Conceptualizing the Consequences of Chronic Arsenicosis
Impairment, Disability & Handicap

There needs to be a clear definition of the impact of chronic arsenicosis in order to examine its social, environmental and biological determinants and consequences. A conceptual framework is also required to establish links between the biological and social consequences. The WHO's International Classification of Impairment, Disability & Handicap (ICIDH) was considered an appropriate tool to start with. Correlating the distribution and extent of impact with biological and social factors can lead to the determinants.

WHO defined health as a state of complete physical, mental and social well being and not merely absence of disease or infirmity. But this definition cannot explain the dynamics of health. In fact health cannot be a state, it is an ongoing process where normal life, disease, illness and sickness co-exist [Park 1997].

Concept of Disease

There have been many attempts to define disease. Webster defines disease as "a condition in which body health is impaired, a departure from a state of health, an alteration of the human body interrupting the performance of vital function." [Webster 1988]. The Oxford English Dictionary defines disease as "a condition of the body or some part or organ of the human whose functions are disrupted or deranged."[Oxford Dictionary]. From ecological point of view, disease is defined as "a mal adjustment of the human organism to the environment" [Gregg Alan 1956]. From a sociological point of view, disease is considered a social phenomenon, occurring in all societies [Suchman 1963] and defined and fought in terms of the particular cultural forces prevalent in the society. The simplest definition is, of course, that disease is just the opposite of health – i.e. any deviation from normal functioning of state of complete physical or mental well-being since health and disease are mutually exclusive. These definitions are considered inadequate because they do not set a criterion to decide when a disease state begins, nor do they lend themselves to measurement of disease.

The WHO has defined health but not disease. This is because disease has many shades (spectrum of disease) ranging from in-apparent (sub clinical) cases to severe illness. Some diseases commence acutely (e.g. food poisoning) and some insidiously (e.g. mental illness, rheumatoid arthritis), in some diseases, a "carrier" state occurs in which the individual remains outwardly healthy, and is able to infect others (e.g. typhoid fever). In some instances, the same organism may cause more than one clinical manifestation (e.g. streptococcus). In some cases, the same disease may be caused by more than one organism (e.g. diarrhoea). Some diseases have a short course, and some a prolonged course. It is easy to determine illness when the signs and symptoms are manifest, but in many diseases the borderline between normal and abnormal...
is indistinct as in the case of diabetes, hypertension and mental illness. The end point or final outcome of disease is variable – recovery, disability or death of the host [Park 1997].

Distinction is also made between the word disease, illness and sickness, which are not wholly synonymous. The term “disease” literally means “without ease” (uneasiness) – dis-ease, the opposite of ease – when something is wrong with bodily function. “Ill ness” refers not only to the presence of a disease, but also to the individual’s perceptions and behavior in response to the disease, as well as the impact of that disease or the psychological environment [Ouslander 1982]. “Sickness” refers to a state of social dysfunction. Susser has suggested the following usage [Susser NW 1971]: Disease is a physiological / psychological dysfunction. Illness is a subjective state of the person who feels aware of not being well. Sickness is a state of social dysfunction i.e. a role that the individual assumes when ill (“sickness role”). However, the clinicians see people who are ill rather than the disease, which he must diagnose and treat. In short, an adequate definition of disease is yet to be found – a definition that is satisfactory or acceptable to the epidemiologist, clinician, sociologist and the statistician [Le Riche WH 1971].

Till early 20th century, the curative approach was main approach in control diseases. Although, number of preventive measure had been taken by states like sanitation measure, enactment of public health laws, quarantine, and vaccination and so on. Existing disease pattern was one reason for undertaking such measure. By and large number of morbidity and mortality attributed to infectious disease and common notion of outcome of the diseases was either recovery or death.

Later disease patterns started changing in the world (specially in western world), which had been evidenced by shifting from acute infectious disease to chronic non-infectious disease, less mortality by infectious disease due to improved nutrition and curative technological advancement. This has also led to gradual increase in prevalence of residual effects of diseases (also due to reduced mortality). Advent of new diseases and existence of old diseases made the disease pattern even more complex. Moreover, in organization and planning of a health care delivery system as well in administrative work, compartmentalization of diseases was needed for efficient and smooth functioning [Thomas McKeown 1977].

Thus, International Classification of Diseases (ICD) emerged out of the need to provide a valuable and relevant means for studying health experience and underlying cause concept. As mentioned earlier, the acute infections when come under control, other diseases assume a greater importance. As long as the latter are life threatening, the simple indicators such as mortality continue to be valuable; so that ICD terms retain their usefulness for evaluation. However, as technological power is developed, the situation changes, ICD terms no longer reflect outcome goals. ICD is essentially based on the medical model of illness i.e. etiology → pathology → manifestation [WHO, 1977, 1980, 1993] and could not address the consequences of disease.
This feature is more prominent with chronic illness. The onset is usually insidious; there may be a gradual progression of symptoms, or more permanent problems may develop as the sequel to a number of acute episodes. [WHO, 1980].

The challenges for health care changed, as chronic illness come to occupy a more dominant position. The sufferers themselves, the health professionals concerned to help them and the policy makers and planners encountered difficulties in coming to terms with the consequences of disease. The confusion that all three groups share stems largely from the lack of a coherent scheme or conceptual framework against which to set such experiences.

The concept of disability started before development of the concept of ICD. Disability policy scholars describe four different historical and social models of disability. [Nagi SZ 1976, Jette A 1997, Marks D 1997, Deborah Kaplan 2002]

- **Moral Model**: A moral model of disability, which regards disability as the result of sin. This model is historically oldest and less prevalent today. However, there are many cultures that associate disability with sin and shame and disability is often associated with feeling of guilt, even if such feelings are not overtly based in religious doctrine. Even in less extreme circumstances, the model has resulted in general social ostracism and self-hatred.

- **Medical Model**: The medical model came about as "modern" medicine began to develop in the 19th century along with the enhanced role of the physician in society. Since many disabilities have medical origins people with disabilities were expected to benefit from coming under the direction of the medical profession. Under this model; the problems that are associated with disability are deemed to reside with in individual. In other words, if the individual is 'cured' then these problems will not exist. Society has no underlying responsibility to make 'place' for persons with disabilities, since they live in an outsider role waiting to be cured. This model has major problem in considering the disabled as sick and thus affects the social security system. It is also the source of enormous problems for persons with disabilities who want to work but who would risk losing all related benefits, such as health care coverage or access to personal assistance service, since a person loses one's disability status by going to work.

- **Rehabilitation Model**: it is similar to medical model, it regards the person with a disability as in need of services from a rehabilitation professional who can provide training, therapy, counseling or other services to make up for the deficiency caused by the disability. Persons with disabilities have been very critical of both the medical model and the rehabilitation model. While the individual can require medical intervention at times, it is naïve and simplistic to regard the medical system as the
appropriate locus for disability related policy matters. Many disabilities and chronic medical conditions will never be cured. Persons with disabilities are quite capable of participating in society and the practices of confinement and institutionalization that accompany the sick role are simply not acceptable.

- *Disability Model*: this model regards disability as a normal aspect of life, not as a deviance and rejects the notion that persons with disabilities are in inherently 'defective'. Most people experience some form of disability, either permanent or temporary, over the course of their lives. Given this reality, if disability were more commonly recognized and expected in the way that we design our environments or our system, it would not seem so abnormal. The disability model recognizes social discrimination as the most significant problem experienced by persons with disabilities and as the cause of many of the problems that are regarded as intrinsic to the disability under the other models.

United Nations (WHO) developed a model of disablement in 1980, known as International Classification of Impairments, Disabilities and Handicaps (ICIDH). ICIDH is a manual issued by the WHO in 1980 as a tool for the classification of the consequences of disease, injury and disorder and for analysis of health related issues. The ICIDH was designed to provide a framework to organize information about consequences of disease. Classification of diseases fails to capture the variety of experience of people who live with various health conditions, and ICIDH was designed to fill the gap. In other words, ICIDH was developed as an extension of the International classification of Diseases (ICD) and provides a detailed classification system for three concepts: impairments, disabilities and handicaps.

Apart from ICIDH, there are other models like Nagi model or National Center for Medical Rehabilitation Research (NCMRR) model. But these are essentially based in USA and developed in US context. On the other hand, WHO's ICIDH has been used and experimented in different parts of the world. ICIDH is not a finished system and a considerable amount of work is currently being devoted in improving certain aspects of the system. The flexibility of the system and possibility of adapting it to specific problems and contexts allowed us to adopt it in the present research on social epidemiology of arsenic poisoning.

**International Classification of Impairments, Disabilities and Handicaps (ICIDH)**

ICIDH deals with appraisal of the magnitude of the problem, testing relevant concepts, examination of methods for ascertainment and assessment, explanation of nature of associated experiences, development of appropriate information system and derivation of directory of...
services for people with disabilities – which all are under realm of social epidemiology and its application. The disablement and handicap are outcomes of interaction between health condition and contextual factors. The interaction is complex, bi-directional and dynamic and occurs within and by means of contextual factors. Two sorts of contextual factors are identified: social and physical environmental factors (social attitudes, architectural characteristics, legal and social structures, as well as climate, terrain and so forth) and personal factors that include gender, age, other health conditions, coping styles, social background, education, profession, past and current experience, over all behavioral pattern, character style and other factors that influence how disablement is experienced by the individual. All these factors are essential components of social epidemiological research.

WHO’s ICIDH described ‘four planes’ of disease experience in the sequence given below.

Something abnormal occurs within the individual; this may be present at birth or acquired later. A chain of causal circumstances, the "etiology," gives rise to changes in the structure or functioning of the body, the "pathology". Pathological changes may or may not make themselves evident, when they do they are described as "manifestations", this is expressed in attitude: such as the engendering of stigma; or in behaviour; which may include specific instruments such as legislation.

The last three planes in this sequence – exteriorization, objectification and socialization were given three nomenclature i.e. impairment, disability and handicap respectively [WHO, 1980, Philip HN Wood 1989].

According to WHO, thus disease or disorder (which is intrinsic situation) is followed by three consequent planes i.e. impairment, disability and handicap.

\[
\text{Disease or Disorder} \quad \rightarrow \quad \text{Impairment} \quad \rightarrow \quad \text{Disability} \quad \rightarrow \quad \text{Handicap}
\]

\[(\text{Intrinsic situation}) \quad \rightarrow \quad (\text{Exteriorized}) \quad \rightarrow \quad (\text{Objectified}) \quad \rightarrow \quad (\text{Socialized})\]

WHO adopted this concept from the work of Phillip H N Wood (from Arthritis and Rheumatism Council Epidemiology Research Unit, Manchester, England) and his colleagues and used in the conjunction with the Ninth Revision of the International classification of Diseases (ICD-9) [Khuzama Shaas 1994].

Impairment is defined thus "In the context of health experience, an impairment is any loss or abnormality of psychological, physiological or anatomical structure or function". [WHO, 1980]. It is characterized by losses or abnormalities that may be temporary or permanent; and it includes the existence or occurrence of an anomaly, defect or loss in a limb, organ, tissue or other structure of the body including the systems of mental functioning. Use of the term "impairment" does not necessarily indicate that disease is present or that the individual should be regarded as sick. On the same ground, a concept of latent impairment constitutes a contradiction in terms –
the individual exposed to or harboring an extraneous etiological agent of disease is not impaired; impairment ensues only when the agent has initiated a reaction by the body so that pathological processes develop. [WHO 1980, Khuzama Shaas 1994, Philip HN Wood 1989]

For the ICIDH, disability has been defined thus, "in the context of health experience, a disability is any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or with in the range considered normal for a human being". As normal human activity is context specific (depending upon, social, cultural, economic, personal and physical environment), the nature and extent of disability varies according to the situation. Impairment is concerned with individual function of the parts of the body. Disability on the other hand is concerned with compound or integrated activities expected of the person or of the body as a whole, such as is represented by tasks, skills or behaviour. Disability represents a departure from the norm in terms of performance of the individual, as opposed to that of the organ or mechanism. The concept is characterized by excesses or deficiencies of customarily expected behavior or activity, and these may be temporary or permanent, reversible or irreversible, and progressive or regressive. The key feature relates to objectification. This is the process through which a functional limitation expresses itself as a reality in everyday life, the problem being made objective because the activities of the body are interfered with. Disability takes form, as the individual becomes aware of a change in his identity. Customary expectations embrace integrated functioning in physical, psychological and social terms and it is unrealistic to expect a neat separation between medical and social aspects of activity. [WHO, 1980, Khuzama Shaas 1994, Philip HN Wood 1989, Marijke Kleijn-de Vrankrijker 1989, Judith G Greenword 1985, David Memel 1996]

The ICIDH defines handicap as "in the context of health experience, a handicap is a disadvantage for a given individual, resulting from an impairment or a disability, that limits or prevents the fulfillment of a role that is normal (depending on age, sex, and social and cultural factors) for that individual."

ICIDH manual mentioned three features of this concept
i) Some value is attached to departure from a structural, functional, or performance norm either by the individual himself or by his peers in a group to which he relates.
ii) The valuation is dependent on cultural norms, so that a person may be handicapped in one group and not in another – time, place, status and role are all contributory.
iii) In the first instance; the valuation is usually to the disadvantage of the affected individual.

The state of being handicapped is relative to other people – hence the importance of existing societal values, which, in turn, are influenced by the institutional arrangements of society. Thus, the attitudes and responses of the non handicapped play a central role in modeling the ego concept, and defining the possibilities of an individual who is potentially handicapped – the latter
has a very limited freedom to determine or modify his own reality. In this context, it is relevant to take note of differences in societal responses to visible as opposed to invisible impairments and to serious as opposed to trivial disadvantages.

Handicap is characterized by discordance between the individual's performance or status and the expectations of particular group of which he is a member. Disadvantage accrues as a result of his being unable to conform to the norms of his universe. Handicap is thus a social phenomenon, representing the social and environmental consequences for the individual stemming from the presence of impairments and disabilities [WHO, 1980, Khuzama Shaas 1994, Philip HN Wood 1989, Marijke de Kleijn-de Vrankrijker 1989, Mervyn Susser 1990].

Integration of Concepts

The aforementioned concepts are represented in simple linear progression along their full sequence. But the situation is in fact more complex. In the first place, handicap may result from impairment without the mediation of a state of disability.

A disfigurement may give rise to interference with the normal operation of cues in social intercourse. Another example, an individual with red green color blindness has an impairment, but it would be unlikely to lead to activity restriction, whether the impairment constitutes a handicap would depend on circumstances – if his occupation were agricultural he might well be unaware of his impairment, but he would be at a disadvantage if he aspired to drive a railway engine, because he would be prevented from following this occupation [WHO 1980, Khuzama Shaas 1994].

It is worth to note that Mervyn Susser, a noted epidemiologist, who was one of the pioneers in working on “Disease Experience” stated, the new concept of Impairment, Disability and Handicap were actually analogous to Susser's earlier concept of Disease, Illness and Sickness [Mervyn Susser 1990]. According to Susser, “Impairment – analogous with disease, refers to a stable and persisting defect in the individual at the organic level which stems from know or unknown molecular, cellular, psychological or structural disorder. Disability – analogous with illness, refers to stable and persisting, physical, psychological dysfunction at the personal level, by necessity again confined to the individual, the dysfunction stems from the limitations imposed by the impairment and by the individual psychological reaction to it. Handicap, like sickness refers to persisting social dysfunction, a social role assumed by the impaired or disabled individual that is assigned by the expectations of society. Handicap stems, that is, not from the individual but from social expectations, it follows from the manner and degree in which expectation alter the performance of social roles by impaired and disabled persons.” [Mervyn Susser 1990]
There are two other phenomena, which increase the complexity in relation among the experience (impairment, disability and handicap). First, certain disabilities can retard or conceal the development or recognition of other abilities, thus, an impairment of language can interfere with the expression of other and dependent qualities, such as intelligence. This phenomenon is equally applicable with disabilities also for example, simple gripping disability may lead disability of carrying, eating even of climbing (if ladder is used). Secondly, there can be available degree of influence in a reverse direction along the sequence. Thus, as part of illness behaviour the experience of certain handicaps can engender not only various disabilities but at times even the impairments of certain faculties. [WHO, 1980].

The concept of consequences of disease gradually started gaining acceptance among policy makers, professionals and researchers. But in attempting to apply this conceptual framework for the consequences of disease, two related difficulties appeared – i.e. related to terminology and deviation from norm.

**Terminology**

A major reason for the lack of information about the disabled in society is that various agencies concerned have not shared a common unambiguous definition of what constitutes disablement, impairment and limitation. Most of the terms over which confusion arises have been used with common-sense meaning in every day speech and writing. The underlying problem has been that concepts relating to disability and disadvantages have been insufficiently explored, and as a result no systematized language usage specific to these concerns has developed [WHO, 1980, Mervyn Susser 1990].

WHO initiated to transform this state of affairs. Two successive initiatives were taken (from 1975) in order to make preferred nomenclature. The definitions of impairment, disability and handicap are one of the outcomes. In addition to that, to make clearer semantic distinctions, two levels of effort had been seen.

i) Avoidance of the same word to identify impairment, a disability and a handicap like mental retardation, mental disability and mental handicap blur the distinction.

ii) Use of different parts of speech seemed to be appropriate. For the quality represented by impairments on adjective derived from a substantive is apposite, but for the activities included as disabilities a participle was deemed more suitable, the "-ing" ending emphasizing the dynamic aspects. Like –

<table>
<thead>
<tr>
<th>Impairment</th>
<th>Disability</th>
<th>Handicap</th>
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<tbody>
<tr>
<td>Language</td>
<td>Speaking</td>
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<tr>
<td>Hearing</td>
<td>Listening</td>
<td>Orientation</td>
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<td>Vision</td>
<td>Seeing</td>
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<tr>
<td>Skeletal</td>
<td>Dressing, feeding, walking</td>
<td>Physical Independence, Mobility</td>
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<tr>
<td>Psychological</td>
<td>Behaving</td>
<td>Social integration</td>
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Classification of impairment

Impairment is classified as functional consequences of the disease. For example breathing difficulty or shortness of breath is an impairment caused by TB or arsenic poisoning (Impairment code i.e. I code 61.0) or pigmentation/ de-pigmentation due to arsenic poisoning or any other cause (I code 87.0). Therefore, impairment denotes pathological process of any organ or system of body. Hence impairment has been classified on the basis of signs and symptoms due to pathology of any organ or system.

According to ICD -- 10 (10th revision of ICD), Arsenic poisoning belong to 19th major Chapter (between S 00 – T 98). [WHO, 1980, Park 1997].

Classification of Disability

Disability (D) Code has been designed to encompass the more important behaviors and activities associated with everyday life. The key influence in designing this classification has been the feasibility of recording the interface between an individual and his environment in such a way as to display his potential; this may be supplemented by the handicap classification as a means of indicating the extent to which potential is realized. The ideal aim for the D Code was to present a profile of the individual’s functional abilities, as determined by his disabilities in such a way that reciprocal specification of the environment allowed matching with the individual’s capabilities. Therefore, D-Code was required to eliminate much of the complexity and detail present in conventional assessment such as those of the activities of daily living. Only in this way could simple procedures be developed. The actual assessment procedures may need to retain their complexity but, as in the I Code, this additional detail could be incorporated in the D Code more as a means of clarifying the content of broader classes [WHO, 1980].

There is one important difference in the classification of disabilities from both the ICD and the I Code – disabilities are not threshold phenomena; they reflect failures in accomplishments, so that a gradation in performance is to be expected. Provision has therefore been made for recording the degree of disability, which is termed as severity scale category. All disabilities follow the same severity scale category. [WHO, 1980].

Classification of Handicap

It is important to recognize that the handicap classification is neither taxonomy of disadvantage nor a classification of individuals. Rather it is a classification of circumstances in which disabled people are likely to find themselves, circumstances that place such individuals at a disadvantage compared to their peers when viewed from norms of society.
The degree of disadvantage attached to reduced competence may vary appreciably in
diverse cultures, but some adverse valuation is almost universal. The key accomplishments
include the ability of the individual to –

i) Orient himself in regard to his surroundings and respond to these inputs.

ii) Maintain an effective independent existence in regard to the more immediate physical
    needs of his body, including feeding and personal hygiene.

iii) Move around effectively in his environment.

iv) Occupy time in a fashion customary to his sex, age and culture, including following an
    occupation or carrying out physical activities such as play and recreation.

v) Participate in and maintain social relationships with others.

vi) Sustain socio-economic activity and independence by virtue of labor or exploitation of
    material possessions, such as natural resources, livestock or crops. [WHO, 1980]

These six dimensions may be designed as survival roles and the handicap classification
has been done using this analysis as a base. Survival roles have the merit of being broadly trans-
cultural, in fact, disturbance of orientation, physical dependence, immobility, restricted occupation,
social isolation and poverty are the biggest and most frequent problems of the impaired and
disabled. This is true even of urbanized and industrialized societies with appreciable surplus
wealth.

The handicap code (H-Code) is nominal in nature because a nominal variable is easier to
classify, moreover the classes are mutually exclusive. A hierarchy has to impose on a
classification of nominal variables by identifying similarities and grouping these together. Although
the H-code has been carefully made, considering all possible dimensions, it was not flawless. An
H-code statement is a means of summarizing the situation semi-quantitatively, rather than
identifying discrete categories. Overlap between categories in different dimensions has been kept
to a minimum, but it could not be altogether eliminated. For instance, who is bedfast, is not only
immobile, but also totally dependent on others for care. Theoretically it might be possible to
eliminate such overlap, but in practice it appeared preferable for each dimension to stand on its
own. ICIDH also admitted that fulfilling all scale categories for all dimensions of handicap is not
always possible. Nevertheless, it can give good guidelines for use according to different
situations. Unlike disability, all six dimensions of handicaps have respective severity scale
category.

Another problem, ICIDH admitted is, disadvantage may be perceived in three different
ways – subjectively, by the individual himself / herself; by others who are significant to the
individual and by the community as a whole. But, during research it is important to take into
account all the views to go in for more rational analysis instead of relying solely upon either
individual subjective feeling alone, or 'objective' expert assessment alone. [WHO 1980]
Application of ICIDH

After ICIDH was published by WHO, in 1980, many social workers, physicians, physiotherapists, researchers and policy makers all over the world attempted to apply ICIDH in their activities. Many used it separately i.e. impairment in medical services, disabilities in rehabilitation facilities and handicaps in social welfare provisions and also in social policy such as those concerned with education, employment, transport and housing [Mervyn Susser 1980]. On the other hand, there were several instances where all thee dimensions (impairments, disabilities and handicaps) have been assessed [Marijke de Kleijn-de Vrankrijker 1989, Molenaar DSM 1995, Abramson MJ 1996, Philip HN Wood 1989, Gomez Rodriguez P 1989, Jane Finstram 1988, 1989].

ICIDH had been used as an assessment tool or instrument in the study of impairment, disability, handicap and rehabilitation as well. In the context of epidemiological research, it had been considered very essential method. Some researchers used all [Barrs I 1983, Dalgaard OZ 1987, Gomez Rodriguez 1989] or part [Granger CV 1985, Colvez A 1986, Last PM 1985, Jane Finstram 1989] of the ICIDH as an assessment instrument. Others have accepted the concept of "handicap" and the ICIDH classification, but have searched for different scales with which to measure it [Lankhorst GJ 1985, Minaire JC 1989, Veen S 1991] and some have measured disability only [Siedel C 1985]. Marijke de Kleijn-de Vrankrijker divided the application of ICIDH in rehabilitation into two categories i) general application and ii) special application. General application has been further divided into groups:

a) Micro-level (individual)

b) Macro-level.

Most examples of ICIDH used in general application seems to be at the micro level. Micro level studies were mainly done using small number of cases by individual examination whether in a hospital or in the community. Marijke de Kleijn-de Vrankrijker, Ford B recorded impairment, disability and handicap from hospital based data. Whereas Last PM, Lankhorst W, Minaire JC examined individual patients and assessed impairment, disability and handicap. As compared to the number of micro level studies, large scale studies were very few. Use of ICIDH concept by the Council of Europe in its policy statements on the rehabilitation of disabled people, by L'Office des personnes, handicap'es du Que'bec, (a Canadian provincial government agency to propose a comprehensive policy aiming at the social integration of disable persons through the elimination of factors contributing to an eventual impairment), an intervention model to prevent or minimize impact of impairment or disability as well as the elimination of physical and social barrier are some examples of macro level application [Marijke de Kleijn-de Vrankrijker 1989]. At the macro level, the use of the ICIDH concepts and categories is reported within the framework of community-based rehabilitation in Punjab, Pakistan [Jane Finstram 1988, 1989]. Uses of ICIDH for special group include children suffering from specific disease (cerebral palsy, mental
Abramson MJ mentioned the evaluation of respiratory impairment and the disability arising from it and the role of such disability in causing handicap. He graded impairment and disability in terms of the limitation of normal activities in that particular context (like simple walking test). He argued that, instead of taking more objective means of assessment of respiratory impairment and disability, a researcher can take more subjective assessment. He said, there would be many occasions when the disability claimed by the patient as a result of dyspnea will appear fully consistent with his/her documented respiratory impairment. But he cautioned that a patient’s exercise capacity during test should be limited by respiratory function but not by anxiety, poor motivation, hyperventilation or non-respiratory impairment such as arthritic pain, claudication or angina [Abramson MJ 1996].

Molenaar DSM outlined the idea of measuring impairment, disability and handicap due to peripheral neuropathy. He opined that signs and symptoms of neuropathies (weakness, pain, paraesthesia, numbness, impaired sensation and reflexia) were measures of impairment. He considered the need for care and performance of daily activities as measures of disability, whereas social performance scales were regarded as measures of handicap [Molenaar DSM 1995].

Comments from Users of ICIDH and Modification

The users have made several comments on ICIDH with regard to its utility, the reaction ranged from complete rejection to acclaim [Khuzama Shaas 1994]. Problems related to linguistics was made by many users [Philip HN Wood 1989, Marijke de Vrankrijker 1989, Gomez Rodriguez P 1989, Judith Greenwood 1985, David Memel 1996, Barrs I 1985, Dalgaard OZ 1987]. Nevertheless utility of classification had been acknowledged. Many opined using the same classification means speaking a common language and using a common framework. This leads to better understanding and communication, which in turn can result in improved service. A classification also means structuring a certain area, thus facilitating policy formulation, data collection, statistics and documentation of information [Marijke de Vrankrijker 1987].

Philip HN Wood, who was a consultant to WHO for the development of the ICIDH said the impairment code did not have any significant antecedent; it endeavored to provide an exhaustive listing of organ or system malfunction to complement the exhaustive enumeration of diseases in the International Classification of Disease (ICD). But Chamie suggested simplifying the classification of impairment to avoid assessment cumbersome [Mary Chamie 1989]. According to Gomez Rodriguez P, unlike disabilities, which are recognized by subjects, impairment assessment requires professional skill. Often in practice, the person affected cannot detect the
manifestations, sign and symptoms of disease in an organ or the function of an organ. This consideration, very often lead to divergence from the classification and definition of impairments established by WHO. Furthermore he states there are several instances where one impairment leads to more than one disability and/or a disability could have been produced by more than one impairment. He also stated certain cases where study of impairment along with consequent disabilities has been impossible. For example, disabilities of very young children having some organic problem or mental retardation or running disabilities of very old cannot be assessed [Gomez Rodriguez P 1989]. Dynamics of impairment is also very important in impairment study. Some diseases are self-limited, progressive or require medical intervention and leave behind a sequel of various dimensions [Srinivas H 1989].

As ICIDH often deviates from the medical model, particularly in defining disability and handicap its users need proper orientation and there has to be a conceptualized of every step. For example in leprosy, the leprosy workers failed to use ICIDH absolutely as they always look at patients from a medical point of view, lack of well defined concept of 'disability' among leprosy workers and confusion over terminology as well [Wim H Van Brakel 1998]. Users of ICIDH noticed that the relationship between impairment and disabilities are not essentially linear (just cause and effect relationship) and degree of disabilities is not directly proportional to magnitude of impairments. The common opinion made by the users are disability is very context dependent. One individual with a given impairment may experience much more difficulty with certain activities than someone with the same impairment living under different circumstances. Brakel found how different types of terrain in Nepal attribute to different grades of disabilities among leprosy patients with similar kind of impairments [Wim H Van Brakel 1998, Haley SM 1994]. Study conducted in India regarding disabilities due to leprosy revealed that household size reduces disability score. Since family support plays a crucial role in preventing disabilities and in coping with economic and social adversities, it is important to have information about the families of affected persons and the resources at their command [Srinivas H 1998].

According to Chamie [Mary Chamie 1989], WHO classified disability in a way that reached beyond medical diagnosis of disease or trauma and moved on to classifying long term effects - physiologically, behaviorally and socially. An assessment of the situation of disabled persons should cover, inter alia, their socio economic condition, family and household status, access to and use of social, economic, health and welfare programmes available in the community; degree of participation in the labor force, in education programmes; use of public transport, type of transport used to get to work or school, housing and living condition etc. In fact, the International Disability Statistics Data Base (DISTAT) shows that poverty, low life expectancy, old age and low occupational status, are associated with high rates of disability [Mary Chamie 1989]. Studies conducted in the Cape Peninsula, South Africa [Disler PB 1986 (a, b, c)] show higher incidence of disabilities due to various diseases among the less developed, backward classes (in terms of culture and socio economic conditions). Like aforementioned sociological
factors, cultural differences in various societies are also important determinants of the severity of disability. Many rehabilitation programmes failed to achieve success as the planners could not understand the cultural difference of the particular society. There is also a tendency to speak of cultural barriers in local societies, and to see culture as a burden for target groups. It should be realized, however, that programmes themselves contain assumptions and values that are cultural. In order to establish improved intercultural programmes and their users it is first necessary to analyze the cultural assumptions of both sides. But, it is worth noting that cultural differences should not deflect attention from economic ones. Differences in the social circumstances of households are just as important as the beliefs held about disability. It is difficult to help the poorest people because they often do not have the resources to reach and take advantage of existing program. It would be an over simplification to blame this state of affairs on cultural belief [Susan Reynolds 1988]. Rodriguez, in his study conducted in Spain regarding general disability study at community level, selected specific disabilities, which were considered serious in Spanish society [Gomez Rodriguez P 1989]. He also developed guidelines to know the real origin of disability.

i) When the disability was the result of a time-limited disease which had resolved or was no longer evolving but had left some sequel, it was considered to be related to the organ, system or tract in which the sequel had occurred. For example, a walking disability due to an episode of poliomyelitis from which the patient had recovered was considered as resulting from an impairment of locomotor system.

ii) When the disability was the result of a degenerative and progressive disease i.e. a process which was not completed, but still evolving the impairment considered was that of the relevant system, irrespective of the sequel in any particular organ. For example, a walking disability arising from Parkinson's disease to an impairment of the nervous system.

iii) When the disability is produced by a long but curable disease, the sequel of the disease appears at the same time as the disease continues to have a direct effect on an organ or system. These sequels generally affect the same organ as the disease and thus the two processes lead to the same impairment. For example, a running disability caused by pulmonary tuberculosis was considered to be due to an impairment of the respiratory tract, both when the patient was still suffering from the disease and when he/she had recovered but was left with pulmonary fibrosis which made running impossible [Gomez Rodriguez P 1989].

Disability specific questions need further methodological improvement. As disability is context specific, prototype questionnaire cannot be useful in all cases (even in same kind of disability). Regarding the use of Disability Code (D-Code) mentioned in ICIDH, there was mixed reaction. Dalgaard OZ recommended that D-code could be useful for every day purposes and also for assessment and evaluation of need for aids and assistance. On the other hand Alaranta
H et al said severity scale for disability was not suited to most patients with low back pain. Furthermore, Yvonne J J M van Banel commented that D-code of ICIDH in its full form as an instrument was impractical. They said that scale measure was ordered in character. Each successive score does not necessarily represent an equal amount of change. A score of 3 means more disabled than a score of 2 and a score of 1 means more disabled than a score of 0, but the difference between 3 and 2 is not necessarily equal to the difference between 1 and 0. The score numbers imply equal to the difference between 1 and 0. The score numbers imply equal intervals, but in reality the differences between scores are probably not equal. As a result, the score does not necessarily represent the same level of disability for all items. Therefore, the mathematical or statistical calculation of the scores will be misleading [Dalgaard OZ 1987, Yvonne JM van Banel 1995].

There are mixed reactions among the users who adopted ICIDH during assessment of handicap. Despite following ICIDH in handicap assessment, by and large, the users assessed critically. The critical expressions are based on theoretical perception of consequences of disease and experiences acquired through use of ICIDH in field. Greenwood stated handicap was a result of perceived disability as well as of clinical disability. He also mentioned that the consequences of impairment and disability can, but do not necessarily, lead to handicaps or conditions of disadvantage, the composite result of individual functional limitations and faults in physical, cultural, social, economic and political environments. Rehabilitation for handicapping conditions then implies not necessarily the restoration of maximum functional activity or independence, but the restoration of maximum social function, including work and family roles [Judith G Greenwood 1985]. Many users gave stress on wider environmental aspects where household and community responses played major role in assessing handicap [Judith G Greenwood 1985, Mary Chamie 1989, Gunner Grimby 1988]. Therefore assessment of handicap at hospital set up would not give any actual picture. For example, a patient on admission can walk with some assistance in their home and at discharge has achieved independence in walking with high degree of security and endurance, but still confined to home due to architectural barriers, would not be classified as "improved" in terms of handicap within ICIDH classification. If such a patient also needs the same degree of personal assistance at discharge as at admission, no change in physical handicap would be indicated by the WHO system. Similarly, the degree of social integration might qualitatively improve within one's family, but if the patient does not increase contacts with outside world, this would not be reflected as an improvement on the WHO classification [Gunner Grimby 1988]. Hence household and outdoor architectural barrier, family support and community response influence handicaps assessment and outcome of rehabilitation program. Chamie explicitly described environment and its role in handicap. According to her, in survey research, the concept of handicap ought to be considered as an analytical tool rather than as a classification scheme for identifying or screening people into a disability survey. According to the ICIDH, handicaps are descriptions of the cumulative loss, namely the social and economic losses that result both from the characteristics of impaired people and from characteristics of their
environment. With the conceptual framework, the study of handicap as described in the ICIDH would be based on an analysis of economic and other opportunity loss of disabled persons that may be explained through the influence of impairments and disabilities in different environments.

Thus, handicap is viewed as a result of the interaction between disabled people and their environment rather than as the result of impairments and disabilities alone, or environment alone. In order to allow such an analysis, environments must also be assessed and statistically classified [Mary Chamie 1989]. Furthermore, Sandra Jowett mentioned how skin manifestation like acne, psoriasis or eczema resulting of disfigurement of face may lead to social integration handicap without much disability [Sandra Jowett 1985]. While working on the inter-relationships between impairment and disability due to cerebral palsy and spinabifida in relation to psychological adjustment and quality of social life, Hirst noticed social handicap was more often associated with particular configurations of impairments and disabilities than with individual functional limitations. According to him poor psychological adjustment and extreme social isolation were not necessarily direct consequences of any impairment or disability arising from severe functional loss, rather it was shaped by dependency on others, restricted choices, physical barriers and the adverse reactions of others. He gave stress on social context and local environment in determination of handicap [Michael Hirst 1989]. Adding to that the task force on stroke outcome recommended some variables which might be determinants of handicap like (i) Cultural values (age, sexism, racism, religion and ethnicity), (ii) Social system and policy (employment, transportation, education, welfare, health, legal systems) (iii) Physical environment (housing, geography, work place, places of leisure, shops) (iv) Individual characteristics (age, sex, personality characteristics, attitudes, life satisfaction, well being, adjustment / acceptance) (v) Relationships (family functioning, friendship, social support) [Levene MI 1990]. These variables are equally applicable to other diseases. For instance, Richardson during a community level study in rural Nepal faced difficulties in assessing handicap. He expressed difficulties in assessing the disadvantage to a particular person resulting from impairment or disability as it required knowledge of everyday life, social relationships and the values, practices and norms of the society in which the person lives [Richardson SA 1983].

Despite criticism of ICIDH, many users and concerned experts applauded WHO’s pioneering effort to provide a framework for considering every patient’s response to disease. Apart from having relative semantic complexity, the successful incorporation of this system is a major challenge to the profession (clinicians, epidemiologists and social workers), at a time when patients are demanding that professions do not avoid the broader psychological issues associated with being sick [McFarlane AC 1984]. In response to varied opinions from users, Philip H N Wood, who played leading role in framing ICIDH, defined what the ICIDH was not – “it was not a complete system, it was not something ready made nor was it a classification of individuals” [Khuzama Shaas 1994]. However, he claimed, the ICIDH offered a means of resolving some of the ambiguities which had been earlier in the concept of disease experience. He pointed out in
handicap classification, pre-existent social indicators with established empirical utility were deliberately not followed, because it was thought more important to try to preserve the conceptual distinctions identified and offer a scheme which dovetailed more closely into the over all approach of the ICIDH [McFarlane AC 1984].

Several users of ICIDH modified it, according to context and convenience. Gunner Grimby during application of the WHO handicap classification in rehabilitation of stroke patients omitted the occupational and economic dimension since all of the patients were living in a rehabilitation ward. Abramson M assessed respiratory impairment (dyspnea) by simple walking test. Conducting simple walking test at community level does provide patients motivation, confidence and topographic background of the area. Mary Chamie suggested further need of methodological improvement regarding disability. She has also suggested simplification of procedure to avoid analysis of data cumbersome. Aralanta condensed severity scale of Disability and Handicap scale. Ferngren AH modified the handicap code of ICIDH for a study of 6-7 year old mentally retarded children. Finstram J excluded economic self-sufficiency dimension of handicap while using the WHO classification in assessing the prevalence of Disease, Impairments and Handicaps in Punjab Province, Pakistan. Yvonne suggested 4-point scale (instead of 9-point scale by ICIDH) in measuring disability (i.e. 0 – not disabled to 3 – severely disabled). Moreover, Yvonne has stated that point scale measures are ordinal in nature but not equal amount of change (equal interval). As a result, the scores cannot easily be totaled and average. So mathematical or statistical manipulations of the scores may be misleading. Rodriguez also suggested to simplify the classification because it would ensure the survey be feasible, comprehensive and fully understandable. Selection of disabilities is also an important aspect of disability study. The disabilities, which are considered serious in the given society, should be taken into account. Establishing inter relationship among impairments, disabilities and handicaps are very important to understand the dynamics of disease consequences. One impairment often entails more than one disability and / or a disability that could have been produced by more than one impairment. He stresses on subjectivity in assessing handicap [Gunner Grimby 1988, Abramson MJ 1996, Mary Chamie 1986, Alaranta 1986, Ferngren AH 1988, Jane Finstram 1988, 1989, Yvonne 1995, Gomez Rodriguez P 1989].

The detailed methodology and the adaptations made in the ICIDH to suit the specific situation for studying the impact of arsenic patient in this study are detailed in the following section.