Do doctors and other healthcare professionals know overdiagnosis in screening and how are they dealing with it? A protocol for a mixed methods systematic review

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ABSTRACT

Introduction Overdiagnosis is the diagnosis of a disease that would never have caused any symptom or problem. It is a harmful side effect of screening and may lead to unnecessary treatment, costs and emotional drawbacks. Doctors and other healthcare professionals (HCPs) have the opportunity to mitigate these consequences, not only by informing their patients or the public but also by adjusting screening methods or even by refraining from screening. However, it is unclear to what extent HCPs are fully aware of overdiagnosis and whether it affects their screening decisions. With this systematic review, we aim to synthesise all available research about what HCPs know and think about overdiagnosis, how it affects their position on screening policy and whether they think patients and the public should be informed about it.

Methods and analysis We will systematically search several databases (MEDLINE, Embase, Web of Science, Scopus, CINAHL and PsycArticles) for studies that directly examine HCPs’ knowledge and subjective perceptions of overdiagnosis due to health screening, both qualitatively and quantitatively. We will optimise our search by scanning reference and citation lists, contacting experts in the field and hand searching abstracts from the annual conference on ‘Preventing Overdiagnosis’. After selection and quality appraisal, we will analyse qualitative and quantitative findings separately in a segregated design for mixed-method reviews. The data will be examined and presented descriptively. If the retrieved studies allow it, we will review them from a constructivist perspective through a critical interpretive synthesis.

Ethics and dissemination For this type of research, no ethical approval is required. Findings from this systematic review will be published in a peer-reviewed journal and presented at the annual congress of ‘Preventing Overdiagnosis’. In addition, the results will serve as guidance for further research on this topic.

INTRODUCTION

Overdiagnosis is the diagnosis of a disease or medical condition that would never have caused any symptom or problem. It is a significant harm of screening. The screening process could turn a previously healthy person into a patient diagnosed with a disease of which he/she would never have had any symptoms if the screening had not taken place. Although the diagnosis is 'correct' according to current diagnostic standards, the early treatment of this screen-detected condition will not benefit the patient. However, overdiagnosis will harm through unnecessary treatment, fear, ‘opportunity costs’ and financial burden. Overdiagnosis is an issue in several medical domains, such as mental health, cardiovascular diseases and infectious diseases, but it has only attracted widespread attention since its major impact in cancer screening became apparent.

However, the phenomenon is counterintuitive, not tangible and hard to grasp. It can only become visible on a population level, only rarely at the individual one. Once diagnosed with a screen-detected disease, most patients will receive early treatment. Therefore, they will never know what the natural course of their disease would have been or
whether their diagnosis may have been an overdiagnosed condition. The result is that patients and their treating physicians will never perceive the diagnosis as unnecessary or even harmful. On the contrary, they will feel relieved and believe that they avoided complications or death thanks to the early catch.

Additionally, research to estimate and quantify the problem is challenging, requires long-term follow-up of screening data and high-quality morbidity registers, is prone to bias and confounding factors and outcomes rely highly on the basic assumptions of the researchers.

Nevertheless, overdiagnosis is nowadays recognised as a non-neglectable harm of screening. Since the late 20th century, there has been a rise of dissident voices in the dominant discourse of propagating screening. They claim that people should not be 'motivated' to participate in screening programmes but instead informed about benefits and harms and encouraged to make an informed decision that relates well with their preferences and values in health.

Since then, multiple studies have tried to assess to what extent this information has reached the general public, especially those who already participated or are about to participate in a screening programme. A recent systematic review synthesised all qualitative research on lay people's understanding of overtesting and overdiagnosis. Only a minority of patients seems familiar with the phenomenon, and most people cannot remember receiving information about the risk of overdiagnosis before getting screened. Participants find the concept difficult to understand, are often baffled that it exists and generally prefer to be informed about it. Providing information had mixed effects on the respondents' intention to participate in screening.

It is perhaps not surprising that people are unaware of this problem. After all, in the early years of organised screening programmes, none of the leaflets and websites of the official cancer screening programmes mentioned overdiagnosis as possible harm. Although the quality and comprehensiveness of information about screening has improved recently, still not all programmes inform the public about the risk of overdiagnosis. Moreover, a systematic review of patient decision aids (PDA) for cancer screening found that one in five decision aids does not address overdiagnosis at all. However, there was significant variability between screening programmes, with nearly all PDAs for lung and prostate cancer screening addressing overdiagnosis, but only 61% of those for breast cancer screening.

Public awareness and accurate understanding of this intricate problem need widely available information and doctors willing to address this topic in shared decision-making about screening. However, the findings in patients and the general public suggest that doctors do not discuss overdiagnosis with their patients and the research about websites and PDAs proves that one in five omits this information.

It is essential to find out what might lie behind this lack of transparent and balanced information. Could it be that doctors and healthcare professionals (HCPs) involved in providing or organising screening are perhaps not fully aware of this problem themselves? Does knowledge of this phenomenon affect their opinion on screening policy? Are they in favour of disclosing this information to the public? Or, do other considerations and concerns (like the fear that it might lower screening uptake) make them decide not to address the issue?

In contrast to the multiple studies in the general public, research on this topic in HCPs is far less prominent. However, a preliminary search found that HCPs attribute different levels of value to the phenomenon, depending on their role, intrapersonal and contextual factors, suggesting that apart from knowledge, other factors, such as moral position, emotions, perceived expectations and dominant discourse, might steer doctors and other HCPs in their decisions to disclose information on overdiagnosis. Insights in how HCPs perceive and deal with this problem might provide a substantial knowledge base to explain why the information has not disseminated well in the general public until now.

Research question
The research questions of this mixed methods systematic review are:

- Are doctors and other healthcare providers involved in offering or organising screening aware of overdiagnosis resulting from health screening?
- How important do they think this problem is, and to what extent does it influence their position on screening?
- How do they feel about informing their patients or the public about overdiagnosis?
- Do they in favour of disclosing this information to the patients or the public about overdiagnosis?
- Are they in favour of disclosing this information to the public about overdiagnosis?
- Are other considerations and concerns (like the fear that it might lower screening uptake) make them decide not to address the issue?

We translated our research question into a modified population/patient–intervention–comparator–outcome (PICO) format. It is a tool that helps researchers to be as clear and precise as possible about the exact question they want to answer. Because our research question does not involve an intervention or a comparator, we used population–concept of interest–outcomes (PCO), one of the alternative formats, to formulate a research question. PCO stands for:

- Population: doctors and other HCPs offering or organising screening.
- Concept of interest: overdiagnosis as a result of health screening (cancer screening as well as other screenings).
- Outcomes: awareness, knowledge, perception and appreciation of the phenomenon of overdiagnosis and effect on position on screening policy and informing patients or the public about overdiagnosis.

METHODS AND ANALYSIS
This protocol is written according to the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) guidelines (online supplemental appendix 1).
Table 1  Study selection criteria

| Criteria                                      | Justification                                                                                                                                 |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Original research                            | To avoid duplication, we restrict our review to primary data of original research.                                                             |
| No language restrictions                     | The researchers master English, French, Dutch and German and assume that these languages will cover most of the available research. However, if our search would retrieve relevant publications in other languages, we will try to translate them. |
| Research that questions doctors and other healthcare professionals (HCPs) directly on this topic | We look for studies that question HCPs directly on their perception of this topic, for example, through questionnaires or interviews. We will not include studies that only use indirect methods, for example, field observations or analysis of written materials. |
| Both qualitative, quantitative and mixed methods research | To assess the proportion of HCPs familiar with the phenomenon, we need quantitative research, like surveys, whereas qualitative research is more appropriate for gaining insight into participants’ perceptions, considerations and values. |
| Examining overdiagnosis in screening          | The topic overdiagnosis has to be an explicit research theme, although it can be a research topic among other screening aspects. We will not include studies addressing other definitions of overdiagnosis not related to screening. |
| In doctors and HCPs, implicated in offering or organising screening | This review focuses explicitly on doctors and other HCPs. Therefore, publications only dealing with patients’ or the general public’s perspectives will not be included. |
| No restrictions in the time frame            | We do not set any limitations on the publication date.                                                                                     |

**Study selection criteria**

All study selection criteria and their justification are summarised in table 1.

**Search strategy**

We will perform systematic searches to retrieve studies from medical, sociological and psychological perspectives in the following databases: MEDLINE (via the PubMed interface), Embase (via the Embase.com interface), Web of Science, Scopus, CINAHL and PsycArticles (via ProQuest). We plan to search for quantitative and qualitative studies at once with a dedicated search filter for qualitative research and surveys. A specialised librarian helped develop the search strategy for the different databases (online supplemental appendix 2). We will also scan reference and citation lists of the included articles and contact experts in the field for additional publications. Finally, we will hand search all abstracts of the annual conference on 'Preventing Overdiagnosis'.

**Selection and further processing**

Three researchers will select eligible studies in a stepwise approach and report the selection process in a PRISMA diagram.

- We will import all references into EndNote reference software (EndNote V.X9.3.3) and Rayyan software for systematic reviews.
- VP and a second reviewer will independently make the first selection for full-text review based on title and abstract. In case of disagreement, we will delay the decision until after the full-text review.
- VP and a second reviewer will independently screen all full texts for eligibility and reasons for exclusion will be recorded. In case of disagreement, AVH will assist in the discussion until consensus is reached.
- All eligible studies will be organised into three subsets for quantitative, qualitative and mixed-method publications during the selection process.
- If a possible eligible study provides insufficient or unclear information for a final decision, we will contact the author for clarification and wait another 2 weeks before deciding on inclusion.
- After quality assessment, we will extract qualitative data into NVivo research software V.1.4.1, and quantitative data will be managed in MS Excel for spreadsheets.

**Quality assessment**

On the one hand, there is much debate on whether it is appropriate to subject qualitative research to formal quality assessment and, if so, what criteria should be assessed and how researchers should make decisive evaluations. The available quality checklists do not provide formal scoring systems and require substantial interpretative judgment from the researcher. On the other hand, a quality assessment will provide valuable information on the credibility of the results and the study design’s appropriateness. Therefore, we decided to perform a formal quality appraisal, mainly for informative reasons, not excluding studies.

For the qualitative studies, we will use the 'Framework for Assessing the Quality of Qualitative Research Evidence' and for quantitative data, a ‘Guide for appraising Survey Reports’ (online supplemental appendix 3).

VP and FS will independently appraise the included studies. AVH will supervise and assist in discussions in case of disagreements.

**Data extraction**

For each study, we will complete a predefined and piloted data extraction form, including:

- Title, author and bibliographical details.
Data analysis

Qualitative studies

This appears to be a relatively untravailed field of research, and our preliminary search learns that the available studies seem scarce. Therefore, we propose a double-layered analysis. First, we believe that it might be of essential informative value to summarise the available research and perform a content analysis in a ‘neutral’ descriptive way.

However, if enough data were available, a more interpretative analysis from a constructivist perspective would provide a valuable and insightful second layer with the generation of new theories and concepts. We plan to use ‘critical interpretive synthesis’ (CIS) as our review method. CIS uses an iterative and inductive approach to generate new themes and constructs. It allows for the combination of qualitative and quantitative data and, more importantly, to enrich the data with research from adjacent research fields.

VP will thoroughly familiarise herself with the available publications and gain insight into each study’s position and context separately and into what it adds in relation to the other studies. She will draft a coding tree guided by the principles of a ‘line-of-argument (LOA) synthesis’. This method builds on several researchers’ work; it is a central technique in meta-ethnography and adapted by the authors who presented CIS as a novel methodology for review qualitative research. LOA analyses the findings in separate layers or lines, where ‘first-order constructs’ are how participants in the primary studies see and in separate layers or lines, whereas ‘second-order constructs’ consist of the interpretations, explanations and theories introduced by these studies’ researchers.

Additionally, two research team colleagues will independently code a subset of the articles, and after discussing discrepancies and similarities, we will adapt the coding tree where necessary. We will present a first overview of the emerging themes and constructs to the research team and several researchers with different academic backgrounds (psychology, sociology, educational sciences, medicine) and invite them to suggest modifications and relevant theories, to point out inconsistencies or gaps and to pose critical questions. We will then reassess all publications in light of these review sessions’ outcomes and repeat this iterative and reflexive process until no new comments or insights emerge.

We might complete the LOA synthesis with ‘synthetic constructs’ and a ‘synthesising argument’ if enough data is available. Dixon-Woods et al, who introduced CIS as a review method, conceive synthetic constructs as “the result of a transformation of the underlying evidence into a new conceptual form... they are grounded in the evidence, but result from an interpretation of the whole of that evidence, and allow the possibility of several disparate aspects of a phenomenon being unified in a more useful and explanatory way”. The authors define that “a synthesising argument integrates evidence from across the studies in the review into a coherent theoretical framework comprising a network of constructs and the relationships between them”.

Quantitative studies

Our first exploratory literature search did not reveal any quantitative studies so far. If some were to be found with our thorough search in various databases, we would analyse them separately from the qualitative studies in a segregative design for mixed methods reviews. With this method, we treat qualitative and quantitative findings as conceptually distinct approaches for gaining insight into the phenomenon of interest. Therefore, we will select, appraise, analyse and synthesise qualitative and quantitative data separately and bring both syntheses as complementary outcomes together in a mixed-method synthesis. Depending on the number and the content of the quantitative studies, we will use the appropriate methodology to synthesise them. If the data would allow it, we plan to use meta-analytic techniques to combine data from different sources. If not, we will present the quantitative findings merely descriptively. However, if no quantitative studies are revealed, this will become a single-method systematic review with only qualitative studies.

Strength of evidence

We will apply the Grading of Recommendations Assessment, Development and Evaluation-Confidence in the Evidence from Reviews of Qualitative research (GRADE-CERQual) framework criteria for assessing the strength of evidence of this review’s findings. CERQual is a novel approach developed by a subgroup of the GRADE working group to ‘assess the extent to which a review finding is a reasonable representation of the phenomenon of interest’. It provides guidance for evaluating each review finding on four distinct components: (1) methodological limitations, (2) coherence, (3) adequacy of the data and (4) relevance. Additionally, attention is drawn to the ‘risk of dissemination bias’ as the fifth component of
interest, although without specific guidance on assessing it, as this theme is still a work in progress.34

Acknowledgements The authors would like to thank Mrs Nele Pauwels for all her valuable help as an Information Specialist (Knowledge Centre for Health Ghent at the authors’ Faculty of Medicine and Health Sciences and Ghent University Hospital).

Contributors VP is the guarantor and drafted the manuscript together with SH. She integrated the feedback provided by the other authors and finalised the manuscript accordingly. AVH provided expertise for the search strategy, quality assessment and analysis framework. SH, AVH, AVdB and ADS read, provided feedback and approved the final manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

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REFERENCES
1 Welch GHS, Lisa M, Woloshin, Steve overdiagnosed, making people sick in the pursuit of health, 2011.
2 Jenniskens K, de Groot JAH, Reitsma JB, et al. Overdiagnosis across medical disciplines: a scoping review. BMJ Open 2017;7:e018448.
3 Njor SH, Paci E, Rebolj M. As you like it: how the same data can support manifold views of overdiagnosis in breast cancer screening. Int J Cancer 2018;143:1287–94.
4 Puliti D, Duffy SW, Miccinesi G, et al. Overdiagnosis in mammographic screening for breast cancer in Europe: a literature review. J Med Screen 2012;19 Suppl 1:42–56.
5 Etzioni R, Gulati R. Recognizing the limitations of cancer overdiagnosis studies: a first step towards overcoming them. JNCI Cancer Health Care 2018;3:622160.
6 Gøtzsche PC, Olsen O. Is screening for breast cancer with mammography justifiable? Lancet 2000;355:129–34.
7 Heath I. Role of fear of cancer and overdiagnosis — an essay by Iona Heath 2014;349.
8 Ghanouni A, Renzi C, Waller J. Improving public understanding of ‘overdiagnosis’ in England: a population survey assessing familiarity with possible terms for labelling the concept and perceptions of appropriate terminology. BMJ Open 2018;8:e021260.
9 Hersch J, Jansen J, Barratt A, et al. Women’s views on overdiagnosis in breast cancer screening: a qualitative study. BMJ 2013;346:f158.
10 Moynihan R, Nickel B, Hersch J, et al. Public opinions about overdiagnosis: a national community survey. PLoS One 2015;10:e0125165.
11 Van den Brul A, Jones C, Yang Y, et al. People’s willingness to accept overdiagnosis in cancer screening: population survey. BMJ 2015;350:h980.
12 Rozbroj T, Haas R, O’Connor D, et al. How do people understand overtaking and overdiagnosis? systematic review and meta-synthesis of qualitative research. Soc Sci Med 2021;285:114255.
13 Gummesson B, Håkansson B, Schindler M, et al. Are women getting relevant information about mammography screening for an informed consent: a critical appraisal of information brochures used for screening invitation in Germany, Italy, Spain and France. Eur J Public Health 2010;20:409–14.
14 Jørgensen KJ, Gatzsche PC. Content of invitations for publicly funded screening mammography. BMJ 2006;332:538–41.
15 Kearney AJ, Polisena J, Morrison A. A review and comparative analysis of information targeted to the general public on the websites of breast screening programmes in Canada. Health Policy 2017;13:57–67.
16 Huesten AJ, Lowenstein LM, Hoffman A, et al. A review of the presentation of overdiagnosis in cancer screening patient decision AIDS. MDMPolicy Pract 2019;4:238146831988144.
17 Walshe O, Gigerenzer G. “There is nothing to worry about”: gynecologists’ counselling on mammography. Patient Educ Couns 2011;84:251–6.
18 Pickles K, Carter SM, Rychetnik L. Doctors’ approaches to PSA testing and overdiagnosis in primary healthcare: a qualitative study. BMJ Open 2015;5:e008367.
19 Parker LM, Rychetnik L, Carter S. Framing overdiagnosis in breast screening: a qualitative study with Australian experts. BMC Cancer 2015;15:606.
20 Butler A, Hall H, Copnell B. A guide to writing a qualitative systematic review protocol to enhance evidence-based practice in nursing and health care. Worldviews Evid Based Nurs 2016;13:241–9.
21 Shamseer L, Moher D, Clarke M, et al. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. BMJ 2015;349:g7647.
22 GRADE-CMM. Qualitative research in health care. 4th edition. Wiley Blackwell, 2020.
23 Liz Spencer JR, Lewis J, Dillon L. National centre for social research. Quality in Qualitative Evaluation: A framework for assessing research evidence, 2003.
24 Burns KEA, Kho ME. How to assess a survey report: a guide for readers and peer reviewers. CMAJ 2015;187:E198–205.
25 Dixon-Woods M, Cavers D, Agarwal S, et al. Conducting a critical interpretive synthesis of the literature on access to healthcare by vulnerable groups. BMC Med Res Methodol 2006;6:35.
26 Barnett-Page E, Thomas J. Methods for the synthesis of qualitative research: a critical review. BMC Med Res Methodol 2009;9:59.
27 Sandelovski W, Voils CI, Barroso J. Defining and designing mixed research synthesis studies. Res Sch 2006;13:29.
28 Araujo-Soares V, Gubrium B, Schmid CH, et al. Meta-Analysis of survey data: application to health services research. Health Services and Outcomes Research Methodology 2008;8:98–114.
29 Lewin S, Booth A, Glenton C, et al. Applying GRADE-CERQual to qualitative evidence synthesis findings: introduction to the series. Implement Sci 2018;13:2.
30 Munthe-Kaas H, Bohren MA, Glenton C, et al. Applying GRADE-CERQual to qualitative evidence synthesis findings-paper 3: how to assess methodological limitations. Implement Sci 2018;13:9.
31 Colvin CJ, Garside R, Wainwright M, et al. Applying GRADE-CERQual to qualitative evidence synthesis findings-paper 4: how to assess coherence. Implement Sci 2018;13:13.
32 Glenton C, Carlsen B, Lewin S, et al. Applying GRADE-CERQual to qualitative evidence synthesis findings-paper 5: how to assess adequacy of data. Implement Sci 2018;13:14.
33 Noyes J, Booth A, Lewin S, et al. Applying GRADE-CERQual to qualitative evidence synthesis findings-paper 6: how to assess relevance of the data. Implement Sci 2018;13:4.
34 Booth A, Lewin S, Glenton C, et al. Applying GRADE-CERQual to qualitative evidence synthesis findings-paper 7: understanding the potential impacts of dissemination bias. Implement Sci 2018;13:12.
35 Brodersen J, Schwart LM, Heneghan C, et al. Overdiagnosis: what it is and what it isn’t. BMJ Evid Based Med 2018;23:1–3.