The role of case studies as evidence in public health

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Abstract

Background

Case studies are used in evidence-based public health and are generally considered useful in public health. Case studies vary in quality and content and are difficult to find and critically appraise.

Methods

This study used a mixed methods approach; a literature review, a content analysis of a sample of case studies and a small number of qualitative interviews on the use and usefulness of case studies. The aim of the study was to define, explore and make recommendations around the nature and use of case studies in public health.

Results

Our research points to the role that case studies have in public health in capturing real experiences of public health work in a specific time and place, and as ‘stories’ of what interventions or event took place. They are produced by a variety of organisations and vary in content and purpose. There are potential guidelines to aid the production of case studies and to aid the critical appraisal of case studies, enabling translation into practice and replication.

Conclusions

Case studies capture local knowledge of programmes and services, and illustrate processes and outcomes that cannot be captured in other ways, and this is what makes them valuable. They would benefit from guidelines and templates to improve the format, replicability and assessment and they would benefit from a higher rating in evidence hierarchies as they often describe complex interventions, implementation and different contexts.

About the UK Health Forum

The UKHF is both a UK forum and an international centre for the prevention of non-communicable diseases, including coronary heart disease, stroke, cancer, diabetes, chronic kidney disease and dementia through a focus on up-stream measures targeted at the four shared modifiable risk factors of poor nutrition, physical inactivity, tobacco use and alcohol misuse. The UKHF recognises that tackling the risk factors for NCDs demands action to address the wider economic, social and environmental determinants of disease, and that doing so will have potential co-benefits for health inequalities, sustainable development, climate change and social justice.
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Background

Evidence-based practice (EBP), is a recommended theory of practice underpinning decision-making in health and care practice and part of clinical governance and patient safety. EBP is “the process of systematically finding, appraising, and using contemporaneous research findings as the basis for [making] decisions” (Rosenberg and Donald, 1995). EBP suggests that individuals use a systematic method of sourcing and applying the best available evidence in their work (Kelly and Moore, 2012, Sackett et al., 1996).

Research shows that individuals working in public health lack a common definition of what constitutes ‘evidence’ (Armstrong et al., 2014, Forum, 2013). There is an avoidance in public health of discussing what type of evidence is accepted in EBP (Petticrew and Roberts, 2003).

The Cabinet Office (Cabinet Office, 1999) lists expert knowledge, published research, existing statistics, stakeholder consultations, policy evaluations, outcomes from consultations, costings of policy options, output from modelling and the Internet as forms of evidence. Often individuals will use a combination of sources to form an ‘evidence base’.

Recent research into EBP shows that making a change to practice is more complicated than simple decision-making and in fact requires system and organisational change, as well as individual change (Grimshaw et al., 2004, Greenhalgh et al., 2004). The evidence-base is often ambiguous, contested, and constantly needing re-interpretation in local context and priorities, which often involves power struggles amongst professional groups, political cultures and values (Greenhalgh et al., 2004, Hansen, 2014). Merely presenting evidence does not necessarily lead to application of evidence or change in practice so there is a need to develop knowledge adoption capacity in users (Hansen, 2014).

This research was undertaken between November 2014 and February 2015. We undertook a literature search to establish definitions for case studies, their usefulness, and use and how they might be critically appraised. We also undertook a scoring exercise utilising an adapted checklist, to establish what content case studies contain and what might be missing in order to recommend what a good case study might look like. We undertook five qualitative informal interviews with people working in public health to understand their use and production of case studies to help draw recommendations for this report.

The research was commissioned by Public Health England. The aims of this research were to (a) evaluate the value of case studies in public health by examining their use, usefulness and content in order to make
recommendations on the optimal layout and content of a case study; (b) examine what tools exist to
quality assess case studies; (c) examine the production of case studies. The research questions were: (1)
How do we define a case study? (2) What is the value of case studies in public health? (3) What tools exist
to critically appraise a case study? (4) What is the optimal content layout for a case study?
Methods

Ethics statement
Participation of the interviews for this work was voluntary. Information about the purpose of the study was provided, and this allowed participants, members of the public health workforce interested in case studies, make an informed decision about whether or not to participate in the interviews. The study did not collect sensitive personal data, and the study kept participant’s identity confidential. Ethical approval was not sought as was not required by funding arrangement.

Literature search
The literature search was undertaken to provide background information on what is known about case studies and to find frameworks that could be used for critically appraising case studies. Searching for suitable literature was challenging. The following databases were searched: Google Scholar & Google search, PubMed, Opengrey.eu, LISA. We limited searches to English language publications only, published 2004 – 2014.

A variety of keywords and subject headings were used, and searches were repeatedly refined to narrow them and make them more applicable. We found that the description and labelling of case studies is different in databases, and in grey literature the keywords are selected by the author. The following terms were found to be used in association with case studies: case studies, evidence typology, documentation/methods, review literature as topic, knowledge synthesis, success stories, anecdotes, health promotion/methods, best practice, evidence hierarchy, evidence movement, policy making, evidence, research design, publishing standards, information dissemination, research utilization, data collection standards, health policy, evidence-based method(s)/practice, case report.

Several searches were undertaken to retrieve discussion about case studies and case studies themselves. An example of such a search is:

((("information dissemination") OR "publishing standards") OR "review literature as topic") AND ("documentation/methods") OR "evidence typology") AND ("policy making") OR "health policy"))). This was supplemented by hand browsing references in papers found.

Sampling of case studies
The second component of this research involved analysing a sample of case studies in order to gather data on the kind of information usually included in case studies, and on the different types of case study that exist.
A combination of Google search and sampling from specific websites was carried out in order to collect case studies covering a range of topics relevant to public health. Case studies were selected from these sources at random, without regard to length or format. Any item which was headed or described as a ‘case study’ or which was indexed in a website section or publication labelled ‘case studies’ was eligible for inclusion. Sampling was terminated once thirty case studies had been selected. One case study was discarded as it was a duplication of another but a different format. This left twenty-nine.

Scoring method
Using a template score card, adapted from the Good Publication Practice (GPP) 2 guidelines (Graf et al., 2009), each case study was checked for headings, content, format, and layout to identify what was missing. The score card looks at transparency of information, completeness of work done, and integrity of content. We also added formatting checks suitable to case studies in public health, e.g. topic area, setting description, geographic location etc. It is not suggested that case studies should contain all the information proposed for a peer-reviewed paper, however it seemed a good method of analysing case studies for completion and transparency, and for our recommendations of what detail a case study should report.

Interviews
Five telephone interviews were conducted in February 2015 to collect qualitative data from representatives of the public health workforce on their use of case studies and the perceived usefulness of case studies. Sampling was carried out through a mixture of directed convenience sampling and sampling of potential participants that expressed interest in the research after some open invitations to participate were published online. The interview questions can be downloaded from our website. Interviews were transcribed by hand. A typed summary of the telephone discussion was emailed to each participant, for review and agreement prior to analysis.
Results and discussion

Definitions of case studies
The first research question was How do we define a case study? The findings of the literature search show that a case study can be formal or informal. The formal case studies method is used by researchers to gain a deeper understanding of a specific case relevant to the research focus. Informal case studies are descriptions of something that have happened in a particular context. They are thought of as stories about something unique or special about an individual, occurrence or entity (Yin, 2013). They are observational in nature, and they are complementary to other methods, not alternatives, but they provide real life context (Thomas, 2011).

Case studies are described as stories, or focused narratives, that convey a sequence of events, and are a potential vehicle for communicating at national and local levels to a broad audience. They can be used to showcase programmes and services and to illustrate processes and outcomes that are not captured by quantitative methods (Zwald et al., 2013).

These definitions are confirmed by the people we interviewed, where several individuals said similar things “A case study is one that shows clear benefits, a story to tell, demonstrates the value and benefit...in practice.”

Why case studies are valuable
Research question two asked what is the value of case studies in public health? It is useful to discuss why case studies are often undervalued in order to put into context the importance in addressing the value of them.

The value of case studies is sometimes reduced due to their low position in the evidence hierarchy\(^1\) which is utilised as a tool to measure quality of evidence within evidence-based medicine (Sackett et al., 1996). According to Sackett, the evidence at the top of the pyramid are ‘best evidence’, but he also states that we may not always need a randomised controlled trial or indeed we should not wait for one to take place (Sackett et al., 1996).

Case studies are often made up of anecdotal evidence. But because their quality is difficult to assess, they are considered less reliable than evidence gathered using scientific methods (Dicks et al., 2014). Case studies are sometimes produced based on experience or expert opinion (also called ‘opinion-based bypass’), based on no scientific evidence synthesis (Dicks et al., 2014).

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\(^1\) [http://canadiantaskforce.ca/](http://canadiantaskforce.ca/)
From our interviews with public health workers we know that the collection of stories from the field can support the advancement, assessment and translation of public health initiatives. Stories can be shared with policy makers, funders and media to bring increased visibility to a project, demonstrate value of funding and document cost savings. They are useful for sharing results where anticipated outcomes are not yet measurable. They can bridge the translational gap between practitioners, researchers and policy makers. Zwald highlights that case studies are not developed frequently because of the perceived subjectivity and susceptibility to bias and because of the traditional reliance on quantitative outcomes in public health (Zwald et al., 2013). Nevertheless, they feature a diverse set of accomplishments, challenges and lessons learned and increase knowledge in prevention (Zwald et al., 2013).

People we interviewed said: “As case studies are often publicly available, organisations are not going to make claims that they are not certain of” and “Ideally, there is evidence of impact. But often with small projects you don’t get that, and it doesn’t mean the case study can’t be useful.” Even if information within them is derived from opinion, experience and expertise (e.g. anecdotal), it is not far-fetched as long as it can be evaluated (Tyndall, 2008).

As discussed, the traditional hierarchy and grading of evidence, lower levels of evidence have often been excluded from decision-making, or as evidence, as not rated at a higher level. A person we interviewed said: “[Case studies] should not be about academic standards of the requirements or academic pieces of work.” Another person said: “There must be proportionate effort in producing case studies and certain standards in existence disadvantage the type of results/impact that organisations […] publish.”

In public health decisions, clinical practice guidelines sometimes need to be developed in the absence of high level evidence. It is recognised that rigid robust evidence from trials is often required in tandem with qualitative and other descriptive studies. In public health it’s not just about the intervention, but also about the context in which outcomes were achieved and how they were implemented. A typology of methods that suit different questions has been proposed (Armstrong and Gray, 2001, Hansen, 2014). The typology suggests that by looking at what your research question is, you then determine what evidence would be most appropriate in answering it (Hansen, 2014), e.g. a survey is a more suitable piece of evidence for satisfaction or salience than an RCT (Petticrew and Roberts, 2003).

Another proposal is for a continuum rather than a hierarchy of evidence, as discussed at a workshop in a local council in England (Butcher, 2013), where evidence ranging from qualitative to quantitative may better suit evidence-based practice in local government.

In order to be more inclusive of different types of evidence, Hillier et al. have proposed a new methodology, FORM, which uses aetiology questions as an alternative to intervention questions (Hillier et
al., 2011), when evaluating what works in public health. It has also been argued that RCTs are inappropriate research methods for community based public health interventions as they are not evidence of effectiveness (Kelly et al., 2004).

A common theme emerged in the literature review and interviews around case studies being valued for the in-depth local knowledge they provide. In a qualitative study of local councils, in-depth knowledge of the local area took precedence over published literature as evidence and evidence-based practice was absent from their practice (Phillips, 2014).

Contextual data gathered from interventions in local areas can provide understanding of the local population and community. In a situation where a new public health intervention is being implemented in a local area, a case study could be valuable for a public health practitioner wanting replicate an intervention in their community.

Kelly argues that any evidence needs refinement to be useful in everyday practice and requires an understanding of local professionals’ knowledge bases, commitment and engagement, and detailed assessment of the population at whom the intervention is aimed at (Kelly et al., 2004). Case studies as a research design in particular works in situations where you need to examine complex interventions implemented in different contexts, e.g. ‘what works for whom in what circumstance?’ (Hansen, 2014).

Frameworks for critically appraising a case study

The third research question was What tools exist to critically appraise a case study? Critical appraisal is about the affirmation that a report, and the content within it, is an accurate account of what has happened.

Case studies are often disseminated informally through websites and social media and in reports, but it is not always explicitly said if a case study has undergone peer review. Furthermore, lack of information skills such as critical appraisal skills may present barriers in the access and use of information. Literature confirms the widespread concern about quality within qualitative research (Treasury, 2012). However, the Joanna Briggs Institute (JBI) model of evidence-based healthcare adopts a pluralistic approach to the notion of evidence whereby the findings of qualitative research are regarded as rigorously generated evidence, and content derived from opinion, experience and expertise is an acknowledged as a form of evidence (Tyndall, 2008).

Our literature search did not retrieve any appraisal systems specific to case studies and interviewees did not follow any set process. One interviewee said: “The reader of a case study acts in ‘good faith’ when appraising its value.”
There are some proposed methods and frameworks in existence that could be used to quality assess grey literature (Tyndall, 2008, Development, 2013, Thomas, 2011, Treasury, 2012, Hillier et al., 2011, Petticrew, 2014, Zwald et al., 2013). Qualitative research should be assessed on its own terms with premises that are central to its purpose, nature and conduct (Treasury, 2012). Hansen proposed three criteria for judging evidence: relevance, for or against some proposition; sufficiency, information must meet the criteria of corroboration with other pieces of information on the same topic; veracity, process of gathering free from distortion and uncontaminated by vested interests (Hansen, 2014).

What a good case study looks like

The fourth research question was What is the optimal content layout for a case study?

Those we interviewed said a good case study: “…is about either practical keys to success that are replicable so that other grassroot organisations can learn from the case study…” A case study should “show impact of work, delivery and context of the work, the benefit of the work.” We also heard that case studies should have “clear metrics/measurements of impact, although metrics are difficult to find. Sometimes benefits are not seen for several years.”

This aspect of the research was an opportunity to analyse 29 case studies to examine their content, layout and we used an adapted scorecard for this purpose from a publication guideline (Graf et al., 2009). Despite the small sample size, the case studies retrieved had been produced by a variety of organisations. Organisations and sectors included: NHS (1), Local government/authority (14), NGO/charity (6), UK government (6), international government (2), international local government (1), academic (3) totalling 29 (1 duplicate was removed). About half the case studies were retrospective) and the other half were in process or prospective.

According to our score card, each case study could score up to 33 points. A points system was used to show where information was missing (0) or where it was included (1). We were interested in the overall score of all case studies against the checklist headings, not individual scores. Case studies were anonymised.

We are reporting some of our findings here but will not go into detail.

Case studies do not ‘report’ when described events took place and whether the case study and/or project results had been peer-reviewed or evaluated. Case studies also lacked information about recognition of research sponsors or funders, links and references to further information or data, limitations of the work or results, accessibility, e.g. data or the research information available in other formats. Only 14 case studies had an author or contact information published.
Areas where case studies scored well were where the author described the context of why the case study was written, description of the setting (e.g. hospital, school) and topic of the piece (e.g. tobacco, alcohol).

We observed that in case studies that scored well, authors included a great deal of information without sacrificing the style or the short nature of a case study.

Many case studies were promotional in nature, showcasing what’s being done locally, or a specific product, or were interim project reports for funders. Some case studies were abstracts and login was required to access full content. Hyperlinks within documents were not working and references were missing in many documents. Potential conflicts of interest were not reported in some case studies (e.g. work funded by an organisation with specific bias attached).

Another noteworthy observation was that some results classified as “case studies” did not fit the definition of a case study e.g. were not reporting what had happened in a particular place and a particular time. They were short abstracts from meetings, news pieces or describing the political landscape and decision-making locally.
Conclusion

The aim of this mixed methods research was to further the understanding of the value of case studies as resource types in public health, to look at how they may be critically appraised and what a model case study may look like.

We touched on some of the tensions present in relation to the use of traditional hierarchies of evidence as a structure for grading evidence in supporting decision-making in public health. Comments from interviews around the difficulty in case studies showing immediate benefits (to society), and both the literature review and interviews brought up discussions around the pressure and requirements for ‘rigour’ and ‘academic standards’ that may downgrade the results of a case study. In fact, case studies are valued more highly by some public health groups than scientific literature, because they are more honest and represent local expertise and knowledge. They are more ‘digestible’ than scientific papers, bridging the gap between research and policy and supporting the translation of public health initiatives.

The definition of case studies as ‘stories’ and the comments of in the interviews show that case studies have a role in public health of capturing experiences of carrying out public health work in a specific time and place. Respondents to the interviews talked about the value of case studies as showing “impact of work”, “replicable”, “practical keys to success”, and showing “unique characteristics” in social action.

Our findings indicate a clear place for case studies as ‘evidence’ in public health. Comments suggest that case studies are often used as evidence of impact to present to funders, or as a way of marketing the work carried out by an organisation to an audience, but also describing a specific intervention and its impact or success (if known).

Our examination of case studies shows that there is room for improvement in the writing and production of case studies. It would be useful to have guidelines and templates available for people who produce case studies, describing content that could be included for transparency, integrity, completeness and responsibility of releasing results of projects. The purpose of a case study should be made clear.

It would be useful to include in existing appraisal checklists how to critically appraise a case study or that a checklist is produced for this purpose. This will help users who refer to them as evidence in their work.

It is also helpful if case studies indicate project evaluations and outcomes. This helps with their inclusion as evidence and in project replication. However, literature tells us that case studies are also useful where anticipated outcomes are not yet measurable, aiding the advancement of public health initiatives and inspiring new ideas.
Case studies that are considered ‘good’ show impact, return on investment, describe challenges and solutions, but are most of all are transparent, complete, based on integrity and responsibility. What happened, the work that is described in case studies set the scene. It is important that they are descriptive, giving information about the context, the population, and geographic area.

The methodology of the research itself doesn’t seem to matter, but this depends on where their use is needed. Descriptions of robustness of research and benefits to society are useful, but academic rigour and expected measured outcomes should not reduce the value of a case study. Practical keys to success that are replicable are a desirable output from case studies.

The perfect case study should report transparently the same type of information as a peer-reviewed paper, albeit in much shorter format.

Limitations to this research
As little research exists looking at the usefulness of case studies, this research represents the beginnings of examining case studies in public health. Our research is based on open access material only and five interviews. The research does not go into the complexity of cultural and political nature, e.g. the lack of trust in evidence due to funding, potential bias of authors or agendas and how decision-making is made in public health etc. This research should also be considered together with what we know about information needs, public health decision-making and information behaviour. We recommend additional research should be developed to support our findings and to examine details further.
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