The ‘yin and yang’ of epidemiology — the North West Adelaide Health Study as an example of the successful merging of quantitative and qualitative ways of thinking

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Introduction

Epidemiology, as we know it, is the study of the distribution and determinants of health-related states or events that are normally communicated in numeric terms such as rates, percentages, risk ratios, medians, means and confidence intervals. The thinking informing epidemiological methods has been drawn from a reductionist tradition which is increasingly acknowledged as being limited in addressing the complexities of health problems.

The complex nature and context of health problems mean that the design of future public health policy must be informed by a diversity of evidence. Increasing attention is being given to the need to combine different methods of data collection and analysis in the investigation of health and social issues. The purpose of this paper is to continue dialogue and debate about how epidemiology can achieve this by applying both qualitative and quantitative ways of thinking.

In contrast to quantitative or reductionist research, qualitative research explores a situated activity where ‘qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of meanings people bring to them’. These two different, but complementary, research approaches are both valuable epidemiological research tools. We use the North West Adelaide Health Study (NWAHS) as an example to show how these two different ways of thinking contribute to producing an innovative knowledge network.
Addressing the complexity that is public health

The use of mixed methods research (the use of quantitative and qualitative methods) has been the subject of much debate. Like others, we argue the need to consider how qualitative and quantitative ways of thinking complement each other to address the complexity that is public health. We acknowledge that terms like ‘quantitative research’ and ‘qualitative research’ have many diverse and contested meanings, but it is not our intent here to debate this. We suggest that the variety of approaches labelled as either qualitative or quantitative research provide the diversity of data needed to address public health problems precisely because they are different.

Researchers informed by a quantitative way of thinking provide descriptive statistics and epidemiology, as mentioned above. Researchers informed by a qualitative way of thinking provide a textual description of populations, groups or individuals. Qualitative researchers can offer descriptions of how people think/feel/do/value to give contextual understandings.

Quantitative research can be differentiated based upon the type of statistical test, from descriptive to inferential, that is applied to the data gathered. So too can qualitative research be differentiated. Qualitative researchers can offer descriptions; interpret material using specific methodologies (e.g. hermeneutic phenomenology); apply specific methodological rules to interpret what people think, feel, do and/or value; and be informed by specific theoretical positions that direct them about how to think and, in turn, analyse, the data or material collected (see also the paper by Baum on differences between quantitative and qualitative research).

North West Adelaide Health Study methodology

Combining population health surveillance, biomedically measured data and research focused on articulating how individuals think about, feel or perceive their health and health services has been an important consideration of, and for, the team of NWAHS investigators.

There are many benefits from combining different perspectives on health issues, including:

- enhanced data quality and quantity
- actionable results in local situations
- findings having more credibility to consumers, policy makers and practitioners
- increased health awareness
- enhanced trust between the research teams and the public
- improvements in research definitions and directions
- enhanced translation and sustainability of research findings
- improvements in the community's health, education and socioeconomic situation as a result of involvement in proposed participatory programs and ongoing research
- fuelling of alternative theoretical frameworks.

As Chief Investigators of NWAHS, we believe that our participation and bringing together of different ways of thinking constitutes NWAHS as an innovative formal knowledge network, one that can accelerate the creation and implementation of public health solutions for sustainability. As Chief Investigators of NWAHS, we believe that our participation and bringing together of different ways of thinking constitutes NWAHS as an innovative formal knowledge network, one that can accelerate the creation and implementation of public health solutions for sustainability.

‘Formal knowledge networks consist of groups of expert institutions (people) working together on a common concern, strengthening each other’s research and communications capacity, sharing knowledge bases and developing solutions that meet the needs of target decision makers at the national and international level.’

Our experience with NWAHS has demonstrated that qualitative research can enrich understanding of complex problems—often supplying the ‘why and how’ when traditional epidemiological methods have provided the ‘what’. Having a qualitative component can assist in developing a larger information base from which to interpret biomedical and statistical findings.

NWAHS is an epidemiological population-based cohort study exploring chronic conditions, risk and protective factors and health-related quality of life of people living in the north-western region of Adelaide. Details on the study methodology and selected results are published elsewhere. In the study 4060 randomly selected adults (aged 18 years or older and living in the northern and western suburbs of Adelaide at recruitment) were recruited in 2000–03 via computer-assisted telephone interviewing (CATI) to participate in a longitudinal study of health. The study is currently in the field for the third time, with over 82% of the original cohort still participating.
Epidemiology and Public Health

The study is based on traditional epidemiological investigation of chronic disease and health-related risk/protective factors, with the key diseases verified by a range of clinical (quantitative) tests. These include lung function tests for asthma and chronic obstructive pulmonary disease (COPD)\textsuperscript{17,20}, fasting blood for diabetes and cholesterol\textsuperscript{21}, two calibrated sphygmomanometer measurements for high blood pressure, the use of calibrated scales and stadiometers for height and weight\textsuperscript{22,23}, and a combination of these measures to determine the presence of metabolic syndrome.\textsuperscript{24} However, the Chief Investigators of the study hold the view that it is important that assumptions in population research are challenged on an ongoing basis and the risk factor paradigm is broadened and questioned. In so doing, the study can ensure rigorous development and full use of the multidisciplinary research team and the generous participation of participants, and offer reliable and diverse evidence and advice to policy and other decision makers.

The ability to analyse NWAHS data from both qualitative and quantitative perspectives has increased understanding of the range and corroborative nature of the evidence that will form the basis of policy and investment decisions. Bringing together researchers who offer quantitative and qualitative ways of thinking facilitates a process of critical reflection on the overall project focus—on what is learned and how different situations may change outcomes. Importantly, the team have regular discussions on:

> why some questions were raised and not others
> why it was that some groups were involved and not others
> why some phenomena were observed and not others
> why one sense of each situation was made instead of an alternative sense.

The qualitative studies undertaken within the NWAHS project have covered both of Popay’s models\textsuperscript{25}—the ‘enhancement model’, where the qualitative research has enhanced the biomedical research; and the ‘epistemological model’, where the qualitative research has itself produced new knowledge. In addition, and almost as importantly, the qualitative research has assisted with methodological issues such as increasing response rates and quality control of the biomedical clinical examinations.

Examples of studies within NWAHS that use qualitative methodology include:

> describing the experiences, perceptions and understandings of people with a chronic condition\textsuperscript{26}
> describing education and information issues among people with diabetes\textsuperscript{27}
> identifying community responses to the idea of taking part in a longitudinal study\textsuperscript{28}
> understanding why people are unwilling to participate in NWAHS\textsuperscript{29}
> learning from exit surveys of people taking part in the study\textsuperscript{30}
> understanding the influence of self-reports by people living with chronic disease\textsuperscript{31}
> exploring the impact of death on the provision of contemporary health care\textsuperscript{32}
> rethinking partnerships in contemporary health care.\textsuperscript{33}

Summary

Qualitative and quantitative research approaches can be the ying and yang of epidemiology. The qualitative research field has a stringent set of criteria on which to assess a study design.\textsuperscript{34} The epidemiologist needs to make sense of the rates and ratios, as well as incorporate the findings into the context of the social world in which the participants/responders/subjects live. As argued by Popay\textsuperscript{25}, ‘neglecting the contribution that qualitative research can make to epidemiology is failing to deliver (this) potential’. After all, the two different ways of thinking are based on the same concerns—‘the wellbeing of people in the community’.\textsuperscript{35}

The NWAHS has successfully combined these two approaches so that the epidemiological-based results published have not been isolated from the personal accounts of patients and the complex nature of chronic diseases, and the associated factors are not presented with stand-alone empirical statistics.

References


Epidemiological evaluation of mammography screening

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Background

Breast cancer remains the most common cancer in females notified to Australian cancer registries, well ahead of colorectal cancer in second place.\(^1\) Breast cancer has long been the leading cause of cancer death in Australian women, although it is now being overtaken by lung cancer.\(^1\) Age-standardised breast cancer mortality rates were stable between 1970 and 1990, but an approximate 27% decrease occurred between 1990 and 2006.\(^1,2\) This and parallel reductions in other western populations have been attributed to mammography screening, adjuvant therapies and possibly other treatment gains, with the collective results of modeling indicating approximately equal contributions from screening and treatment.\(^3,4\)

Multiple field trials have indicated a reduction in mortality from mammography screening (Table 1).\(^5\) In response to a challenge of this evidence by some researchers, a panel of 24 experts from 11 countries was convened by the International Agency for Research on Cancer (IARC). The panel found the trial evidence to be valid, and that it pointed to a 35% reduction in breast cancer mortality in screening participants aged 50–69 years.\(^5\)

Effects of mammography screening around the world

Effects of mammography screening on breast cancer mortality are more difficult to evaluate under normal service conditions where screening is not randomly allocated between test and comparison groups. Nonetheless, these evaluations indicated reductions in breast cancer mortality of between 32% and 43%, depending on assumptions made when adjusting for screening selection bias (Table 2).\(^6\) Notably, this range encompasses the 35% reduction estimated by the IARC panel from the trial evidence. Case-control study results, while variable, have pointed collectively to a 37% reduction in breast cancer mortality,\(^7-10\) which is also close to the 35% figure cited by the IARC panel (Table 3).