Survey of Disability
Overview of Surveys and their design considerations

By
Rajendra Singh

UN Headquarters, New York
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- Goals of the survey
- Population of interest (target population) and sampling frame
- Type of disability surveys
- Approaches of sampling
- Estimation of sample size
- Documentation
- Summary
- Issues for discussion
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• Goals – important to design a survey
  – Prevalence rate – could be defined as:
    • At least one of the disabilities or by type of disability such as hearing, seeing walking, bathing, etc.
    • By demographic or socio-economic characteristics such as sex, age, employment status or income level, etc.
    • By level of geography – states, urban/non-urban, etc.
    • By any combination of above
    • Concepts of disability characteristics should be practical and could be implemented correctly

  – Precision – two options:
    • Coefficient of variation (CV)
    • Margin of error
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• Population of interest (target population) and sampling Frame:
  – Objectives identify target population, for example,
    • Any disability in the population – entire population
    • Disability rate for a province – population of province
    • Disability rate for school children – population of school children
    • Type of disability of persons living in long-term care centers – population living in long term care centers
• Sampling Frame – data source(s) from which a sample is selected
• Sampling Frame should
  – Represent population of interest
  – Be complete
  – Be recent or current
  – Be accurate
  – If above conditions not satisfied, take steps to meet above conditions
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• Approaches for sampling
  – Three main approaching for sampling:
    a) Standalone disability sample of HHs
       • A sample of enumeration areas (EAs)
       • Stratify EAs to form strata
       • Select EAs within stratum proportional to their population size
       • Select a sample of households (HHs) within selected EAs
       • Identify HHs with at least one person with disability
       • Partitions sampled HHs into two strata
          – One with HHs with at least one identified disabled person
          – Second with HHs with no identified disabled person
       • Select sample of HHs from both strata
          – Select a large sample of HHs from strata with disabled person
          – Select a small sample of HHs from strata with no disabled person
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• Standalone sample of HHs (Continued ….)

• Advantages:
  • More complete in terms of target population
  • Would collect detailed data on disability as its primary goal
  • Would collect demographic and/or economic characteristics of disabled persons as needed
  • Provide more insight about the disabled persons’ conditions
  • Greater flexibility

• Disadvantages:
  • It is expensive

• Limitation:
  • Budget
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• Main sampling approaches (continued …)

B) Incorporate a disability topical module in a survey

• Before using the survey to attach a topical module one must:
  – Understand the sample design of the survey to be used for topical module (target population, oversample, etc.)
  – Understand the limitation for using the survey (sample size, number of disability questions for topical module, etc.)
  – Understand the effect on main survey
  – Understand the implication on disability data (precision, limitations on amount of data)
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Incorporate a topical module (continued ...)

Advantages:
- Allows comparison of disabled persons with general population
- It is economical

Disadvantages:
- Respondent burden may adversely affect primary survey response rate
- May provides fewer details on disability questions since it’s not a primary disability survey
- Sample size constraint due to main survey sample size
- Less flexibility

Limitations:
- Sample size
- Amount of data on disability
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• Main sampling approaches (continued …)
   C) Standalone sample using administrative list(s)
   Two types of lists – a list of persons and a list of institutions
   1) List of Persons
      • Use organizations (stakeholders) with knowledge of lists with disabled persons to obtain all lists to form complete target population
      • Combine multiple lists together into one list
      • Stratify the disabled persons on list(s)
        – By geographical location (province, urban, rural, etc.)
        – By type of disability even if rates are not needed by type of disability
      • Select random sample from each stratum
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• Standalone sample using list (continued …)

  2) List of institutions
    • Use organizations with knowledge of lists of institutions
    • Create a combined list of persons for each type of institution
    • Stratify institutions
      – By their geographic location
      – By type of institutions (long term care center, home for assisted living or elderly, etc.)
    • Select
      – Simple random sample OR
      – Select a sample proportional to the number of disabled persons residing in each institution, and then select a random sample within the sampled institutions
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• Standalone sample using list (continued…)
  • The following applies for both types of list(s)
    – Unduplicate persons that are in two or more lists or institutions to get correct selection probability to result in unbiased results
    – Bias results for disabled population if list incomplete or inaccurate
  • Correct for bias due to incomplete or inaccurate list
    – For an incomplete list
      » Supplement list sample with general population sample
      » Select a larger sample from list frame and a smaller sample from general population
    – For inaccurate list, determine the source of inaccuracy and take steps to correct the list
    – Unduplicate persons that are in two or more lists – a difficult process unless persons have unique IDs
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• Standalone sample using list(s) (continued …)

• Advantages:
  – Good for target population such as persons with known disability, homes for elderly, long term care centers, home for assisted living, etc.
  – Easy to select simple random or systematic random sample
  – Possible to use stratified PPS sample to reduce cost

• Disadvantages:
  – Requires preparatory work
    » Check for list completeness
    » Check list for accuracy
    » Check list for being current
    » Check if persons on the list can be located
    » Creating frames by combing multiple lists (different formats, different order of field locations, etc.)
    » Supplement list sample with general population HH sample if list is incomplete

• Limitations:
  – Complexities may limit sharing and combining lists
  – Not always possible to get a complete and accurate list
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• Sample size considerations – objectives and budget
  – Objectives
    • Disability prevalence rate
    • Precision of prevalence rate -- two types
      – Coefficient of variation (CV)
      – Margin of error
  – Budget
• Parameters needed to estimate sample size are
  • Rate of disability prevalence – if unknown, use the best guess based on the available information
  • Precision for prevalence rate
  • Estimate of design effect – if unknown, use the best guess based on available information
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- Formula to calculate the sample size based on CV requirement;

\[ n = \frac{q}{(CV)^2} \frac{Deff}{p} \]

Where

- \( n \) = Sample size in terms of persons
- \( p \) = Disability prevalence rate
- \( q \) = 1 - \( p \)
- \( CV \) = Coefficient of variation
- \( Deff \) = Design effect

Finite population correction (FPC) factor is assumed to be 1 when \( n \) is very small compared to total population size. The sample size formula that include FPC will multiply sample size ‘n’ by FPC factor \([(N-n)/N]\) where \( N \) population size.
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• Design effect (Deff) is defined as
  – A factor by which the sampling variance for a survey is increased over that which would come about if a simple random sample was used with the same sample size.
  – Mathematically, it is defined as:
    • \( \text{Deff} = 1 + \rho (m - 1) \), where
    • \( \rho \) is the intraclass correlation and represents the clustering effect for the characteristic in question
    • \( m \) is the (average) size of the cluster
    • Deff is always \( \geq 1.0 \);
    • Deff = 1 for only simple random sample
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• Design effect role in sample size computation
  – Most of the countries use personal interviews to collect survey data
  – To save cost, generally simple random sample is not used instead a multi-stage stratified cluster sample is used
  – Cluster sample increases variance over simple random sample
  – Clustering effect high if characteristics under study is highly clustered
  – Disability is not expected to be highly clustered in general population survey -- multi-stage stratified cluster sample preferred
  – Disability is expected to be highly clustered in institutional population such as long term care centers, elderly housing, etc. – simple random sample preferred
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• Estimation of sample size
  – Initially estimate the sample size for each target population that meets objectives
  – Budget may not support such a sample size, therefore,
  – Determine the largest sample that can be supported by the budget
  – Consider trade-offs to use sample size supported by budget
  – Consider changing objectives (prevalence rate or precision or both) to remain in budget
  – Consider getting additional budget to support larger sample
  – Most likely it would be an iterative process to reach at final sample size
  – Discuss with sponsor(s) of the survey about the implications of insufficient budget
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- Survey documentation – an important aspect
  - Document for
    - Future references, and
    - To inform data users
  - Document should include
    - Sampling methodology
    - Estimation methodology
    - Quality of survey data including its strengths and weaknesses
    - Limitations of the data
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• Summary
  – Main considerations in designing a reliable and affordable survey are:
    • Objectives
    • Precision
    • Budget
  – Additional information (distribution by type, sub-national, etc.) would require larger sample
  – Increase efficiency of design by
    • Designing a stratified cluster sample
    • Using list/administrative frames when possible and disabled persons on list can be easily located
    • Screening for disability on national survey or on census of population and housing
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• Summary (continued …)
  – Ensure that the frame is complete, accurate and current, if not current, take steps to bring up to date
  – Use enumeration area (EA) as first stage of sampling from general population frame
  – Reduce bias when using list frames by
    • Supplementing list frame with general population frame
    • Unduplicate persons in different frames to get correct selection probability
  – Use multi-stage stratified sample when appropriate
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• Summary (continued …)
  – Use Proportion to population size (PPS) sampling scheme to select first-stage sample units
  – Reduce design effect by reducing cluster size
  – Consider adjusting objectives if insufficient budget
  – Document sampling and estimation procedures
  – Document data quality including its strength and weaknesses
  – Document limitations of data
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• Issues for discussion
  – What frame should be used? Census, list or list combined with general population frames.
  – Should disability survey use a standalone design?
  – Should topical module be used in a survey to collect disability data?
  – In case of using topical module, how to increase sample for disability module if primary survey does not have sufficient sample? (ex. collect data over several different time periods – months, quarters or years subject to primary survey design)
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Thank you
Rajendra Singh