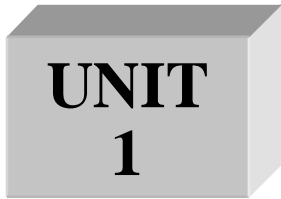



# Measurement of Disability in Rehabilitation



## Introduction

Disability has often been defined as a physical, mental, or psychological condition that limits a person's activities. In the past, this was interpreted according to a medical model. That is, disability was linked to various medical conditions and was viewed as a problem residing solely in the affected individual. Disability was seen solely as the result of an individual's inability to function. Interventions usually included medical rehabilitation and the provision of social assistance.

	Time needed to finish this unit	Approximately 4 weeks
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<b>Lessons of this unit</b> Lesson 1: The theory of measurement and the critical review Lesson 2: Value of measurement and rehabilitation science, Lesson 3: Measurement of qualitative outcome in practice Lesson 4: Measurement of quantitative outcome in practice
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## Lesson 1: The theory of measurement. The critical review



### Learning Objectives:

After completion of this lesson students will be able to.....

- Understand the basics of disability and Rehabilitation related theories.
- Know the medical and social model of disability.
- Know different approach of measurement.
- Acquire knowledge about different theories of measurement and critical review.

	<b>Keywords</b>	Critical review
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## Subject-matter

### **1.1.1: Basics about Disability and measurement Theory**

The **measurement of disability** has implications for law and policy. There is no universally accepted definition for disability. There are, however, a number of conceptual models which guide measurement. No model can encompass all the dimensions of disability, but different models serve different purposes and provide useful perspectives on disability in a given context. This models summarizes the main theoretical models and measurement tools for disability. Unlike other reviews, which treat the theory and measurement of disability separately, this models synthesizes the two domains. The strong theoretical links in current trends in disability measurement are highlighted, with particular reference to the developing countries. The measurement of disability is crucial for developing countries because a large proportion of the world's disabled population live in these countries, and from a policy perspective there is a need to target limited resources optimally. Only through the use of appropriate instruments for the measurement of disability can this be achieved.

### **1.1.2: Medical Model of Disability**

This medical model has recently been replaced by the social model of disability, which conceptualizes disability as arising from the interaction of a person's functional status with the physical, cultural, and policy environments. If the environment is designed for the full range of human functioning and incorporates appropriate accommodations and supports, then people with functional limitations would not be "disabled" in the sense that they would be able to fully participate in society. Interventions are thus not only at the individual level (e.g., medical rehabilitation) but also at the societal level, for example the introduction of universal design to make infrastructure more accessible, inclusive education systems, and community awareness programs to combat stigma.

### **1.1.3: Social Model of Disability:**

According to the social model, disability is the outcome of the interaction of person and their environment and thus is neither person nor environment specific. The International Classification of Functioning, Disability and Health (ICF) developed by the World Health Organization is the starting point a recent developments in measuring functional capacity.

### **1.1.4: Theoretical Model:**

Based on a theoretical model that draws upon the social model of disability, disability in the ICF is not an "all or nothing" concept. People are not identified as having a disability based upon a medical condition, but rather are classified according to a detailed description of their functioning within

various domains. The first of these domains – body structure and function – is closely related to the medical model as it refers to the physiological and psychological functions of body systems. Body structures are defined by the ICF as “anatomic parts of the body such as organs, limbs and their components.” This domain relates to very specific capabilities, for example being able to lift one’s arm over one’s head or produce articulate speech sounds. Thus, it is not a “whole” person classification, as are the other domains – activities and participation.

### **From the medical to the social model**

The historical tendency has been to explain disabled peoples’ experience in relation to impairment. The ontology has become known as the medical model. Disability is perceived to be caused by physical impairments resulting from disease, injury or health conditions (Barnes and Mercer 2003). Impairment leads directly to the loss of bodily and social functioning. Hence interventions are primarily medical, including rehabilitation and institutional care, as well as social assistance programmes such as special education, vocational training and social welfare.

The social model views disability as a social, rather than individual, construct; hence social change is seen as the primary remedy (Barnes *et al.* 2002). Impairment itself is not important, but rather accommodations made for persons to function in society determine, and therefore are able to ameliorate disability (e.g. change in attitudes, physical accessibility). The modern response to impairment has cast disabled people as the ‘other’, excluded from and denied access to society. It has gained universal currency with evidence for its influence in current international declarations and conventions, national legislation and the global expansion of community-based rehabilitation and inclusive education programmes (Gabel and Peters 2004).

### **1.1.5: Different Approaches to Measurement**

Censuses and surveys from around the world take very different approaches to measuring disability. In fact, different instruments within the same country often report very different rates of disability. For example, in Canada, the reported rate of disability in 2001 ranged from 13.7% to 31.3% (see Table 1). In the Participation and Activity Limitations Survey disability was defined as having limitations in undertaking various activities. The reported prevalence rate was about 14%. The Canadian Community Health Survey reports a much higher rate of disability because it considers any condition that affects one’s health, even those that do not necessarily have an impact on the range of activities a person could perform in daily life.

## Adult Disability Rates for Major Canadian Survey

Adult Disability Rates for Major Canadian Surveys, 2001	
Instrument	Percent
Participation and Activity Limitations Survey – Filters	13.7
Participation and Activity Limitations Survey – All	14.8
Census	18.5
Survey of Labor and Income Dynamics	20.5
Canadian Community Health Survey	31.3
Source: Rietschlin and MacKenzie, 2004	

### 1.1.6: Across countries the variation is even greater- Prevalence of disability in selected countries by source:

<u>Censuses</u>			<u>Surveys</u>		
Country	Year	Percent of population with a disability	Country	Year	Percent of population with a disability
United States	2000	19.4	New Zealand	1996	20.0
Canada	2001	18.5	Australia	2000	20.0
Brazil	2000	14.5	Uruguay	1992	16.0
United Kingdom	1991	12.2	Spain	1986	15.0
Poland	1988	10.0	Austria	1986	14.4
Ethiopia	1984	3.8	Zambia	2006	13.1
Uganda	2001	3.5	Sweden	1988	12.1
Mali	1987	2.7	Ecuador	2005	12.1
Mexico	2000	2.3	Netherlands	1986	11.6
Botswana	1991	2.2	Nicaragua	2003	10.3
Chile	1992	2.2	Germany	1992	8.4
India	2001	2.1	China	1987	5.0
Colombia	1993	1.8	Italy	1994	5.0
Bangladesh	1982	0.8	Egypt	1996	4.4
Kenya	1987	0.7			
Source: United Nations Statistics Division; IBGR (Brazil), INEC (Nicaragua), INEC (Ecuador), INEGI (Mexico), Statistics New Zealand, INE (Spain), Census of India 2001, SINTEF Health Research (Zambia) 2006					

According to a recent review of the literature, disability rates ranged from 3.6 to 66 percent and low quality of life resulting from disability ranged from 1.8 to 26 percent (Barbotte, et al., 2001). The authors note that “the heterogeneity of the conceptual framework and insufficient recognition of the importance of indicator accuracy, the age factor and the socioeconomic characteristics of the studied

populations impede reliable international comparison.”

Developing countries tend to report the lowest rates of disability. While some factors would lead to higher rates of disability in richer countries – more elderly people and higher survival rates for people with disabling conditions.

### **1.1.7: Critical Review of disability measurement**

#### ***The traditional model***

Traditionally, in many cultures around the world, people with physical, sensory or mental impairments were thought of as under the spell of witchcraft, possessed by demons, or as penitent sinners, being punished by God for wrong-doing by themselves or their parents.



Fig: A medieval woodcut of witches.

#### ***Critiques of medical model of Disability***

The medical model of disability focuses on the individual's limitations and ways to reduce those impairments or using adaptive technology to adapt them to society. Current definitions of disability accept biomedical assistance but focus more on factors causing environmental and social exclusion. Uncritical reliance on the medical model produces unwanted consequences.

Also, some disability rights see the medical model of disability as a civil rights issue and criticise charitable organizations or medical initiatives that use it in their portrayal of disabled people, because it promotes a pitiable, essentially negative, largely disempowered image of people with disabilities rather than casting disability as a political, social and environmental problem (see also the political slogan "Piss On Pity").



Fig: Diagram showing the effects of medical model thinking

### **Critique of the social model**

Bury 2000 quoted that do not believe that the ‘social model’ has really engaged with the real issues facing the vast majority of disabled people, and, despite its rhetoric and undoubted attractions for some, it has not produced a cogent approach which can serve the real practical needs of disabled people, or indeed the research community.


The social model has been criticised for failing to address impairment, argued as integral to the experience of disability [e.g. people with Down Syndrome (usually) have three chromosome 21s, the phenotypic expression of which impacts their life course]. The implication of this criticism is that the model does not fully account for the lived experience of PWDs. While some PWDs position on their lives fully within the social model, others do not (Pinder 1997)


Other theorists reject the critique of the one-dimensional social model as dismissive of impairment: ‘the potential for impairment to limit activities is not denied, but such restrictions do not constitute disability’ (Thomas 2002, p.43); ‘[social model proponents] point to inequalities between the disabled and the non-disabled and, instead of reducing them to impairments themselves they interpret them as effects of oppression and discrimination’ (Reindal 2009, p.157). It is conceded, however, that the relational element between the individual and society has been lost (Thomas 2004). Subsequently, a refined version of the social model, the social-relational model, has developed.

The social-relational model of disability acknowledges both the personal and social effects of impairment yet still asserts that disability is contingent upon social conditions (Thomas 2004; Reindal 2008). Disability is understood as resulting from the effects of societal attitudes added to the effect of impairment: ‘it is the organisation of society which presumes that people labelled disabled can do little or nothing of value’ (Pfeiffer 2000, p.1079). Consistent with classical social model views, importance is placed on reducing the barriers in society for people with impairment.



Fig: Disabled people rally together to demonstrate for their rights.

 <b>Learners Activities</b>	Thoughts analysis of different model of disability
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 <b>Summary</b>
Different models of disability thought has been conducted and approached in different time so its implication is also different.

 <b>Study Skill</b>
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**Short Questions**

- Briefly describe the medical and social model of disability.
- Briefly describe different approach of disability measurement.
- Critical Review of disability measurement

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## Lesson-2: Value of Measurement and Rehabilitation Science



### Learning Objectives

After completion of this lesson students will be able to.....

- Understand the values of measurement of disability and Rehabilitation.
- Acquire knowledge about health and rehabilitation sciences.

	<b>Keywords</b>	Measurement, rehabilitation, science
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### Subject-matter

#### 1.2.1: Value of Measurement of Disability

The demand for robust disability statistics increased following the International Year of Disabled Persons (1981), the World Program of Action Concerning Disabled Persons, the Standard Rules on the Equalization of Opportunities for PWDs, and most recently the CRPDs. In recent decades, the collection of disability data and the production of statistical information have proliferated. The bulk of this data is from high-income countries. There is a varying in disability rates between and within countries due to definitions, data collection systems, age ranges and populations included (United Nations 1990; Barbotte *et al.* 2001; Mont 2007a; Loeb *et al.* 2008). Consequently, international comparison of disability statistics is not possible (Barbotte *et al.* 2001).

An explanation for the discrepancy between reported and expected disability prevalence in rich and poor countries is offered by the United Nations Disability Statistics Compendium (1990). Summarizing 63 surveys across 55 countries, use of an impairment or functioning screen was found to be an important determinant of disability prevalence and was positively associated with increasing country income. Low- and middle-income countries traditionally have applied an impairment measure and high-income countries a functioning measure. Functioning screens are currently being introduced into population censuses and household living standards surveys in low- and middle-income countries.

#### Impairment screens

Impairment screens define disability on the basis of impairment. In the most basic form, an impairment screen may read: ‘do you have a disability?’ Alternatively, persons may be screened for



impairment across several domains or diagnosable conditions, for example ‘do you have a hearing, speech, visual, mobility, and mental disability?’ Prevalence assessed using impairment screens is low; ranging from 0.3 to 5.5% (United Nations 1990). Countries of Africa, Asia and South America use impairment screens to measure disability more commonly than do European and North American countries (United Nations 1990; Barbotte *et al.* 2001).

With their origin in the medical model, impairment screens are criticised for neglecting the impact of impairment on a person’s functioning in terms of activities or social participation, and the impact of personal or environmental factors (Van-Brakel and Officer 2008). They also lead to under-reporting because the term disability carries social stigma; in many cultures disability is perceived as retribution from a past life (Ingstad and Whyte 1995). Mental or psychological impairments are particularly stigmatised and under-reported (Patel 2001; Miller 2006). The term disability often implies a very serious condition, hence impairment screens are directed towards severe or profound impairments (Mont 2007a). Impairment screens are commonly used in developing countries as a proxy for severe disability for priority health and social service provision. Screens that list impairment domains or medical conditions are subject to error as people may not know their diagnosis or may be incorrectly diagnosed. This particularly concerns resource-poor settings where access to quality health services is low.

### **Functioning screens**

For the reasons above, screens that focus on functioning ability rather than impairment are preferable. Many functioning screens have been developed (McDowell and Newell 1987; Mont 2007a). In general, functioning screens measure the loss of functional capacity resulting from a health condition. Due to difficulties in measuring the impact of environmental factors on functioning, screens have focused on the personal experience of ill-health on functioning in a given environment (Barbotte *et al.* 2001). Functioning, within an ICF conceptual framework, encompasses body function, as well as activities and participation, hence a variety of measures at any or all of these levels are possible. Mostly, screens have measured limitations in bodily functioning and activities of daily living (Barbotte *et al.* 2001). Activities represent elements of participation and can determine the mechanisms that interfere with or facilitate participation (Madans *et al.* 2004). If participation only is measured there is no way of distinguishing persons with impairment who have adequate accommodations and enabling environments from non-disabled people.

### **1.2.2: Washington Group general measure on disability**

The Washington Group general disability measure (hereafter WG measure) evolved from the ICF with the aim of producing an internationally comparable general disability measure (United Nations

Statistics Division 2009). Equalisation of opportunities, inspired by the ICF, formed the conceptual framework through which the measure was developed. The measure has been proposed to reflect the current disability paradigm and has been pre-tested extensively for validity in many countries. Recommended by the UN Population Division, WG question sets are currently being phased into censuses and national surveys around the globe (Leonardi *et al.* 2006). The outcome will be comparable cross-country disability data, marking an important development in international disability statistics.

### **Washington Group General Disability Measure**

#### **Short-question set**

- Do you have difficulty seeing, even if wearing glasses?
- Do you have difficulty hearing, even if using a hearing aid?
- Do you have difficulty walking or climbing steps?
- Do you have difficulty remembering or concentrating?
- Do you have difficulty with self-care such as washing all over or dressing?
- Do you have difficulty communicating; for example, understanding or being understood by others?

#### **Response categories**

- No difficulty
- Some difficulty
- A lot of difficulty
- Unable to do it.

*Source:* United Nations Statistics Division (2009).

Early prevalence results from developed countries and some developing countries average 10–12%, suggesting that the screen has a moderate threshold for functional limitations (Mont 2007a; Loeb *et al.* 2008). One key factor in determining prevalence is the cut-off point for measuring disability. The WG questions are graded on an ascending scale of difficulty: no difficulty, some difficulty, a lot of difficulty, and unable to do it. From a pilot study in a Vietnamese province, the prevalence of disability was 31.6% if a cut-off of ‘some difficulty’ in any of the six functions was used, 10.0% for ‘a lot of difficulty’ and 2.6% for ‘unable to do it’ (Mont 2007a). In Zambia, for a cut-off of ‘at least some difficulty’ national prevalence rates varied considerably if difficulty was experienced in at least one or two domains (17.8% and 13.4%, respectively) (Loeb *et al.* 2008). Different countries will select different cut-off severity thresholds for political, social and economic reasons. The Washington Group recommends a cut-off of “at least one domain that is coded as ‘a lot of difficulty’ or ‘cannot do

it at all” to be used internationally in the reporting of disability statistics in order that comparable rates can be obtained from different countries.

### **1.2.3: Outline of the steps in the Value measuring methodology (VMM)**

Each of the four major steps of the VMM process has tasks and outputs. The breakdown below, and the description of major value factors, is based primarily on the suite of VMM documents from the US Federal Chief Information Officers Council in 2003.

#### **Develop a decision framework:**

- **Tasks:**
  - Identify and define value structure
  - Identify and define risk structure
  - Identify and define cost structure
  - Begin documentation
- **Outputs:**
  - Prioritized value factors
  - Defined and prioritized measures within each value factor
  - Initial risk factor inventory
  - Risk tolerance boundary
  - Tailored cost structure
  - Initial documentation of basis of estimate of cost, value and risk

#### **Analyze alternatives:**

- **Tasks**
  - Identify and define alternatives
  - Estimate value and cost
  - Conduct risk analysis
  - Ongoing documentation
- **Outputs**
  - Viable alternatives for solutions
  - Cost and value analyses
  - Risk analyses
  - Tailored basis of estimate documenting value, cost, and risk, economic factors and assumptions

#### **Pull the information together**

- **Tasks**
  - Aggregate the cost estimate

- Calculate the return on investment
- Calculate the value score
- Calculate the risk score
- Compare value, cost, and risk

- **Outputs**

- Cost estimate
- ROI metrics
- Value score
- Risk scores (cost and value)
- Comparison of cost, value and risk

### **Communicate and document**

- **Tasks**

- Communicate value to customers and stakeholders
- Prepare budget justification document
- Satisfy ad hoc reporting requirement
- Use lessons learned to improve processes

- **Outputs**

- **Documentation, insight and support:**

- To develop results-based management controls
- For enterprise budget reporting and analysis
- To communicative initiative value
- For improving decision making and performance measurement through "lessons learned"

- Change and ad hoc reporting requirements



## Learner's Activity

Practice VVM methodology



## Summary

The interventions should be evaluated in regular basis and it should be used the best evidenced while practice any intervention whereas the values of measuring disability should be considerable as its standard maintenance.



## Study Skills

### Short Questions

- Value of Measurement of Disability
- What are steps in the Value measuring methodology (VMM)?

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## Lesson-3: Measurement of Qualitative Outcome in Practice



### Learning Objectives:

After completion of this lesson students will be able to.....

- Description of qualitative measurement with types;
- Know about the strength and limitation of qualitative measurements.

	<b>Keywords</b>	Outcome Measurement
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### Subject-matter

#### 1.3.1: Define Qualitative Measurement

Qualitative means without determining a value. You might simply be doing a comparison, e.g. making observations: lithium compounds produce a red flame color while sodium compounds produce a yellow one.

Qualitative measurement focuses on collecting information that is not numerical. You can remember this by thinking of the word 'quality.' Quality is not something that you measure with numbers. You don't say that dinner was 3 qualities, or that park bench is only one quality. Likewise, qualitative data is not numerical. Instead of statistical analysis, the goal of qualitative measurement is to look for patterns and get a general feel for how things are.

Comment cards, like the ones Carrie is using, are a good example of qualitative research. Other examples include things like how depressed a person feels (very depressed, a little depressed, or not depressed at all) or how women in power are perceived (strong, unfeeling, masculine, and so on).

#### 1.3.2: Different Types of Qualitative Measurements

##### *Ethnography*

Ethnographic research is probably the most familiar and applicable type of qualitative method to UX professionals. In ethnography, you immerse yourself in the target participants' environment to understand the goals, cultures, challenges, motivations, and themes that emerge. Ethnography has its roots in cultural anthropology where researchers immerse themselves within a culture, often for years! Rather than relying on interviews or surveys, you experience the environment first hand, and sometimes as a "participant observer."

For example, one way of uncovering the unmet needs of customers is to “follow them home” and observe them as they interact with the product. You don’t come armed with any hypotheses to necessarily test; rather, you’re looking to find out how a product is used.

### ***Narrative***

The narrative approach weaves together a sequence of events, usually from just one or two individuals to form a cohesive story. You conduct in-depth interviews, read documents, and look for themes; in other words, how does an individual story illustrate the larger life influences that created it. Often interviews are conducted over weeks, months, or even years, but the final narrative doesn’t need to be in chronological order. Rather it can be presented as a story (or narrative) with themes, and can reconcile conflicting stories and highlight tensions and challenges which can be opportunities for innovation.

For example, a narrative approach can be an appropriate method for building a persona. While a persona should be built using a mix of methods—including segmentation analysis from surveys—in-depth interviews with individuals in an identified persona can provide the details that help describe the culture, whether it’s a person living with Multiple Sclerosis, a prospective student applying for college, or a working mom.

### ***Phenomenological***

When you want to describe an event, activity, or phenomenon, the aptly named phenomenological study is an appropriate qualitative method. In a phenomenological study, you use a combination of methods, such as conducting interviews, reading documents, watching videos, or visiting places and events, to understand the meaning participants place on whatever’s being examined. You rely on the participants’ own perspectives to provide insight into their motivations.

Like other qualitative methods, you don’t start with a well-formed hypothesis. In a phenomenological study, you often conduct a lot of interviews, usually between 5 and 25 for common themes, to build a sufficient dataset to look for emerging themes and to use other participants to validate your findings.

For example, there’s been an explosion in the last 5 years in online courses and training. But how do students engage with these courses? While you can examine time spent and content accessed using log data and even assess student achievement vis-a-vis in-person courses, a phenomenological study would aim to better understand the students experience and how that may impact comprehension of the material.

### ***Grounded Theory***

Whereas a phenomenological study looks to describe the essence of an activity or event, grounded theory looks to provide an explanation or theory behind the events. You use primarily interviews and

existing documents to build a theory based on the data. You go through a series of open and axial coding techniques to identify themes and build the theory. Sample sizes are often also larger—between 20 to 60 with these studies to better establish a theory. Grounded theory can help inform design decisions by better understanding how a community of users currently use a product or perform tasks.

For example, a grounded theory study could involve understanding how software developers use portals to communicate and write code or how small retail merchants approve or decline customers for credit.

### ***Case Study***

Quantitative researchers can relate to the value of the case study in explaining an organization, entity, company, or event. A case study involves a deep understanding through multiple types of data sources. Case studies can be explanatory, exploratory, or describing an event. The annual CHI conference has a peer-reviewed track dedicated to case studies.

For example, a case study of how a disability management process happening in the community.

### **1.3.3: Differences between the five qualitative methods:**

<b>Method</b>	<b>Focus</b>	<b>Sample Size</b>	<b>Data Collection</b>
<b>Ethnography</b>	Context or culture	—	Observation & interviews
<b>Narrative</b>	Individual experience & sequence	1 to 2	Stories from individuals & documents
<b>Phenomenological</b>	People who have experienced a phenomenon	5 to 25	Interviews
<b>Grounded Theory</b>	Develop a theory from grounded in field data	20 to 60	Interviews, then open and axial coding
<b>Case Study</b>	Organization, entity, individual, or event	—	Interviews, documents, reports, observations

### **1.3.4: Strengths of Qualitative Measurement**


- Issues can be examined in detail and in depth.
- Interviews are not restricted to specific questions and can be guided/redirected by the researcher in real time.
- The research framework and direction can be quickly revised as new information emerges.




- The data based on human experience that is obtained is powerful and sometimes more compelling than quantitative data.
- Subtleties and complexities about the research subjects and/or topic are discovered that are often missed by more positivistic enquiries.
- Data usually are collected from a few cases or individuals so findings cannot be generalized to a larger population. Findings can however be transferable to another setting.

#### **1.3.5: Limitations of Qualitative Measurements:**

- Research quality is heavily dependent on the individual skills of the researcher and more easily influenced by the researcher's personal biases and idiosyncrasies.
- Rigor is more difficult to maintain, assess, and demonstrate.
- The volume of data makes analysis and interpretation time consuming.
- It is sometimes not as well understood and accepted as quantitative research within the scientific community
- The researcher's presence during data gathering, which is often unavoidable in qualitative research, can affect the subjects' responses.
- Issues of anonymity and confidentiality can present problems when presenting findings.
- Findings can be more difficult and time consuming to characterize in a visual way.

 <b>Learner's Activity</b>	Specify qualitative measurement
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 <b>Summary</b>
Qualitative measurement would use for qualitative study which could help to analyse the data and conclude the findings.

 **Study Skills**

**Short Questions**

- What is qualitative measurement?
- What are the types of qualitative's measurement?
- What are the strengths and limitation of qualitative measurements?

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## Lesson-4: Measurement of Quantitative Outcome in practice



### Learning Objectives:

After completion of this lesson students will be able to.....

- Basics of quantitative measurements and its types.
- Acquire knowledge about different quantitative procedures and scales.

 <b>Keywords</b>	Quantitative measurement
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### Subject-matter

#### 1.4.1: Basics of Quantitative Measurement

**Quantitative** information or data is based on quantities obtained using a quantifiable measurement process. In contrast, *qualitative information* records qualities that are descriptive, subjective or difficult to measure.

Quantitative methods emphasize objective measurements and the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques. Quantitative research focuses on gathering numerical data and generalizing it across groups of people or to explain a particular phenomenon.

#### 1.4.2: Quantitative Scale Measurement

**Nominal Scale:** The nominal scales is essentially a type of coding that simply puts people, events, perceptions, objects or attributes into categories based on a common trait or characteristic. The coding can be accomplished by using numbers, letters, colors, labels or any symbol that can distinguish between the groups. The nominal scale is the lowest form of a measurement because it is used simply to categorize and not to capture additional information. Other features of a nominal scale are that each participant or object measured is placed exclusively into one category and there is no relative ordering of the categories. Some examples include distinguishing between smokers and nonsmokers, males and females, types of religious affiliations, blondes vs. brunettes and so on. In a study related to

smoking, smokers may be assigned a value of 1 and nonsmokers may be assigned a value of 2. The assignment of the number is purely arbitrary and at the researcher's discretion.

**Ordinal Scale:** The ordinal scale differs from the nominal scale in that it ranks the data from lowest to highest and provides information regarding where the data points lie in relation to one another. An ordinal scale typically uses non-numerical categories such as low, medium and high to demonstrate the relationships between the data points. The disadvantage of the ordinal scale is that it does not provide information regarding the magnitude of the difference between the data points or rankings. An example of the use of an ordinal scale would be a study that examines the smoking rates of teenagers. The data collected may indicate that the teenage smokers in the study smoked anywhere from 15 to 40 cigarettes per day. The data could be arranged in order and examined in terms of the number of smokers at each level.

**Interval Scale:** An interval scale is one in which the actual distances, or intervals between the categories or points on the scale can be compared. The distance between the numbers or units on the scale are equal across the scale. An example would be a temperature scale, such as the Fahrenheit scale. The distance between 20 degrees and 40 degrees is the same as between 60 degrees and 80 degrees. A distinguishing feature of interval scales is that there is no absolute zero point because the key is simply the consistent distance or interval between categories or data points.

**Ratio Scale:** The ratio scale contains the most information about the values in a study. It contains all of the information of the other three categories because it categorizes the data, places the data along a continuum so that researchers can examine categories or data points in relation to each other, and the data points or categories are equal distances or intervals apart. However, the difference is the ratio scale also contains a non-arbitrary absolute zero point. The lowest data point collected serves as a meaningful absolute zero point which allows for interpretation of ratio comparisons. Time is one example of the use of a ration measurement scale in a study because it is divided into equal intervals and a ratio comparison can be made. For example, 20 minutes is twice as long as 10 minutes.

### **1.4.3: Quantitative Approach**

A **Descriptive Design** seeks to describe the current status of a variable or phenomenon. The researcher does not begin with a hypothesis, but typically develops one after the data is collected. Data collection is mostly observational in nature.

A **Correlational Design** explores the relationship between variables using statistical analyses. However, it does not look for cause and effect and therefore, is also mostly observational in terms of data collection.

A **Quasi-Experimental Design** (often referred to as Causal-Comparative) seeks to establish a cause-effect relationship between two or more variables. The researcher does not assign groups and does not manipulate the independent variable. Control groups are identified and exposed to the variable. Results are compared with results from groups not exposed to the variable.

**Experimental Designs** often called true experimentation, use the scientific method to establish cause-effect relationship among a group of variables in a research study. Researchers make an effort to control for all variables except the one being manipulated (the independent variable). The effects of the independent variable on the dependent variable are collected and analyzed for a relationship.

#### **1.4.4: Different Quantitative Procedures**

##### **Work Disability**

Work disability is defined as the impact of an injury or illness on an individual's ability to perform his or her job tasks. In the context of a Workers' Compensation system, the impact of the injury or illness may result from interaction of multiple systems: workplace, healthcare, insurers, employers, and workers. Work disability may be viewed on a continuum from minor work limitations to complete work absence.

##### **Work Disability Prevention**

It refers to the entire continuum of the prevention and return- to work process. The term has been used interchangeably with disability management in the past.

**Work Injury Rate** This is a frequency that shows the numerator as number of injuries (either or both non-time loss and time loss) per 100 or per 1000 workers i.e. 3.3/100.

##### **Disability Management (DM) and Return to Work (RTW)**

Both terms are used to refer to programs that included the development of policies within a healthcare facility or organization such as the RHA, as well as the processes and practices in a worker's recovery and rehabilitation, and return to his or her job.

##### **Economic Evaluation in Disability**

Economic Evaluation is a comparative analysis that evaluating alternative courses of action and examining both costs and consequences as

- Identify
- Value
- Measure

- Compare

Economic evaluation considers assessment of intervention effects in economic terms, which is often of greatest interest to fund allocators.

### **Types of Economic Evaluation**

Tracing all inputs and finding valuations for all resources used can be difficult but should not deter intelligent estimates being made. Evaluations that consider both outcomes and resources use are full economic evaluations – there are four distinct types:

#### **1. Cost-minimisation analysis**

- Involves comparison between two or more alternative interventions whose outcomes are assumed to be exactly the same;
- Assumes all consequences of the alternative interventions are the same;
- Generally not recommended.

#### **2. Cost-effectiveness analysis**

- Most common type of economic evaluation in health care;
- Benefit is usually measured as a quantifiable unit.
  - **behavioural** - fruit and vegetable intake
  - **health outcome (glucose level)**
- Criticised for failing to recognise the broader benefits of PHN interventions however quantification of measures is required for analysis;
- Cannot be used to compare interventions - most suitable when interventions with the same health aims are being compared.

#### **3. Cost-utility analysis**

- Uses a common measure of outcome to enable comparison between a range of interventions - between PHN intervention, or between PHN intervention and treatment approach;
- Benefits or outcome are expressed as a measure that reflects how individuals value or gain utility from the quality and length of life;
  - *QALYs (quality adjusted life years)*
  - *DALYS (disability adjusted life years)*
  - *HYE (health year equivalents)*
- Can identify only relatively large changes in individual health status and can put PHN interventions at a disadvantage.

#### **4. Cost-benefit analysis**

- Measures all outcomes in monetary terms;

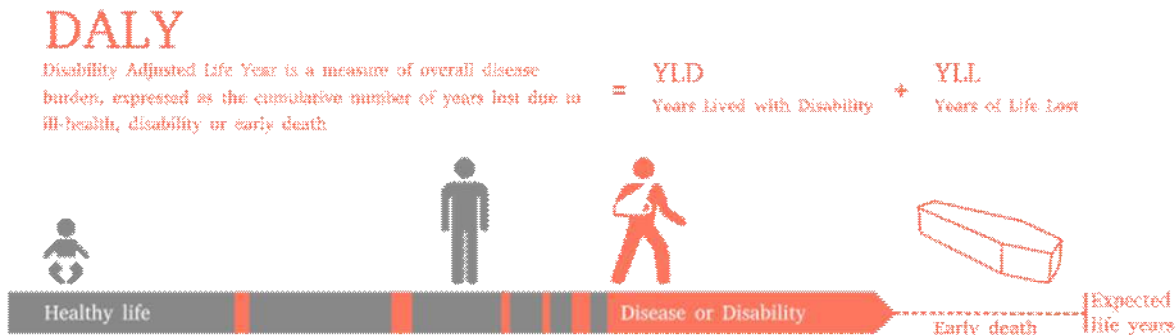
- Calculates monetary values of health benefits and costs to conclude if one side is greater than the other;
- Commonly expressed as cost-benefit ratio;
- Useful for comparing interventions with many diverse outcomes - most appropriate for economic evaluation of inter-sectoral interventions.

### Disability-Adjusted Life Year (DALY)

The **disability-adjusted life year (DALY)** is a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death. It was developed in the 1990s as a way of comparing the overall health and life expectancy of different countries.

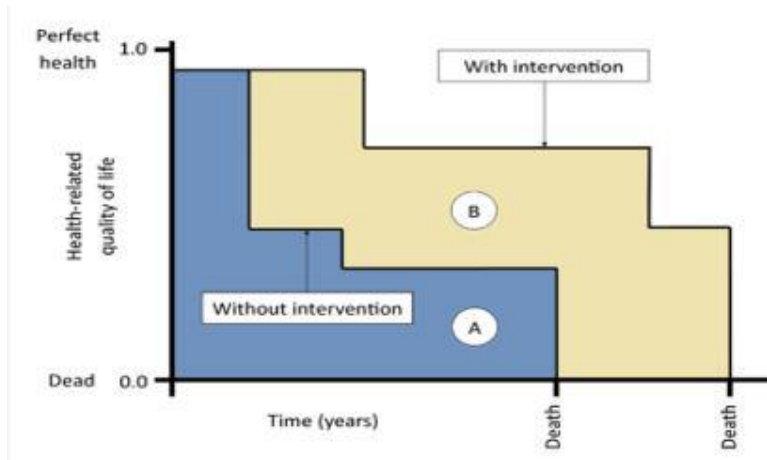
It is the primary metric used by the World Health Organization to assess the global burden of disease, and the primary metric used by projects such as the **Disease Control Priorities in Developing Countries** report to quantify the cost-effectiveness of different programs.

#### Calculation of DALY:



#### Quality-adjusted life year or quality-adjusted life-year (QALY):


The **quality-adjusted life year** or **quality-adjusted life-year (QALY)** is a generic measure of disease burden, including both the quality and the quantity of life lived. It is used in economic evaluation to assess the value for money of medical interventions. One QALY equates to one year in perfect health. If an individual's health is below this maximum, QALYs are accrued at a rate of less than 1 per year. To be dead is associated with 0 QALYs, and in some circumstances it is possible to accrue negative QALYs to reflect health states deemed 'worse than dead'.



### Use of QALY

The QALY is often used in cost-utility analysis in order to estimate the cost-per-QALY associated with a health care intervention. This incremental cost-effectiveness ratio (ICER) can then be used to allocate healthcare resources, often using a threshold approach.

In the United Kingdom, the National Institute for Health and Care Excellence, which advises on the use of health technologies within the National Health Service, has since at least 2013 used "£ per QALY" to evaluate their utility

 <b>Learner's Activity</b>	Make an example of QALY/ DALY
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## Summary

Different strategies are used here for clinical interventions and its evaluation measurement



## Study Skills

### Short Questions

- What is quantitative measurements?
- What are type of a quantitative measurements?
- Describe economic evaluation in disability.
- What is DALY? Briefly describe it.
- What is QALY? Briefly describe it.

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