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Original Research

Optimizing the Aging Brain: The BEAD Study on the Ethics of Dementia Prevention

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Abstract

Dementia has lately undergone a profound reconceptualization. Long conceived of as an unpreventable process of mental deterioration, current evidence shows that it can be prevented in at least one in three cases intervening on a specified set of factors. Issues of justice and equity loom large on the implementation of dementia prevention, from a global health perspective. Our project thus embraces emerging evidence about dementia risk factors and their uneven distribution nationally and globally by specifically focusing on the situated aspects of dementia prevention.

The aim of the BEAD study (Optimizing the Aging Brain? Situating Ethical Aspects in Dementia Prevention) is to dissect the ethical and clinical assumptions of this novel understanding of dementia, and to analyze how such new discourse on dementia prevention plays out in three countries: Canada, Germany and Switzerland.

This study adopts a multi-perspective, comparative, qualitative approach, combining stakeholder interviews with different kinds of focused ethnographies, elaborating on conceptual, ethical, and social aspects of what we would like to call the “new dementia”.

By situating the paradigmatic shifts in Alzheimer’s and dementia research within current aging cultures and contemporary social policies, we aim to initiate a debate about the often implicit unresolved social, ethical, and political implications and preconditions of the medical understanding and handling of cognitive disorders.

Key words: Dementia, prevention, brain health, healthy aging, ethics.

Background

Worldwide, more than 50 million people experience dementia - an umbrella term encompassing multiple diagnostic entities the most common form of which is Alzheimer’s disease (AD), accounting for about two thirds of the total cases of dementia.

Over 60% of people affected by some form of dementia live in low-to-middle-income countries (LMICs) (1). Current demographic trends highlight an increase in the proportion of older people in almost every country worldwide. It is therefore expected that the prevalence of dementia will increase globally in the near future. Some 140 million people may be affected by dementia in 2050. The economic and social cost of such scenario will grow accordingly. They include not only direct healthcare costs, but also the burden and costs borne by families and informal caregivers.

Until recently, efforts at developing a safe and effective treatment for dementia, and in particular for AD have been frustrating, despite conspicuous public and private investments. The most credited biological hypothesis about AD is that it is associated with amyloid-β (Aβ) plaques in the brain and characterized by abnormal concentration of pathological-tau (P-tau) protein in the brain. Many scientific efforts have thus revolved around the reduction or elimination of Aβ plaques. In 2021, the Food and Drugs Administration (FDA) approved aducanumab (Aduhelm™) in the United States, the first AD drug to ever reach the market (2). However, such decision was met with controversy because of safety concerns and because, while some albeit disputed evidence supports Aduhelm™ capacity to reduce Aβ plaques as detected by PET scan, resulting clinical benefits have not been demonstrated (3).

Considerable efforts have gone also to anticipating AD detection to the very early, prodromal phases of the disease, in the hope that new treatments could prove effective if the disease is attacked before it produces extensive neuropathological damage. A number of allegedly prodromal constructs have been developed in research settings, and some of them have become commonly used in the clinic too, as in the case of Mild Cognitive Impairment (MCI). Other prodromal constructs, like Subjective Cognitive Decline and Mild Behavioral Impediment have received considerable attention as early manifestations of AD, but their link with disease onset is still disputed (4, 5).

Since the publication of the 2018 National Institute on Aging—Alzheimer’s Association (NIA-AA) Research Framework, consensus has emerged over the notion that AD builds up before it becomes manifest at a biological, neuropathological and cognitive level (6). These days, AD is commonly viewed as a continuum from the early accumulation of biological markers (Aβ and P-tau) typical of preclinical AD, to the onset of cognitive symptoms (such as MCI), to full-fledged dementia with neuropathological damage sustaining severe cognitive and behavioural deterioration.

While the NIA-AA staging of AD does not allow uncontroversial categorical distinctions between preclinical, prodromal and disease states, it has shifted attention to the idea that AD builds up well before its clinical manifestation. Other observations confirm this hypothesis in the case of non-AD dementia. In countries that have successfully implemented

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public health measures to address cardio-vascular risk factors (e.g. diabetes, hypertension and obesity), the incidence of vascular dementia has reduced over the last decade (7). It is therefore plausible to look at dementia as the product of a slow and progressive accumulation of biological deficits all along a person's life course. If this is the case, it may be possible to identify risk factors to prevent dementia, delay its onset and slow down its progression (8).

Dementia has for a long time been perceived of as an unpreventable process of cognitive degradation and age-related decline. The idea that dementia may be preventable was until recently marginal in dementia research. However, in 2017, the first Lancet Commission on dementia prevention, intervention, and care, revealed that one in three dementia cases might be prevented by acting early on nine dementia risk factors: lack of education, hypertension, obesity, hearing loss, smoking, depression, lack of physical activity, social isolation, and diabetes (9). In 2020, the Lancet Commission added three more dementia risk factors (excessive alcohol consumption, traumatic brain injury, and air pollution), stating that acting on these twelve modifiable risk factors could prevent up to 40% of dementia cases worldwide (10).

Interestingly, some factors are embedded in social and environmental domains, since social isolation, good access to early life education and combating air pollution can only be resolved by political action on a local and – in the case of pollution – on a global level. Further, some studies on dementia prevention have shown that access to well-functioning health care systems seems to be a determining factor for lowering the prevalence and incidence of dementia over time (11–13), turning dementia prevention into a profoundly political (and economic) cause, as well as a clinical issue.

The idea that acting on these recently identified risk factors throughout one's life to either prevent, delay the onset of dementia (14), or to slow decline, is a radical paradigm shift, that we call the "new dementia" (15). This new paradigm marked a "critical turning point in the history of the field" (16) paving the way for new approaches to optimize the functioning of the aging brain.

Also of interest, the "new dementia" discourse bears conceptual resemblance with the paradigm of healthy aging. The World Health Organization (WHO) defines healthy aging as "a continuous process of optimizing opportunities to maintain and improve physical and mental health, independence, and quality of life throughout the life course". In a similar way, both aging and dementia can thus be seen as slow-paced, cumulative processes eventually resulting in biological and functional damage – epitomized by the decline of intrinsic capacity that sits at the core of the healthy aging paradigm (17). The Lancet Commission's dementia risk factor overlap with domains of intervention that are deemed crucial in the context of healthy aging (18). In a similar way, a life-course understanding is clearly emerging in the domain of frailty research (19, 20). In particular, emerging studies on the idea of cognitive frailty make the conceptual association between frailty and age-related cognitive decline particularly attractive (21, 22).

The integration of optimization and prevention strategies for age-related cognitive and functional decline with the aim of improving healthy longevity in view of a life-course approach can be characterized as a new paradigm aimed at reinforcing an organism's capacity to preserve functioning across a broad spectrum of physiological and behavioral domains. We suggest calling this approach "ground-state prevention" – to distinguish it from the existing three-phase classification of prevention in public health practice (23, 24).

Individuals can now start early to intervene on cognitive decline through lifestyle changes, but also through, for instance, digital tracking technologies that are entering consumer markets (25). These technologies are predicted to play a key role in the "new dementia" by identifying subtle changes in health trajectories and facilitating the design and implementation of health promotion plans, exposing individuals to preventive treatments, potentially many years before the onset of dementia, to safeguard their cognitive faculties. Optimization narratives often rely on individual responsibility for healthy choices and policy-driven measures for risk reduction. How those two levels – the individual and the collective – relate to each other in dementia prevention has not yet received sufficient scholarly attention. Such line of research is particularly relevant in light of the newly published WHO white paper on optimizing brain health across the life course (26).

Study hypothesis and objectives

The "new dementia" comes with important conceptual, social, and ethical implications. Hence, we operate with three main working hypotheses for our comparative project. First, preventive thinking might turn healthy individuals into targets of medical interventions, thus blurring the line that separates the normal and the pathological. This represents a major shift away from the idea of health as the absence of disease, towards the idea that health is instead something that one needs to produce throughout one's life by adopting an appropriate and responsible lifestyle. Second, the "new dementia" might endorse and support the responsibilization of individuals as central actors in their health without elaborating on the central role of governments to provide the necessary infrastructure for preventive action (e.g., access to health and education). Third, prevention intervenes in a sphere – that of individual lifestyle – that in many societies is associated with self-determination and autonomy. Understanding dementia solely as a result of individual choices can create the premise for new stigmatizing attitudes toward those who, for a variety of reasons, are unable to conform to the resilience-enhancing lifestyles.

Based on pilot studies (27–29) we detected several emerging ethical and social incongruities affecting the capacity of individuals in their respective environments to recoup the potential of the "new dementia". These include issues around individual responsibility for lifestyle decisions, our relationship with novel monitoring technologies, and the fit between the "new dementia" and existing local cultures of care. It is therefore urgent to undertake a multi-strand, in-depth comparative study leading to a nuanced and fine-grained understanding of the ethical and social dimensions of this preventive turn. Our study will investigate the emerging challenges regarding the recent preventive turn in dementia research in Germany, Switzerland, and Canada.

To fully appreciate the impact of the "new dementia" on the lives of healthy people, patients, professionals, caregivers, and, more generally, on entire health systems, we need to identify what understandings of health, aging, and risk are at play within this new paradigm. To this end, we want to look at the emerging discourse on dementia prevention in three industrialized, high-income countries that show basic similarities (all are democracies, and all provide universal access to health and education). Nevertheless, health policies, cultures of care, and preventive models vary in these countries. Hence, we expect to find different ways of translating, implanting, and incorporating dementia prevention. A rigorous analysis of similarities and differences will help us to nuance our central topic and dissect the "new dementia" regarding its underlying assumptions and norms, as well as its social, ethical, and technology-related implications.

The aim of this study is thus to examine how the new scientific discourses on dementia prevention are taking shape in Germany, Canada, and Switzerland and how emerging recommendations about lifestyle, medication use, and the use of digital technologies are interlinked with national health policy, and more generally with cultures of aging. To achieve this aim, we focus on two main objectives: 1) carefully mapping ethical, social, and policy issues by collecting multi-format data on dementia prevention; and 2) conducting an in-depth analysis of epistemological, ethical, and social implications of the "new dementia" in different contexts (Canada, Germany, Switzerland).

To foster the successful translation of the "new dementia" into effective public health initiatives, due attention must be paid to the uneven prevalence (and burden) of dementia risk factors across different populations, geographies and demographics. Evidence is starting to accumulate demonstrating that dementia risk factors play out differently for different people both nationally and at a global level (30, 31).

In this respect, the "new dementia" needs to be contextualized – or situated - to shed light on taken-for-granted assumptions and normative tensions in the way this idea is currently articulated and communicated. We therefore suggest paying specific attention to "situated prevention", to understanding prevention not as a universal recipe but in its contextual enactments. Studying dementia prevention in different socio-technical contexts will shed light on different forms of sensemaking around this emerging phenomenon, and it will feed directly into our ethical analysis, enabling a fine-grained appreciation of key ethical issues.

Study design

In order to achieve the research objectives, we employ a multi-perspective and interdisciplinary methodology. Namely, we plan to run an interview study and focused ethnographies, in combination with an integrated analysis of the conceptual, ethical, and social aspects of the "new dementia".

First, we will run semi-structured interviews with different stakeholders across the three countries. As stakeholders we include advocates, policy makers and experts that represent collective interests: neurologists, epidemiologists, technology developers, patient advocates, health policymakers and experts serving in policy advice bodies, as well as representatives from organizations working with older people, and in health insurance companies. For each country, we identified between 20 and 25 experts, so we expect a total of 60-75 interviews.

A benefit of the semi-structured interview method is that it provides a confidential environment whereby participants are encouraged to freely share their views. This enables researchers to obtain a diverse range of perspectives in relation to the research topic. However, this process also allows for ideas to be refined through the interaction with the interviewer. The main discussion across all the interviews will follow the relevant semi-structured question routes. The semi-structured question guide ensures that key research questions are addressed and helps to maintain a level of consistency across the interviews, while equally allowing for an exploration of emerging themes. Due to the discursive nature of qualitative research, question routes must be applied in a manner that allows participants to identify their own issues. Therefore, the interviewer has a degree of flexibility in applying the main questions, in terms of the order in which they are posed, and the time spent on them. The main data for analysis will be collected by audio recording the interviews and transcribing them. The questions will capture how stakeholders talk about prevention and ageing, which artifacts and attitudes are part of the preventive enactment, individual responsibility vs. social responsibility, and the role of current and future technologies (e.g., AI, digital biomarkers). If unforeseen ethical aspects should emerge, questions on the topic will be deepened.

Second, to enrich our dataset, we will also conduct ethnographic work. Ethnographies are the data collection tool for capturing – through prolonged interactions and contextualization – how a studied phenomenon is perceived, communicated, embodied, and lived in a certain context. Ethnographies are useful to capture the implicit, tacit knowledge that is important when an emergent topic is being explored (32). This is also true when moral issues are not yet well articulated and are 'mostly invisible', hidden underneath taken-for-granted meanings and discursive articulations – especially assumptions about individual responsibility for prevention, the role of technologies, and a possible medicalization of cognition (33). Finally, most experts consider ethnographic data-gathering as collaborative work, and include informants and other researchers in planning, data gathering, validation, and analysis (34). Following this recommendation, we plan to juxtapose different focused ethnographies (ethnographies that are shorter and target stronger points of interest when compared to traditional ethnographies), within and across national contexts. These methods will be applied at key sites in which dementia prevention is enacted and in which potential ethical questions might be found and lived. The objective is to add through ethnographies two innovative dimensions to our project. First, to show how ethical and social issues are being enacted in everyday local lives. Second, how they reflect (or not) political, ethical, and social debates in each country.

More specifically, we plan to conduct four types of ethnographic studies in each of the three countries. In the Canadian, German, and Swiss contexts, we will first observe two dementia prevention programs explicitly targeted at preventing dementia or promoting "healthy aging" on a national or provincial level. To do so, we will follow these programs for at least three months to see how notions of prevention are articulated and debated, attend conferences, participate in the programs' activities, and analyze relevant discourses and documentation. Moreover, to understand the key role of preventive technologies in shaping the "new dementia" discourse and the optimization narrative, we will conduct what we called "tech ethnographies." These will consist of working closely with a lab or tech company that develops preventive technologies, such as smartphone apps, computer games, smart home devices, or online resources. We will observe their activities and conduct in-depth interviews with researchers, technicians, and product developers to inquire about their research and development experience. As well, we will interview and observe users of these emerging technologies, to understand their experience with dementia prevention. As a third ethnographic endeavor, we will conduct case studies focused on dementia prevention for immigrant populations in each of the three countries. The objective of these specific case studies is to deepen our understanding of what prevention entails and cast a potentially different gaze on it, that may trouble taken-for-granted interpretations of what preventing dementia means.

Integrated Analysis

The analysis process will run both during and after data collection. To gain deeper insight into the preventive turn of the "new dementia", we are currently undertaking a comprehensive conceptual analysis (35). This activity is intended to uncover and analyze the epistemological assumptions at play within the "new dementia" paradigm and to highlight the differences between the three countries. To this end, we will draw on the analytical tools developed in the context of the philosophy of medicine (36, 37). This disciplinary approach ensures a reflective and critical analysis of new ways of understanding cognition, its decline, and its relation to the individual life course. To dissect the biomedical discourse about dementia, we will consider the following key conceptual determinants of such discourse: healthy ageing, life course, intrinsic capacity, cognitive reserve, health promotion in the context of ageing, and the role of health technologies. Our working hypothesis is that these conceptual determinants shape the emerging discourse of the "new dementia" and constitute a set of fundamental epistemological assumptions that need to be brought to light and analyzed. Adapting methods originally conceived for scoping literature reviews (38), we will interrogate online repositories to collect scholarly articles and books published in the last ten years in philosophy of medicine, philosophy of science and Science and Technology Studies regarding the previously identified key conceptual determinants of dementia. Moreover, we will collect relevant health policy documents (last 10 years) by the World Health Organization as well as by public health authorities in Germany, Canada, and Switzerland, on healthy ageing and dementia strategies. Preliminary results will inform the stakeholder interviews and will complement data collection, allowing us to probe our working hypothesis further and to undertake the conceptual elucidation of the "new dementia".

The analysis of qualitative data will run as soon as sufficient data is available. In order to introduce some methodological consistency, the analysis will be based on the principles of thematic analysis (39) in combination with discourse analysis (40), with the help of the professional software ATLAS.ti, and multiple coding by the team. This method will enable us to reconstruct the emerging epistemology of the "new dementia" and to highlight nation-specific meanings in the policy. Constant comparison with data sets from other national sites during regular group meetings will further refine our analysis. For the ethical analysis, we first capture descriptively ethical issues mentioned explicitly, as well as implicit normative incoherence or hidden values in the qualitative material. Stakeholder interview material will serve here as an important data source to identify ethical challenges and conflicting norms. In the second stage, we will follow the idea of a 'situated ethics' approach, in which the perspectives of different agents, namely stakeholders and affected parties, are compared and contrasted. For the latter, we will rely on a qualitative analysis of the ethnographies.

Patient and Public Involvement

Patients and public were not involved in the design, conduct, or dissemination of the study.

Duration

The BEAD project will last for 36 months. The conceptual analysis has already started, and preliminary results have informed the interviews guideline. The data collection phases through semi-structured interview started in March 2022 and will likely be completed in the following months. Ethnographies will start in late 2022 and are expected to be completed in 2023.

Ethical approval

Informed consent and data management are in full compliance with the EU and the respective national legislation in Germany, Switzerland and Canada. Only adult and fully competent participants will take part in the planned research. IRB ethics permissions have been received from the relevant bodies in each country. Informed consent will be obtained for each participant before the interviews. Forms will clearly explain the pseudonymization procedure, the right to revoke consent and the conditions of use, reuse and sharing of the data for research purposes. Within the research team, only pseudonymized data will be exchanged. In our publications, only fully anonymized data will be used.

Dissemination

We aim to communicate the results of this project in a form that is accessible not only to academics, but also to the public as well as health professionals and policy makers. The dissemination of research findings to academics includes academic publications, congresses, and targeted workshops. Because of the multidisciplinary composition of the research team, results will be published in international peer-reviewed journals in the fields of public health, dementia care, medical anthropology, sociology, health ethics, and other related fields. Whenever possible, publications will be Open Access.

We will also disseminate our results among policymakers with the aim of raising awareness about the relevance of context for the ethics, legal and social aspects (ELSA) of dementia prevention. We have already established a large network of stakeholders in each country so that we will have access to their distribution mechanisms and reach out to different kinds of groups.

Discussion

Cultural-scientific and ethical discussion on the current handling of dementia and prevention can benefit from a more precise examination of specific dementia discourses in different national and scientific contexts. Empirical studies are needed to examine in which ways the novel scientific understanding of dementia affects the individual as well as societal notions of risk and responsibility.

We will fill existing knowledge gaps by providing nuanced and context-specific data for both theoretical and 'applied' aspects of dementia prevention. We will dissect the "new dementia" with regard to its underlying assumptions and norms, as well as its social, ethical and technology-related implications. Moreover, we aim to provide tailored knowledge translation strategies to different stakeholders, including the public and policymakers, by creating online material, videos, and a virtual exhibition.

As our analysis is limited to the analysis of dementia discourses in three Western, industrialized countries, we can only carve out the minor differences and national specifics within the current conceptions of dementia risk management and prevention. Further research is required to understand and reflect the features of widely differing understandings of aging, dementia, and risk in non-Western countries and regions with less developed health and social systems.

By situating the paradigmatic shifts in Alzheimer's and dementia research within current aging cultures and contemporary social policies, we aim to initiate a debate about the often implicit unresolved social, ethical, and political implications and preconditions of the medical understanding and handling of cognitive disorders.

The ongoing shift towards early detection and early diagnosis of dementia will have a major impact on health systems in the next years. Costs associated with diagnostic tests (such as PET scans and CSF analyses) can hardly be justified in the absence of disease-modifying drugs (23). But as new treatments make it to the market, such exams may become routine adding up to the cost of the treatment itself. Logistical and financial considerations are in order to understand whether this is a scalable model, especially for LMICs. In such circumstances, building a credible preventive model rooted on robust ethical foundations is of paramount importance to ensure societies have the means to tackle the increasing prevalence of dementia worldwide.

Issues of justice and equity loom large on the implementation of the "new dementia", from a global health perspective. Our project thus embraces emerging evidence about dementia risk factors and their uneven distribution nationally and globally by specifically focusing on the situated aspects of dementia prevention.

Given the urgency of such matters, our work ultimately aims at producing workable recommendations for the fair implementation of the "new dementia" into workable public health measures.

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