Module:
Mental health in the community

Week 3
The epidemiology and burdens of mental disorder

Topic 1
The epidemiology of mental disorder

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Lecture transcript

Slide 3
OK. Well, this talk is about the epidemiology of mental disorder, or to subtitle it, 'why counting stuff is useful'. I suppose the first question is, what is epidemiology? My new not-very-short Shortened Oxford English Dictionary defines it as 'the branch of medicine that deals with the incidence and transmission of disease in populations especially with the aim of controlling it.'

In more detail, the Dictionary of Epidemiology describes epidemiology as 'the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems.' Health problems there aren't just diseases, as you'd understand them, but other things, such as, for example, road traffic accidents. So there's an epidemiology of road traffic accidents, and there are strategies to decrease these. They are in fact, a major public health problem across the world.

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What does epidemiology involve? Well, first of all, it involves defining disorders, and then counting and mapping these disorders in place and time, linking the occurrence of disorder to potential causative factors, and then identifying appropriate interventions-- possibly public health interventions, in the case of infectious disease, for example.

Now, another definition of epidemiology in more detail, 'epidemiology is the study' -- scientific, systematic, data-driven-- 'of the distribution' -- that is to say frequency, pattern, 'and determinants' -- that is to say causes and risk factors, 'of health-related states and events' -- not just diseases, as I said, 'in specified populations' -- so the patient is a community, or a set of individuals viewed collectively, 'and the application' -- since epidemiology is a discipline within public health, 'of this study to the control of health problems.'

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Now, there are a number of excellent free texts on epidemiology available on the internet, and these are provided as additional references for you that give the basics of epidemiology.

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There are two broad strands to epidemiology. The first is descriptive epidemiology, which tells us about the prevalence, incidence, variation between populations, comorbidities, and burden of disorder. And then there's analytical epidemiology, which seeks to tease out causes.

Epidemiological understanding also underlies the design of intervention studies. Will doing x improve health outcomes? That's a very important area, but I won't be discussing it.

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Now I'm going to give you an example of epidemiological thinking that goes right back to the beginning of epidemiology as a useful, functional discipline. This is about John Snow and the Broad Street pump. Broad Street was a street in Soho, it's now Broadwick Street in London.

In 1854, there was an outbreak of cholera in London. The cause of cholera at that time was unknown (it's, in fact, a waterborne bacterium). Snow's theory was that it was caused through the drinking water. Snow mapped the incidence-- that's to say onset-- of cholera, and mapped this to the water pumps in the area, noting a clustering of cases around the Broad Street pump, and no cases amongst workers at a local brewery who had access to a deep well and free beer.

Snow then related cholera cases to where the victims drew their water. The epidemic abated when the handle of the Broad Street pump was removed-- incidentally, much against the residents' wishes.

Now, you can see, actually, Snow's original map, so he was using the technology of his time to map the distribution of the disorder, and then draw inferences on this map. So Snow then undertook more detailed analysis, and he found that there was less cholera in areas by the Lambeth Water Company than the Southwark Water Company.

Lambeth drew its water above London's sewage outlets, Southwark from below. In areas served by both companies, there was more cholera amongst people who used the Southwark Water Company, and this data supports the hypothesis that untreated sewage is a source of cholera. Snow is now commemorated with a plaque at Broad Street, and also, there's a pub named after him.

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The next example of epidemiological thinking is a very striking study by Doll and Hill, early epidemiologists. They looked at the death rates from lung cancer amongst doctors, British male doctors, between 1951 and 1961, and related death rates to the average number of cigarettes smoked per day by each doctor, and they found a straight line relationship between the number of cigarettes and cancer deaths, which proved a very strong argument for something in cigarettes causing lung cancer. That has led to a public health revolution in the sense that we are now aware of the risks associated with smoking, and, for example, very few doctors now smoke.

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Epidemiology is alive and well. You probably know that there's recently been an outbreak of a virus, the Zika virus, in South America. Rapidly after the onset of this outbreak, its transmission, its effects on people and the foetus, its genome, has likely spread. Possible vaccines have been researched by infectious disease specialists.

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Now I'm going to say a little bit about psychiatric epidemiology. It's a branch of epidemiology that looks at the distribution of mental disorders in the population. It helps us understand the onset, cause, and outcomes of mental disorders, helps us measure the burden on society of mental disorders, and also, seeks to identify causal mechanisms underlying the development of mental disorders, with the aim of prevention and modifying outcomes.

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Those are basic concepts in psychiatric epidemiology. The first is caseness, that is to say, defining the presence of a mental disorder using specific operational criteria. And, as we've already discussed, defining caseness is a complex and, to a large extent, contested business.

The next concept is incidence-- the transition to caseness over a defined period of time, usually a year. The final concept is prevalence-- the proportion of people who are cases at any one particular time, which is point prevalence, or over a defined time period: for example, one-year

period prevalence-- the number of people who have a disorder during a year-long period, or over a lifetime-- lifetime prevalence.

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Now, if we approach the problem of the epidemiology of mental disorder from a descriptive perspective, we can identify the population of interest. We can sample the population. We can use structured interviews, which provide data on symptoms and disability. And then, provide estimates of caseness, diagnosis, and the burden of illness within a population.

So defining mental disorder, we've already said, very contested. For the purposes of epidemiological studies, some decision needs to be made about how to define, and all recent studies have used defined diagnostic criteria that are definitely reliable, but have contested validity. The majority of studies, in fact, use the DSM structure from DSM-III through its successors, DSM-III-R and DSM-IV, and no doubt, we'll see in the future, studies using DSM-V to define the population-- and then, instruments derived from DSM-V to interview people, and come to a determination as to whether a disorder is present or not.

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If we approach the problem from an analytical perspective, we do things as above, but then have a plan to break the population down in a structured fashion, and identify other things that you want to measure as correlates or causes of mental disorder in general, or a specific mental disorder. This may involve a variety of different methodologies, from population-based surveys-- for example, case-control studies, where we compare identified cases with non-cases for the presence of a variable of interest.

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Now, the classic epidemiological studies of mental disorder of recent times are from the United States. Firstly, the Epidemiological Catchment Area studies of the 1980s, and then, the National Comorbidity Study in the 1990s, and then, in the 2000s, the National Comorbidity Study Replication, NCSR. And these have in turn used diagnostic tools developed in relation to DSM-III, DSM-III-R, and DSM-IV.

These studies all have significant limitations. For example, they don't tell us anything useful about low-prevalence disorders like schizophrenia, and we need alternative sources of information for these. They also have missed out mental disorders in the elderly, which are a very important source of societal burden in advanced countries. But despite their limitations, the studies have been seminal and are very important.

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Now, of the studies, the latest, the NCSR, has a number of headline findings summarised in an edition of the Archive of General Psychiatry that had the key reports, and the headlines are that mental disorders are common. So a 26.2 per cent 12-month period prevalence was identified, and no less than 46.2 per cent lifetime prevalence. Disorders tend to be of early onset. So 75 per cent of disorders have begun by the age of 24. The majority of disorders are serious or of moderate severity. Also, comorbidity is common-- that is to say, the presence of more than one definable mental disorder at the same time (and perhaps that's a sign of the lack of validity of the classification systems used). Finally, access to treatment is very limited, of relatively poor quality when it happens, and when it does happen, often very delayed.

Despite very divergent and fairly crude assessment strategies, the available data consistently demonstrate, a) an association of all mental disorders with a considerable disability burden, in terms of the number of work days lost, and b) generally low utilisation and treatment rates. They tell us only 26 per cent of all cases had any consultation with professional health care services, a finding suggesting a considerable degree of unmet need.

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So in terms of prevalence of mental disorder, there's absolutely no doubt that experiencing mental disorder is common. There's data on this across countries, which suggests wide discrepancy prevalence. This is summarised in the WHO World Mental Health Survey published in 2007.

In fact, some of these differences aren't entirely plausible. So are people who live in Spain twice as mentally healthy as those living in France? That's what the survey suggests-- doesn't seem terribly likely.

The relatively hard suicide data supports the idea of some variance in societal expression of mental disorder. There's some countries having very high suicide rates. But the WHO data on mental health suggests a low prevalence of disorder, while suicide rate in Japan is actually very high. Again, not entirely plausible.

Looking at suicide, we also know suicide rates vary in a country over time, reliably increasing at times of social dislocation. The epidemiology of suicide is very interesting. So you have countries of relatively low prevalence such as Britain, countries of moderate prevalence such as the United States, and countries of high prevalence such as Russia.

The difference between the United Kingdom and the United States is also very interesting, because it's almost entirely made up of death by suicide by one specific method-- gunshot wounds. Guns, as we know, are readily available in the United States. Much less available in the United Kingdom, and are therefore much less used as a means of suicide.

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So what do epidemiological studies tell us? Putting aside the concerns about diagnosis and the quality of the epidemiological studies that have been carried out, we have a lot of data on the prevalence of mental disorder. Comprehensive information has to include both population-based surveys, which, broadly speaking, pick up common disorders that are of less severity, and administrative data that takes into account what we know about treated populations with severe mental illness and mental disorder, such as, for example, schizophrenia. People with schizophrenia tend not to answer the door when canvassed in population-based studies.

Now, there is specific European Union data, which has actually evolved over time. And in 2005, Wittchen and Jacobi published a paper in European Neuropsychopharmacology, and I'll summarise what they say.

Epidemiological data on a wide range of mental disorders, from community studies conducted in European countries are presented to determine the availability and consistency of prevalence, disability, and treatment findings for the EU. Using a stepwise, multi-method approach, 27 eligible studies with quite variable designs and methods, including over 150,000 subjects from 16 European countries, were identified.

And they go on to describe the results.

Prevalence: on the basis of meta-analytic techniques, as well as on re-analysis of selected data sets, it's estimated that about 27 per cent-- that equals 82.7 million-- of the adult EU population age range 18 to 65 is, or has been, affected by at least one mental disorder in the past 12 months. Taking into account the considerable degree of comorbidity, about 1/3 had more than one disorder. The most frequent disorders are anxiety disorders, depressive, somatoform, and substance-dependent disorders. When taking into account design, sampling, and other methodological differences between studies, little evidence seems to exist for considerable cultural or country variation.

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Further headlines: for me, as a psychiatrist, I'm interested in the prevalence of psychosis, and so

studies suggest roughly an annual prevalence of one per cent; bipolar disorder, again roughly one per cent; and for major depression, seven per cent.

You'll note that the spread of prevalence estimates is, in fact, quite wide. And so Wittchen and Jacobi are using the median as prevalence that they quote in their headlines. And again, remember that annual prevalence, 27 per cent? Strikingly similar to the NCSR data, which is a completely separate data set.

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Wittchen and Jacobi go on to look at disability and treatment, and they conclude, despite very divergent and fairly crude assessments strategies, the available data consistently demonstrate, a) an association of all mental disorders with a considerable disability burden in terms of the number of work days lost, and b) generally low utilisation and treatment rates. They tell us only 26 per cent of all cases had any consultation with professional health care services, a finding suggesting a considerable degree of unmet need.

In conclusion, the paper highlights considerable future research needs for coordinated EU studies across all disorders and age groups. As prevalence estimates could not simply be equated with defined treatment needs, such studies should determine the degree of met and unmet needs for services by taking into account severity, disability, and comorbidity. These needs are most pronounced for new EU member states, as well as, more generally, for adolescent and older populations.

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So the EU and the US data are entirely consistent. They tell us there's a lot of mental disorder, over a quarter of the adult population will meet diagnostic criteria in a year, and only a relatively small portion of people with mental disorder are receiving treatment.

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Let's move beyond the descriptive epidemiology. So we know quite a lot about how common mental disorder is. We know a fair amount about the impact of mental disorder on the individual and society, and I'll be saying more about this in the next talk. But an epidemiological approach may help to identify the causes of mental disorder, and from that, obviously, ways of prevention and treatment.

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Analytical epidemiology, when looking towards causation, again, uses a number of tools. One tool is relative risk. In statistics in epidemiology, relative risk, or the risk ratio, is the ratio of the probability of an event occurring-- for example, development of disease, being injured-- in an exposed group to the probability of the event occurring in a comparison non-exposed group. So you could present Doll and Hill's data as relative risks for lung cancer, in terms of smokers and nonsmokers, and then smokers stratified by smoking habits.

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So what do we know about the relative risk of psychosis? This has been summarised in a number of seminal papers and articles. So what do we know?

Well, pre-morbid cannabis use has a relative risk of 2.0. Urban birth has a relative risk of 2.4. The children of emigrants to the United Kingdom have a relative risk of 7.0. If you have a history of psychosis in a first degree relative, your relative risk is 9.3. So you can see a gradation in relative risk for different risk factors. Interestingly, Paul Bebbington and colleagues have looked at the relative risk of a history of child sexual abuse and psychosis, and they found the odds ratio-- which is a very similar construct to relative risk in low prevalence conditions, and effectively identical in those conditions-- they found an odds ratio of 10.1. That's a very striking finding.

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Could we look at causal mechanisms for psychosis? Historically, epidemiological interest is focused on social factors-- for example, emigration, urbanicity, psychosocial stresses, and life events-- on the prevalence of mental disorders. More recently, there's been a focus on elucidating mechanisms through which social forces might result in the onset of mental disorder, and this material is far beyond my expertise. But there are some potentially very exciting developments underway in what you might call a new psychiatric epidemiology.

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So in a recent edition of Social Psychiatry and Psychiatric Epidemiology, we have a set of papers looking at potential factors, including inflammatory biomarkers in common mental disorders, gene-environment interactions in psychosis, the impact of social environment on neurobiology, the potentials for genome-wide research, investigating both common mental disorders and psychoses, and then the potential impact on understanding of epigenetics and psychosis.