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Review article

A different cardiovascular epidemiology

Abstract

Background. Cardiovascular disease is the main cause of disease and death in Western countries. This disease group is therefore embraced with much attention in medical research, treatment and preventive programmes. Quantifiable biological risk factors form the common conceptual basis for all these areas. We want to demonstrate that the current narrow biological focus may prohibit a deeper understanding of the various expressions of disease.

Theory, material and method. The present paper is based on a theory that considers human beings to be self-reflecting and capable of creating and conveying meaning, formed by culture, time and interpersonal relationships. From such a perspective, the human body is seen as a *lived* body in which experience is expressed. Two patient stories are interpreted in light of recent epidemiological documentation of associations between traumatic experiences and cardiovascular disease.

Results. Research shows that traumatic experiences in general and trauma early in life in particular are potent pathogens. Various types of trauma can, however, not consistently be associated with specific diseases, but rather with complex patterns of co-morbidity. These patterns transcend the mind-body-schism and thereby the distinction between somatic and mental diseases. When such complex disease patterns are interpreted as expressions of embodied life, insight is provided into *how* traumatic experience is imprinted into the lived body.

Interpretation. Correlations between traumatic experience and cardiovascular disease challenge the purely biological approach in mainstream cardiovascular epidemiology. Analysis of the evidence provided by two cases opens up new perspectives. Knowledge about the path from particular and painful experience to particular and painful disease is an inevitable prerequisite for adequate treatment of the individual. Seen from a societal perspective, it is also crucial for development of adequate preventive measures.

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A Doctor's Prayer
If I can stop one Heart from breaking
I shall not live in vain
If I can ease one Life the Aching
Or cool one Pain
Or help one fainting Robin
Unto his Nest again
I shall not live in Vain.

Emily Dickinson

Biomedical knowledge regarding «correct» treatment of human hearts – including measures aimed at preventing future disease –is currently based on randomized studies. Central to these studies are the objectively measurable, apparently independent and assumed separable *risk factors*: e.g. blood pressure, blood lipids, blood sugar, body composition etc. On the basis of such measurements, risk for future disease and death is calculated. Manipulation of risk factors is attempted through pharmacological treatment combined with lifestyle advice (1). Thresholds for risk intervention and treatment are decided by professional consensus dominated by highly specialized expert groups (1). These cut-off levels have been repeatedly revised during the last 20 years (1). The concept of «normality» has thereby become restricted and the number of individuals with «medically acceptable values» has decreased (2). The majority of individuals in of one of the world's longest-living populations, the Norwegian, could in fact be eligible for «maximal clinical attention» if recommended treatment thresholds for blood pressure and cholesterol were implemented into clinical practice (3).

Evidence-based medicine (EBM) represents the foundation for assessment and intervention related to cardiovascular disease. Uncritical use of this approach may adversely affect the health services' mandate in two ways. As EBM does not address basic causes, it only allows for prediction of disease course and impact in the form of calculated probabilities. Such an approach has been shown to imply a risk of medicalization; i.e. large groups of healthy individuals may be defined as treatment requiring on the basis of measurable biological variables (4). The EBM approach may also prevent or delay a more radical and holistic approach to disease causes and disease prevention. Significant pathogenic conditions in the form of adverse life experiences could remain unidentified due to methodological elimination of subjective information. Despite the advent of extensive empirical documentation of traumas' impact on disease progression specifically in cardiovascular disease (5–17), *this* knowledge is not emphasized in current preventive programmes.

In this article we have focused on how the prevalence of cardiovascular disease can be described from a knowledge-based perspective (i.e. empirically documented) different from the purely biological approach. From a *biographical* or existential perspective, we can actually see the contours of a *different* cardiovascular epidemiology.

Theory, material and method

Within a phenomenological frame of reference, we discuss how experience may become the source of disease. Phenomenology is a methodological approach to human experience, but also a philosophical tradition. Human beings are seen as self-reflecting and

Main message

- A conventional understanding of cardiovascular disease is based on a purely biological perspective of the human body
- Extensive empirical documentation supports that existential conditions such as integrity violations and feelings of powerlessness have substantial pathogenetic impact
- Two authentic cases demonstrate the relevance of patients' subjective perspective of their own experience

bearers and creators of meaning in interaction with others. The body is regarded as a *lived body*, as the centre and field of experience, and as such affected by value systems in various political, sociocultural, biographical and historical contexts (18–24).

Two anonymized patients with cardiovascular disease are presented. Their stories are discussed with the *lived body* as a tool for analysis. The stories are woven together and seen in a context of recent epidemiological research on co-variation between disease and experience. The list of literature has evolved gradually as relevant articles, published in acknowledged medical journals, have been assembled during the authors' work with this topic over several years. Associative search strategies have also been used, i.e. specific topics and/or research teams have been followed through reference lists and register-based links (25). The documentation comprises studies from somatic and psychiatric medicine, the neurosciences, psychology, sociology, criminology and demography.

Patient stories

Patient 1. A young man with acute heart problems

Philip Paus is a 36-year-old man who lives alone and has no children (26). His medical history comprises an episode with arrhythmia and sudden loss of consciousness. Because of known cardiac disease in the family – his mother died suddenly when Philip was 10 years old – he was immediately hospitalized in the cardiological department and examined with myoscintigraphy with tomography (during rest and stress). This raised suspicion of stress-related ischemia on the anterior wall and on the lower/posterior wall. These findings were later followed up with quantitative myocardial perfusion gated SPECT (QGSPECT) which showed adequate work-load, a normal-sized left ventricle with normal ejection fraction and no sign of work-induced ischemia or previous infarction.

Philip had consulted his regular general practitioner several times during the period of diagnostic work-up. In the course of these consultations, a logical premise of the sudden referral gradually became evident from an existential perspective. Philip came to remember what had happened in the seconds before he lost consciousness. In the beginning of a public meeting, he suddenly felt panic stricken when realizing that a dark-skinned man had sat down in the seat to his right while he was speaking with someone on his left side. The presence of this unknown man had led to a «sensory shock» which was followed by loss of consciousness. The recollection of this occurrence reminded Philip of an anal rape he had experienced during a journey some years before. The sensational shock had reactivated memories from a meeting filled with fear and humiliation. This feeling of powerlessness also had a resonance in a life of shame and neglect. Philip had experienced that his father had neglected him completely after his mother had died. In the time after his mother's death, Philip was sexually abused by a male neighbour – without intervention from his substance-abusing father (26).

Patient 2. A middle-aged woman with hypertension

Rakel Reitan is a 46-year-old woman who lives alone and works full time as a pharmacist. She has often been ill due to fatigue, lack of strength, lowered attention span and lack of concentration. She is often afraid of making mistakes and asks colleagues to control everything she does, which interferes with the routines. Rakel has contacted many doctors because of sleeplessness and sudden awakenings with sweating and palpitations. This has been explained with early menopause related to her body weight which has always been quite low. Because of high blood pressure, daily recordings have been made. Her mean day-time blood pressure is 149/77 mmHg, whilst the mean during sleep is 159/74 mmHg. In other words, Rakel's nightly systolic blood pressure is consistently elevated.

One day Rakel comes to her regular general practitioner and says that she has read a novel about a girl who grew up in a family where the mother was beaten up and abused by her father. No one knew about this, because it took place in a religious and cultivated home behind locked doors in the night (27). The book has brought back Rakel's memories from her own childhood, memories of frightening sounds from the other side of the wall in her parents' bedroom. Rakel now understands that her awakenings with palpitations, cold sweating, anxiety and breathing difficulties, her uneasiness, stiffness and listening is about a nightly alarm that was switched on when she was a little girl, and that this alarm has persisted in her. It is about her mother's screams dampened by pillows and her pleading panicking voice behind the wall. It is about anxiety about divorce, orphanage, prison, police and many other things that have apparently been «forgotten». It also concerns sin, lies, deceit, double morals, silence and shame.

Abused children and sick adults

The Adverse Childhood Experience Study (ACE study) was the first population study on associations between negative childhood experiences and disease in adult life (28). The following issues in childhood were investigated: various types of abuse (sexual and other psychological and physical types of abuse) and neglect (physical or emotional) and the following conditions in the family where they grew up: not growing up with both biological parents; seeing the mother being mistreated; living with an adult who abuses substances such as alcohol or narcotics, who has a mental disorder, is suicidal, has been convicted of some crime or been imprisoned. The study shows clear dose-response relationships between experience and disease (9, 29), including cardiovascular disease (8).

The dose-response relationship between various negative experiences during childhood and serious disease, chronic pain, physical disability and abuse of health services in adult life is later confirmed in a number of studies (5–9, 11, 17), as well as in population studies from Finland (12), England (16) and Canada (30). This especially concerns risk factors for cardiovascular disease, including obesity and metabolic syndrome (31–33).

Women who have experienced various types of abuse *as adults are statistically likely* to have experienced abuse already as children and/or adolescents (34–39), and they typically have many health problems (34, 40–42). Among women who are abused and mistreated there is a considerable risk for other problems in addition to health problems; i.e. lack of schooling and education, homelessness, poverty and reduced working ability (34, 39, 43–45). Trauma experience both as children and adults predicted the lowest income among women in an American study (46). Low income is associated with a high risk of cardiovascular disease (15, 47) and early menopause (48). Early menopause should with other words not merely be regarded as a biological phenomenon, it is also an existentially conditioned phenomenon, possibly related to cardiovascular disease in a mutual risk relationship (49).

The ACE study showed that having been a *witness to violence against ones mother* while growing up is related to a doubling or quadrupling of risk of also having experienced other unfortunate conditions that were assessed (50). Consequently, children in families where women are beaten are regarded to be at risk – the risk of later health problems is significantly higher for them than for children who have not witnessed violence against their mother (51).

A new look at Philip Paus's story

On the basis of epidemiological documentation Philip Paus can be added to men's risk statistics for cardiovascular disease because of the following factors: family conditions; physical and emotional neglect; depression; anxiety; low social status; low education and income; single man, upbringing in a home with a single parent who abuses substances and is depressive and self-harming; economic problems; chronic stress and a story of long-lasting sexual abuse in childhood by a person he trusted (8, 9, 11, 13, 15, 47, 52, 53).

Philip's story can also be seen in light of the fast-growing documentation linking

acute stress and cardiac problems, termed stress cardiomyopathy, «myocardial stunning» or «broken heart syndrome». The phenomenon concerns, in clinical terms, a classic cardiac crisis triggered by a surge of adrenalin leading to temporary blocking of the left myocardial function. Japanese physicians called the condition «takotsubo» and were the first to describe it (54, 55). The condition was thoroughly described in *The New England Journal of Medicine* in 2005 (56).

A new look at Rakel Reitan's story

The studies we have referred to show that Rakel Reitan fits into several risk statistics for women – with partly high positive correlations between cardiovascular disease on one hand and, on the other, depression, reduced variation in cardiac activity (17, 57–59), hypertension, chronic sleeplessness (60), chronic and phobic anxiety (58), early menopause (49, 61) and osteoporosis (62–64).

Chronic stress and future disease

Social shame and a feeling of being powerless are central to Rakel Reitan's and Philip Paus's stories. This leads our thoughts to two groups of people who have an increased risk of cardiovascular disease from a statistical perspective. The first group is black Americans. Being black is still associated with relational and structural discrimination in the USA (65–67). The other group consists of individuals with a Norwegian mother and a German father, conceived and born between 1940 and 1945. The so-called *German children* have been shown to have a 65 % higher age-adjusted mortality than those with a Norwegian mother and a Norwegian father born in the same time-period. The increase is mainly related to cardiovascular disease, cancer and suicide (68). This reflects the strong pathogen power of a society's despise for the enemy's children and their mothers (69).

To know that one is unwanted, despised and «wrong» does not only affect the «mental» domain. Such experiences are mediated biologically through the immune, hormone and central nervous system which brings us to a growing interdisciplinary field – so-called psychoneuro(endocrino)immunology. Among the consequences of destructive stress are constantly elevated cortisol levels and reduced activity in natural killer cells (NK-cells) (70, 71). Elevated cortisol levels also disturb the lipid and carbohydrate metabolism and are associated with an increased risk of obesity, metabolic syndrome, thrombosis and osteoporosis (72). Psychoneuroimmunological research is currently in the process of linking together apparently different health problems such as obesity, diabetes, hypertension, inflammatory disorders, early menopause, anxiety, depression, chronic pain, premature births and pre-eclampsia (7, 14, 48, 72–81). Integrity violations also increase the risk of psychotic problems (82, 83), which have again been associated with obesity (84, 85) and other risk factors for cardiovascular disease (30–32, 78, 86, 87). Complex trauma in female soldiers (rape during service in war zones) has been associated with a doubling of risk for both cardiovascular disease and pre-menopausal hysterectomy (10). This offers yet another perspective on the association between cardiovascular disease and early menopause (88).

Conclusions and implications

We have presented two authentic stories about cardiovascular disease, and shown how personal experience and new empirical literature on associations between destructive experiences and disease open up for a radically different understanding of individual pathogenesis. Based on a theory about the *lived body*, we have argued that current epidemiological knowledge forms an insufficient basis for understanding the pathogenesis and aetiology of cardiovascular disease and therefore also prevention of such disease. As human bodies consist of matter *and* history, both biology and biography represent relevant approaches to investigation of disease and not least measures to maintain and restore health.

Medical research, both epidemiological and clinical, should develop methods that embrace the health implications of destructive existential experience. Medical measures for prevention of disease in general and cardiovascular disease in particular must start with acknowledging the importance of giving children a safe upbringing close to responsible adults (89).

Declared conflicts of interest: None

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