factors have largely determined the use of dental services, and that middle-class African-Americans and Hispanics use dental services much the same way as anyone else does.

2.10.1.1.5 Geographic Location

Suburbanites are the most frequent users of dental services in the United States, 61.4% of them reporting a dental visit within the last year in 1986. There were 54.3% of central-city residents who reported a visit, and 52.3% of people out-side metropolitan areas [US Public Health Service, 1986]. Almost certainly these distribution are closely related to

SES and race/ethnicity, perhaps also to age and dentate status. There are also variations by region of the country, the northeast, midwest, and west are almost the same in term of utilization at just over 60% reporting a visit with in the last year, but the south is sharply bellow that level at 50.4%. The south has the lowest SES ranking of the four regions and also the most unfavorable dentist-population ratio, which probably are major factors in explaining this diversity.

2.10.1.1.6 General Health

It should not come as a surprise to find that more people who consider themselves in excellent health visit a dentist than do those who see themselves as in good or only fair health. Among those who considered themselves to in 'excellent' health, 62.3% reported a visit during 1986[US Public Health Service, 1986], compared to 50.8% who thought their health was "good" and 38.9% who classed it as "fair or poor". Distributions of a similar nature were found among those who had no restriction of activity compared to those who were limited to some degree. These findings are hardly unexpected, because people whose mobility is restricted quite naturally would find getting to a dentist more difficult. Those in poor general health may be too preoccupied, or too restricted generally, to faced the dentist. These questions also are likely to be related to age and perhaps.

2.10.1.1.7 Dental Insurance

It is also hardly surprising that more people with dental insurance visit a dentist than do people without. The 1986 data of USA showed 70.1% of those with private dental insurance visited a dentist within the last year, compared to 49.9% of those without. These differences are to be expected because dental insurance can substantially reduce the financial burden of dental care.

2.11 Dental personnel

The concepts of dental team encompasses the various providers of dental care who have different roles, functions and period of training, and who combine to treat patients. The dental team can mean different things under different circumstances, such as whether all its members operate under the direct control of a dentist or not. Although it has been

promoted for years by the World Health Organization (WHO, 1959), the dental team remains a concept rather than a precise team. In the United States, the dental profession has long recognized that several different categories of personnel are fundamental to the efficient provision of care. Over 97% of dentists employ at least one non-dentist staff person; almost 65% of general practitioners employ at least one full or part time hygienist (American Dental Association, 1989).

2.11.1 Types of Dental Personnel

A **dentist** is a person licensed to practice dentistry under the laws of appropriate state, province, territory, or nation. These laws ensure that to become licensed a prospective dentist must satisfy certain requirements, such as (a) completion of a specified period of professional education in an approved institution, (b) demonstration of competence, and (c) evidence of satisfactory personnel qualities. Dentists are concerned with the prevention and control of the diseases of the oral cavity and the treatment of unfavorable conditions resulting from these diseases, from trauma, or from inherent malformations. They are legally entitled to diagnose and treat patients independently, to prescribe certain drugs, and to employ and supervise auxiliary personnel.

Dental auxiliary is a generic term for all persons who assist the dentist in treating patients. It includes the categories of dental assistant, dental hygienist, assistant or hygienist with expanded functions, dental laboratory technician, receptionist, and secretary. Auxiliaries can be classified as operating and nonoperating (WHO, 1967), depending on whether they carry out any intra-oral procedures in the direct treatment of patients. With rare exceptions, auxiliaries of all types operate under varying degrees of supervision by dentists.

A **dental hygienist** is an operating auxiliary licensed and registered to practice dental hygiene under the laws of appropriate state, province, territory, or nation. In nearly all jurisdictions, in order to be licensed, hygienists, like dentists, must satisfy certain requirements, such as (a) completion of a specified period of professional education in an approved institution, (b) demonstration of competence, and (c) evidence of satisfactory

personnel qualities. Hygienists are recognized auxiliaries in a number of countries in which their duties and deployment are essentially similar. Dental hygienist have traditionally been concerned with prophylaxis (or "cleaning" teeth), the health of the supporting structures of the teeth, and prevention of further diseases by direct clinical procedures and by the education of individual patients and groups.

The **expanded-function dental auxiliary (EFDA) or expanded-function dental auxiliary (EDDA)** is a more recent development in operating auxiliaries in the United State and Canada. An EFDA is usually a dental assistant or a dental hygienist in some, cases who has received further training in duties related to the direct treatment of patients, though still working under the direct supervision of a dentist.

The **dental laboratory technician** is a nonoperating auxiliary who fulfils the prescriptions provided by dentists regarding the extra oral construction and repair of oral appliances.

A **dental assistant** is a nonoperating auxiliary who assist dentist or dental hygienist in treating patients but who is not legally permitted to treat patients independently. Traditionally, their duties include immediate chair-side assistance in the handling of dental equipment and material used by the dentist or dental hygienist in treating patients.

Denturist is a term applied to those dental laboratory technicians who are permitted in some states in some states in the United States, Some provinces of Canada, in some other countries to fabricate dentures directly for patients with out a dentist's prescription. These denturists must be licensed and registered.

Dental nurse and dental therapist are more-or-less synonymous terms that describe an operating auxiliary who in some countries is legally permitted to treat special population groups, usually children, with little direct supervision from a dentist. The extent of their duties varies from one system to another, as the degree of supervision required, but all dental nurses and therapists require specific training, licensure, and registration.

Preventive dental nurses/therapists are trained in some countries to provide preventive services only usually in a school dental service and they can provide preventive service to specific groups at lower cost than can dentists or hygienists.

2.12 Dental Personnel: Shortage or Surplus?

Whether anywhere the dental personnel are insufficient or surplus? The answer to this question is a matter of debate. Burt and Eklund (1992) tried to find the answer, they start their discussion by mentioning mentioned that, dentist with unfilled appointment books say "too many dentists," while public agencies frequently hear of people unable to receive care and of towns with an insufficient number of dentists. After reviewing many literatures, past records and statistics they conclude by saying that

"The dentist: population ratio has peaked and will decline slowly over the coming decade, yet one hesitates to assert that the resulting number of dentists will be enough, too few, or too many - and judge by whose standards?"

So is clear that the question of shortage or surplus of dental personnel is a subjective or relative question and there is no short cut answer to this question.

2.13 Measuring Dental Personnel Requirements

The supply of dentists traditionally has been measured by the dentist -to-population ratio. Apart from the problem of determining whether active, practicing, or all dentists are being counted, this measure is simple, usually easy to compute with a fair degree of accuracy, and is useful for comparative study. Similar ratios have been used for years in measuring personnel supply in many other areas. In USA the ratios of health professional to population have been used to set national policy, in framing the Health Professions Education Act of 1963. It is nevertheless well recognized that crude dentist: population ratios must be interpreted with caution. If it can assumed that need for care is equivalent between two places, then it is reasonable to assume that the number of dentists that is adequate in one place would also be adequate for other place. These are broad assumptions, however, so it is not surprising that there is dissatisfaction with as a measure of personnel needs (ADA, 1984 and Moen, 1959). First, dental need is not evenly distributed in a race, and other demographic variables are associated with disease.

As these characteristics are unevenly distributed between areas, so is dental need. Second, demand for care is affected by education, income, dentate status, geographic location, and availability of insurance. Where there are substantial difference in these characteristics between areas, use of dental care will also be unequal, regardless of dental need and availability of care. Finally, ratios assume constant productivity of dentists, quality of care, and mix personnel. In fact, all three measures are dynamic, making a dentist: population ratio that was appropriate at one time and place unsuitable in another. The two other most commonly used approaches to estimating personnel needs are demand-based and need-based models. The demand based approaches are comes from economic theory, and aims to make forecasts of the quantity of dental care that people will actually consume. The price and supply of services are key components of these models. Through, such models it is possible to estimate how issues such as changes in insurance coverage, number of dentists, and population growth will affect the provision of dental care. A primary criticism of many of the demand-based models is that few of them have explicitly included dental need, especially future projections of changes in need.

Need-based approaches to personnel requirements come from a philosophically different direction. Need-based models start from measurements of oral need in the population, from which estimates are then derived of how much treatment is added across the entire population, and from that an estimate the number of required provider-hours of care can be determined (WHO, 1989). A problem with the need-based approach is that both the accumulated backlog of need as well as estimates of future disease must included. Other inherent difficulties are that dentists can treat the same condition in different ways, and that demand is often poorly related to need. Demand for some types of care, cosmetic restorations for example, is difficult to predict, which complicates the need-based approach even further.

Two additional approaches that combine elements of both need and demand are microsimulation (Orcutt, Caldwell and Wretheimer 1976) and system dynamics (Forrester, 1969). Although both require large quantities of data, a detail understanding of

process that underlie need and demand, and considerable computing resources to work well, they have potential to add to our understanding of the dynamics of dental care. Whatever approach is used, however, value judgement are still needed to weigh the uncertainties in the forecasts and to reach decision on what the goals should be how they should be achieved.

2.14 Quality of Service

The quality of services is one of the important issue in health care delivery. Mokhtar. Al-Torkey and Khalaf (1992 cited by Ahmed 1994) describe the factors determining the quality of care. Satisfaction with the physicians was the most determinant of overall satisfaction, followed by satisfaction with the house keeping and with nurses. Satisfaction with hospital environment, hospital facilities and with admission process were also significant, while satisfaction with food and radiology services do not affect overall satisfaction as well as satisfaction with specific dimension of hospital services were quite high. Physicians care was the most favorably rated dimension, followed by admission process and housekeeping, while nursing care was least favorably rated dimension. Among the attributes of physicians and nurses' care, technical care, and courtesy were the most favorably rated items; while communication, particularly imparting of information was the least favorably rated aspect. Several attributes of the hospital environment and facilities and of food services were found to be dissatisfying to patients.

Brut and Eklund (1992) has discussed about the quality of care and especially the quality of dental care and they started their argument by quoting the definition of quality from Webster' s New Collegiate Dictionary that define quality as " degree of excellence". They also mentioned the definition of quality assessment given by ADA as the "measure of the quality of care provided in a particular setting". The term quality assurance is defined as " the assessment or measurement of the quality of care and implementation of any necessary changes to either maintain or improve the quality of care rendered." One approach to quality assessment and quality assurance builds on the concepts of structure, process, and outcome. It is based on the idea that while the outcome is more likely if the structural arrangements, such as well-designated treatment facilities, proper equipment,

appropriate and properly trained staff, meet adequate standards. A good outcome come is also more likely if the process used such as diagnostic methods, treatment planning, record keeping and treatment procedures themselves follow recognized protocols. Dental practice assessment procedures that follow recognized protocols. Dental practice assessment that procedures that follow this model have been developed lists examples of some of the dimensions that can be assessed under approach..

Table 2.2: Indices for Assessments of Quality of Dental Care Services

Structure	Process	Outcome
Facilities	Management	Patient satisfaction
setting	practice	Oral health status
physical structure	personnel	oral hygiene
layout	patient	tooth loss
amenities	Records	periodontities
access	content	carries
Equipment	completeness	Completion of treatment
operatories	availability	timely
instruments	legibility	appropriate
supplies	Diagnosis	Recall pattern
sterilization	appropriateness	frequency
Personnel	documentation	needs at recall
appropriate type	thoroughness	
training	Treatment plan	
licensure	sequencing	
certification	appropriateness	
continuing education	Treatment	
Administration	appropriateness	
procedure	timeliness	
record system		
protocols		

(Source: Burt and Eklund 1992).

These many dimensions of quality can present problems, because one can disagree as to whether quality has been attained when they are focusing on different dimensions. Further, the same level of technical quality may be commendable in one setting and inappropriate in another. One more develop types of quality assessment is at the level of technical quality of restorative procedures. Explicit and detail criteria have been developed and widely tested to classify individual restorative procedures as acceptable or unacceptable, and to identify specifically the reasons for unacceptability. By developing an objective understanding of reasons for technical failures, clinicians are more likely to be able to produce superior restoration in future. Other dimensions that are frequently

mentioned, in addition to technical restorative procedures, are appropriateness of care, access to care, cost of care, and patient satisfaction.

2.15 Health Policy, Goal, Target and Government Directive

Public policy is the sum of the decisions that shape society. It provides a framework for the development of, for example industrial and agricultural production, corporate management, and health services. Public policy is a major determinant of the health of the population. Health policy usually refers specifically to medical care issues, but health is influenced by a broad range of policy decisions, not just those in the medical or health field. A true health policy should therefore provide a framework for health-promoting actions in the general economy of a community as well as in agriculture, industry, labor, energy, transport and education. In 1986 the Ottawa Charter for Health promotion made it clear that health is influenced a wide range of policy decisions. Health policy is not simply the responsibility of health departments. Policy decisions by a wide range of agencies, both governmental and non-governmental, have a significant impact on health (Beaglehole, Bonita and Kjellstrom 1997) Tanner(1999) mentioned that, to apprise a health care system the following matters could be considered

Table 2.3: Indices for Appraisal of a Health Care System

HEALTH POLICY	<ul style="list-style-type: none"> ▪ STRUCTURE/DECISION -MAKING ▪ BUDGET-ALLOCATION
SOCIAL-ECONOMIC ONTEXT	<ul style="list-style-type: none"> • GNP ▪ % OF GNP FOR HEALTH • POPULATION GROWTH • HOUSING • FOOD ▪ EDUCATION
PROVISION OF CARE	<ul style="list-style-type: none"> • STRUCTURES • ACCESSIBILITY • AVAILABILITY • UTILIZATION • QUALITY OF CARE
COVERAGE	<ul style="list-style-type: none"> • UNDER 5 POPULATION • WOMEN AND OTHER RISK GROUPS • ANTENATAL CARE • IMMUNIZATION
HEALTH STATUS	<ul style="list-style-type: none"> • IMR • CHILDHOOD-MR • NUTRITION

(Source: Tanner 1999)

To appraise primary health care (PHC) in a selected country he has given emphasis on some factors these are policy on PHC, guidelines and main emphasis/comments, health district concept, links between government- private-NGO, links to traditional services, legislation, regular evaluation, resource allocation and equity strategies.

So it is clearly understandable that public policy, guideline, resource allocation, coverage (target), legislation, equity etc are an important factors in appraising a health care system or health program and considering the fact there were many policy decisions were adapted international and national level. Among different policy decisions the Declaration of Alma-Ata (WHO/UNCEF, 1978) was redial break with conventional thinking. The international conference in Alma-Ata recognized PHC as an essential health care based on practical, scientifically, sound and socially acceptable methods and technology, made universally accessible to individuals and families in the community and country can afford to maintain at every stage of their development in the sprit of self-reliance and self determination (Edited by Cynthia 1997). WHO's decision, policy, goal on oral health is mentioned in the introduction. Besides international level there many countries specially the developed countries have own oral/dental health care policy, targets, goal, legislation. The examples of few countries is given in the bellow.

Table 2.4.:Examples of Dental Policy/Legislation/Target/Strategy of Some Countries

Country	Policy/Legislation/Target/Strategy
UK	<ul style="list-style-type: none"> • Policy document issued by the Dental Strategy Review Group DSRG (an ad hoc professional group set up by the Secretary of State in 1981) reviewed the role of primary dental services and questioned the way in which services to children were provided. In particular it recommended that as far as possible children should be treated in the general dental service, as opposed to the Community Dental Service (CDS). • The 1990 NHS and Community Care Act • Policy to wards the millennium: In 1994, the Department of Health published an oral health Strategy which has set a targets as 'by the year 2003 seventy percent of 5 year children should have had no carries experience'
The Netherlands	<ul style="list-style-type: none"> • To reduce unemployment of dentists 1985 the Ministry of Education decided to reduce enrolment capacity for dentist to only 120 student a year. At that time dentist population reached to 1: 3250. • In 1995, the government introduced a new system of insurance for dental care. Until 1994, 62% of the Dutch population was compulsorily insured with NHI (National Health Insurance) but from 1995 NHI includes only treatments.
In Nordic countries	<ul style="list-style-type: none"> • Legislation on School Health Service in 1917, The Public Dental Service in 1938 & 1949, School Dental Care in 1956, to improve access. • The Children Dental Care Act and act on Public Health Care in 1972 and act on Dental Care in 1984 for equal access. • Act on Dental Care in 1986 & 1987 for equality of oral health.
These are example of some of the policies, laws, targets, strategy about oral or dental health in some countries	

Source: Community Oral Health(1997) edited by Cynthia 1997