

Research Methods in Health Promotion
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Week 04
Lecture 16: Research design and techniques

In this week we were discussing on this health promotion research techniques and the different designs. So, these are our learning objectives for this lecture. The chain of research in health promotion, health promotion research stages, purpose, types and methods, overview of qualitative and quantitative research, this part I have kept here. So, that will be able to grasp the basic differences between qualitative and quantitative research and, when they are used in case of health promotion research. And lastly we will be discussing a bit about sampling in health promotion research. Now in sampling again we will be having a gross overview of it.

So, that we can now understand as we go on with the course which type of sampling to use, which type of design to use and then we can move on to the different data analysis or in fact, the analysis of the whole study as well. So, let us start our discussion for this lecture. So, the research design in health promotion basically what is the use of having these research designs. The research designs or as some say the different research types or in fact, broadly it is said that the research techniques that are employed in health promotion, they are nothing but the selected strategy that the investigator uses to answer the research question.

Now you have the research question in the beginning and to answer the research question you are basically conducting the study. And to conduct the study here you are utilizing the strategy and that particular strategy is called the research design. This is usually applicable not only in health promotion research, but also in the case of core epidemiology or in other forms of research as well. Now apart from this particular research question as you can understand that the ethical issues that are involved the cost, the feasibility and the access to the study population because without the study population you really cannot answer your research question when we are speaking about the studies involving human participants. Now these are the different issues apart from the research question that play a significant part in choosing a particular research design.

Now we will be discussing how to choose a research design when a particular research design is chosen and we will be discussing about the different observational experimental quantitative methods as well in the subsequent lectures. So, there we will discuss how these ethical issues cost, feasibility and the population access these issues play a very important role in addition to the question of research design sorry research question. So, the first learning objective of

this lecture was the chain of research in health promotion. Now see as you can understand see this is particularly a chain ok. Now this is a chain right.

So, when you are utilizing this form of chain of research sorry ok. So, when you are utilizing this particular form of chain of research you should understand the intersections these are the intersections ok. So, what happens with these intersections? Here you can understand how the exploratory investigations they then move on to the refined investigations with priority populations, then they move on to the advanced investigation with the same population and then to the replicated investigations and different populations. Now this particular chain of research in it is very much important in terms of the health promotion research why because obviously, the health promotion research in most of the cases it starts with an exploratory investigation. If you have a very new issue at your hand consider the example of COVID-19 pandemic.

Now during the initial phases of pandemic what did we do? We had certain degree of this exploratory investigations. Now what happened? We tried to understand what is actually going on what are the different factors that are leading to these COVID-19 illnesses. So, here basically we are generating specific research questions and we are not specifically testing no we are not testing in this phase ok. The next phase is refined investigations with priority populations. So, that means, now we have generated the research question a very specific research question for example, what are the different socio economic determinants that are leading to increased COVID-19 transmission for example, among the popular among the rural people or the urban people ok.

So, that is the specific research question now since we have the specific research question we can now move on to the refined investigation. So, here we are performing very you know specific investigation on that particular priority population because in the specific research question we now know which population to focus. So, based on that population the refined investigation or specific investigation is going to be performed right. So, refined studies they initially test. So, after generating the specific research question the refined studies they are going to test a given set of research question and the priority populations are defined through the surveillance and epidemiological studies.

This part is important because from the specific research question we have the priority population as well as through the surveillance and epidemiological studies we have the these priority populations. And now we are going to test the given research question on that particular priority population. So, in if we consider the same example of COVID-19 pandemic what happened from the government report we already knew who are the people who are getting infected and also from our field level studies we understood that the people who are living in slums they are getting more and more infected. The reason may have been the

transmission easier transmissibility and the lack of protection in the population. But that research specific research question that started with the exploratory investigation now when we are testing it is called the refined study or the refined investigation with priority population.

Basically these advanced investigations they are built on findings from the previous tests of research questions. Now the refined studies it has two components first this is 1 and this is 2 why because in 1 what do you do you initially only test a set of research question that you have just found out through your exploratory investigations and then you have advanced investigations those are also you know part of refined studies, but at a later stage see here we have advanced investigations ok. So, the advanced investigations they are again based on these different tests the tests that you have already performed multiple times maybe ok. And this is the final part of the chain this one here we have we have performed the advanced investigations we have tested the research question multiple times and now we know the response in terms of the research questions we know why the COVID-19 pandemic is spreading more and more among the urban slum dwellers. Now we know here the replicated investigation or the replication studies they imply that you replicate your results you do more and more studies on the same population following the same reliable patterns and you replicate your results ok.

Here we know what we are going to find the interesting part in replication study is that investigations should be replicated with a second priority population. So, here you have a second priority population it may be the case that the COVID-19 pandemic was spreading as fast as in the urban slums as you know in the high rises in the urban areas. So, here the high rises though they were not the initially the priority population they will be considered as a second priority population and we can perform the replication study here. That brings us to our next set of discussion that is based on the exploratory and the conclusive research. What is the utility of exploratory and conclusive research? See in the previous slide the exploratory investigations they were the initial part of the of the research process.

So, after exploratory research is done you get conclusive research. Basically from exploration you have to bring some conclusion that conclusion is considered in conclusive research. What happens in exploratory research as we have already discussed these are preliminary type of studies and serves as the basis for the future or for further you know the conclusive researches. The research questions that are involved here the investigation the investigators they will basically describe the issue what is basically going on. If you consider a simple epidemiological description where the disease is occurring who are getting more you know affected by the disease these are descriptions of the problem.

Now similarly in health promotion as well if you have certain behavior for example, COVID appropriate behaviors that we usually study during the pandemic period. Now we can simply

just describe what are the determinants of COVID 19 COVID 19 appropriate behavior that would come under the conclusive research. Because in description we know who are performing these behaviors how they are performing when they are performing like these questions are answered in the description. But whether they are the determinant of the final behavior or not that will come under the conclusive part of research the conclusive research per say. What the conclusive research does it provides information that is useful for reaching conclusions or in making decisions right.

So, I mentioned about the conclusions here they will come at certain conclusions and also make certain decisions these decisions are particularly important for the you know the policymakers. In this phase you have five major purpose what are these five major purpose? First to document the scope of the issue. So, in conclusive research you identify what is the actual scope of the problem that you are discussing. Test causality whether the determinants that we are actually considering determinants we are they causal in nature. So, here we can test it for example, causality means smoking and lung cancer smoking directly causes lung cancer.

Now, we know that smoking I mean smoking is a causal factor to lung cancer. So, it is like that we can test we can understand the associated factors, but in conclusive research we can find out the causal factors. Identify the sequelae of disease or health condition. That means, what happens after the disease actually occurred and if those sequelae has any determinant that is already inbuilt in the disease process or not or in the in the social issue or not like that. Then we have to evaluate the evaluate measurement instruments this often we call it as the validation of the instruments.

This part we do in conclusive research, then we evaluate the treatments or interventions. So, the validation of the instruments are important why because the next part if we have to evaluate finally, it is based on whether your instruments whether the measurements that you have actually conducted previously and you are going to conduct after doing that particular intervention or the treatment is going to work or not whether the measurements are valid or measurements are reliable or not. So, both of these issues whether the tools are valid or not and whether the intervention that you have given whether that is working or not evaluation of that intervention all of these they come under the conclusive research part. This is the health promotion research stages, purpose, types and methods that we have mentioned in the in the concepts covered slide. This is very much interesting because here you have four phases of research basically.

First we discuss the different stages that we discussed already the exploratory stage and the conclusive stage. So, in exploratory stage what we have done we have generated insights about the problem, description of the problem that we have generated. Although we may be may not

be you know able to clearly demonstrate what exactly is the problem and what exactly is causing the problem for that we have the conclusive part of research. Typically the qualitative methods they are utilized during the exploratory phase, but please be careful because it is not only the qualitative methods there may be certain quantitative methods as well that are utilized during the exploratory phase simple observations may be utilized during this exploratory phase. Usually the sample sizes are smaller here we are making observations here we are trying to understand if at all there is any problem and whether that whether we can study that problem or not.

It is usually not generalizable because you have small samples. So, from a group of 1000 people you have selected 10 individuals for example, for doing certain explorations. So, obviously, you cannot generalize the findings from those 10 individuals to the 1000 people it is quite difficult because the sample size is so, so small. If you have considered 100 individuals out of those 1000 then there might have been a chance of generalizability. Now that is considered a larger sample size that we usually do with the conclusive part of research.

And as it has it has been mentioned over here the conclusive research this is typically quantitative in nature ok. So, typically qualitative is the exploratory part and typically quantitative is the conclusive part. And obviously, if you have appropriately taken the samples following certain sampling strategy and the sample size is sufficient with sufficient power. Obviously the results that you get you can generalize that result to the original population from where you have drawn the sample and it informs decisions. So, based on conclusive research you can perform certain advocacy to the policymakers, but the exploratory research it informs further research.

Now these we have discussed in the previous slide and we just have I mean put these things into a perspective so that we can understand what is the purpose of it. So, the purpose is it is descriptive. So, these are the famous questions we consider in epidemiology who, what, where, when and how. These are answered through exploratory research and the causality cause and effect whether smoking is causing lung cancer or not. Whether not wearing mask a particular very interesting behavior is causing increase in COVID-19 spread or not.

So, these are often the causal questions that are considered in the conclusive form of research. So, purpose one is descriptive and for conclusive research it is the assessment of the causality. Types this is very important because see we have mentioned that under exploratory it is observational and under observational we have mentioned qualitative and quantitative. So, a usual way of mentioning types when we study epidemiological studies are that all the research they are quantitative in nature and often we tend to forget the qualitative part of the research. So, under quantitative research we directly classify it like observational or experimental or like this.

So, this is what I would suggest you to follow or at least think before you design any study that the qualitative part of research it is also basically an observational part of or type of a study. So, of the qualitative study the method qualitative, qualitative inquiry falls under observational inquiry. And under observations as it has been mentioned previously regarding the exploratory research that you may have certain quantitative techniques at way as well. In the subsequent lectures we will be discussing regarding the different observational quantitative designs. So, there we will be discussing how the observational quantitative designs they are basically going to you know inform further research ok.

And under you know the experimental quasi experimental design we will be discussing what is experimental and what is quasi experimental later on in a later lecture. And to understand the perspective of it the causal research the purpose causal it leads to the experimental quasi experimental research where we identify the causality. For example, we are giving an intervention we are seeing whether the change is actually occurring. So, then we can attribute that particular change to that intervention. So, that again is a quantitative method of study or a quantitative type of study as you can call it.

So, this is an overview of you to decide which type of research you are going to do and particularly this you know this chart is helpful for framing health promotion research questions. Because in health promotion you typically will have certain behavior related issues certain social you know issues certain social stigma related issues that may not be directly you know measured or that may not be directly tangible. So, these kind of issues they are more you know we discuss them more in health promotion research and this framework will help you identify which type of research you can actually perform with the level of question or the or the degree of clarity that you have with your question. Now, regarding qualitative versus quantitative research as you have noted that the quantitative research it can be simply observational or it can be intervention. But usually from a health promotion research perspective we perform the qualitative research typically only the qualitative research for you know only the observations.

Now, there is another term called a mixed method research. So, a mixed methods research or a mixed design it basically utilizes both these types of research, but please understand we will be discussing mixed methods later on in subsequent weeks, but since we are discussing qualitative and quantitative research. So, it is very good place to you know introduce the concept of mixed methods. What happens with mixed methods? It utilizes the components of qualitative research and also quantitative research, but it is not simply qualitative and quantitative research put together. Mixed methods research mean you have certain research question where you need certain qualitative inputs maybe to put the quantitative findings into perspective.

So, they need to be integrated without that you cannot really perform a typical mixed methods research and qualitative and quantitative by mixing them it is not really a mixed methods research. In that scenario what happens you have separate research question for the qualitative part of your study and you have separate research question for your quantitative part of study. That means, that ultimately is a study where you basically have two different research questions and that is not essentially mixed methods research. Anyways we will be discussing mixed methods later on. So, regarding the research designs and techniques the qualitative research it is utilized in the exploratory stage and the quantitative research it may be utilized in the exploratory state and it also may be utilized when you are trying to find certain causal associations as well.

So, you know the quantitative methods they actually measure the output variables or the outcome of the study in terms of numbers that is why the term is called quantitative and in qualitative you do not have that typical numerical expression of your outcome variables or the proportions, numbers, odds ratios these kind of factors these are not available with the qualitative research. But with qualitative research you can also have certain degree of quantification of qualitative data. For example, if you have a theme appearing out of a qualitative research you can demonstrate the theme in terms of numbers percentages like this. So, again we have a separate week for qualitative research related discussions. This is just to put all the things into perspective so that you can understand which type of research design to actually follow.

So, what are the key issues regarding research technique? Till this point we have discussed regarding the research designs the different types of studies that we may conduct in health promotion. Now we are discussing now three key issues for our consideration when we are basically designing a particular study. So, the first one is selection of the participant because we know that without participants we really cannot conduct a health promotion study. Next key issue is measurement of the variables. How do we measure the outcomes that we want to have from this study? How do we analyze the findings? So, for selection of participants you have sampling.

Sampling is the method of selecting some individuals from a large group of population or the target. Then you have to devise your appropriate tool again we will be having a separate lecture for the validation and reliability aspects. And for analysis you have separate you know data analysis strategies some for qualitative, some for quantitative like this. And we will be discussing those at a later stage of this course. So, for now we will be detailing a bit more on the sampling aspect of it.

So, in sampling you have few keywords sampling what is sampling it is taking any proportion of a population or universe as representative of that particular population or universe. Universe means the number of people that you have for example, if you have this is you have different individuals over here. So, these are your individuals I am putting dot for the individuals. So, they are all your universe or the population the individuals they are your population and this is the universe and you are selecting for example, you are selecting this person you are selecting again this person again this person. So, the individuals whom you are basically selecting is the process is called the sampling and the individuals that you have selected they are called a sample.

And this is basically the target population that we were discussing. What is the target population? It is the collection of all individuals, families, groups or organizations whatever the unit may be or events that we are interested in finding out about. So, the you know the sampling universe may be this portion, but the target population it may move beyond this portion. Interesting part is within this portion if you are if we are considering to study only the 18 year old individuals then the target population will be 18 year old individual, but in your universe you will find some 65 year old individuals, some 30 year old individuals, some 40 year old individuals and obviously, some 18 years old individuals. Then you have to first you have to select all the 18 years old individuals and then you have to sample out of them.

So, for that you have inclusion and exclusion criteria as well. Next comes is what is a sampling unit? It is the unit about which information is collected. For example, if you are collecting information about the individuals we call it individual as a sampling unit. If we are collecting data regarding the households then household becomes your sampling unit. What is your unit of analysis? It is the unit that provides the basis of analysis of your data.

Now see if you have collected data regarding these individuals, you have collected data from these individuals and you are now trying to analyze the data considering all of these individuals together. So, now, the unit of analysis has become broader, but basically where you have selected the sample it is you know it is comparatively lesser to the to the compare when compared to the unit of analysis. This will invariably give rise to problems and you will face certain biases. So, the key issue is you need to maintain certain alignment between sampling unit and the unit of analysis. What is the sampling frame? It is the actual list of sampling units from which the sampling will be done.

So that means, the all the 18 year olds that we have actually selected or based on certain other inclusion exclusion criteria what we have? We have the sampling frame and from the sampling frame will actually finally, select the samples for the study. Now, these are certain you know sampling techniques we have certain probability sampling designs. Simple random sampling here we have certain dots for example, these are your individuals simple random sampling

means we randomly select these for example, these three individuals and we do not have any particular system or any particular rule for selecting these. How do we do the simple random sampling? We you know we usually utilize the different formula for say random number generation we may use random number charts like this. Systematic random sampling it means you have 1, 2, 3, 4, 5, 6 these individuals in line from them you have to select suppose two individuals ok.

So, in this group of people what you can do? You can select the first one that may be again based on a random number or the second one what the random number will say. So, the first point selection in systematic random sampling will be random and after that from out of six individuals you have to select two. So, you will be selecting every third participant. So, after if you have selected one you will be selecting participant number four. What happens with stratified random sampling? You have different strata like this these are the different strata and you select based on this strata for example, that may be a strata of 18 years of age participants that this may be a strata of 65 years of age and you are studying a COVID-19 related research proposal then you have to select participants from this strata from this strata like this ok.

So, you select participants based on which strata they belong and what is the cluster? Here the different homogeneous these are called homogeneous because all the participants are 18 years old all participants 65 years. In a cluster consider this as a cluster of four you have four clusters you have some 18 year old individual some 65 year old even again you have some 18 years old individual some 65 some 18 some 65 like this. What you do? You select a particular cluster. So, you are not directly selecting these individuals 18 or 65 you are not directly selecting ok. So, what do we did we do in the stratified random sampling we selected homogeneous strata and in cluster what we are doing we are selecting a particular cluster that may have certain number of 18 years and 65 years that we have to find out later on.

Usually we do not select only a single cluster usually we select 2, 3 or whatever defined number of clusters that we may need to select that is based on a calculation called sample size calculation. However, we will not be discussing sample size calculation currently there are different formula and there are different softwares through which you can actually calculate sample sizes. And then you have multistage sampling where you will be having you know the different individual based samplings and you will be clubbing them in different levels. For example, if you have to select individuals based on strata from a different cluster you can have multistage sampling like that. Non-probability sampling these are not based on these probabilistic methods because here you have a defined probability of selecting these participants.

You can say that the probability of selecting this cluster is 1 out of 4, the probability of selecting this strata is 1 out of 2 or for this person is 1 out of 3 like this. But in non-probability

sampling we do not have this kind of defined probability, we do it based on our convenience or based on our purpose we can have a quota for it. There are certain things called snowballing and the derivative of snowballing is called a respondent driven sampling. And an interesting sampling technique under non-probability sampling is venue based time sampling. This I will be discussing a bit later on the slide because these are not your typical non-probability sampling.

Here you do a non-probability sampling, but based on certain probabilistic assumptions. So, what is a venue based time sampling? Here it is specifically done for certain hard to reach populations. Examples that I have given for example, commercial sex workers or injecting drug users, what happens is sometimes the injecting drug users they gather around at a particular spot you know at a particular time. So, first before actually performing this sampling you have to go and find when these individuals they are gathering around and when they are you know and in which time they are doing all their activities. So, you have to have a particular epidemiological and also ethnographic aspect built into this you know into this particular sampling.

Once you know when they are present over there you can select that particular time and day ok. Once you have selected that particular time and then you can go and purposefully or you know based on your convenience you can select the individuals whoever is giving consent for that. So, here basically the venue and time this is what we are sampling and once we have done that sampling for example, we have every Wednesday in a month they are gathering somewhere. Now, we can select which Wednesday to target when do we go on that particular Wednesday then after going there we will select purposefully.

So, that is what is a venue based time sampling. So, to conclude we have discussed that what are basically research designs and techniques the general overview we discussed and we discussed that is not really about the research question only it is also about the ethical issues, the cost, the feasibility, access to the study population. We can see the access to study population was very much important when we discussed in the previous slide about these hard to reach participants. For them we had to change our sampling design and by changing the sampling design obviously, the method of inference that also got changed and the answer to the research question also got changed. So, that is how the research question will vary these are the issues. Now, the research that we do in health promotion that may be exploratory that may be conclusive usually the exploratory research that is done in the beginning and after that we do the conclusive research.

The conclusive research helps the policymakers in devising certain policies or concluding and arriving at certain decisions. We also discussed that often the qualitative research is usually aligned with the exploratory stage and the quantitative research is more aligned with the

conclusive state and more with you know the causal inferencing studies and everything. We now know that participants are selected through sampling techniques we discussed different types of sampling techniques very briefly and we understood how the venue based time sampling is done. We also discussed about the snowballing. What is snowballing? You basically go to a one particular person who is for example, say an IDU, injecting drug user.

One way is to go for a venue based time sampling, but also you can ask that particular person who are other members of your cohort. You have to gain trust of that person, but you can ask then that will be a chain of network and you can gain access to another person. That is your snowballing and another semi probabilistic method of snowballing is called a respondent driven sampling, where you utilize the method of you know network and everything. So, these are certain issues that we consider in health promotion research and the sampling part it is also bit tricky in health promotion research. We will be discussing more on this as we go more and more, you know, with this course.

So, these are the resources that we have utilized for this particular lecture. I would strongly recommend you to go through all the three resources particularly the first one because it is one of the you know acclaimed textbooks in health promotion. So, that is all for this lecture. Thank you.