Integrating lifestyle medicine in clinical care

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CHAPTER 1

General introduction, objective and outline of thesis

The absolute number of non-communicable diseases (NCD) is rising. This is driven by population aging, economic development, and increasing urbanization leading to a more sedentary lifestyle and a greater consumption of unhealthy foods linked to obesity.(1) These NCDs, or chronic diseases, such as cardiovascular disease (CVD), and type 2 diabetes (T2D), have become a major burden for individuals, the healthcare system and society. The health impact for the individual is intolerably high. In 2019, 63.8% of disability adjusted life years (DALYs) was attributed to NCDs. In comparison, in 1990, this was 43.2% of all DALYs.(2) Furthermore, NCDs kill 41 million people each year, which amounts to 71% of all deaths worldwide.(3) In Western Europe, the percentage of deaths and DALYs attributable to NCDs have reached staggering heights of close to 90% and 80% respectively.(4)

In addition to this individual health burden, the healthcare system is under pressure. The rising numbers of people with one or more chronic diseases increases the demand for healthcare. To provide optimal healthcare for the increasing number of people with chronic diseases more healthcare workers are needed. Worldwide, the health workforce has increased by 29% from 2016 to 2020.(5) Note that this increase in health personnel was needed even before the COVID-19 pandemic had its impact on the required healthcare workforce. In developed countries such as the Netherlands, this increased demand of healthcare personnel could mean that in 2040, 1 in 4 working people needs to work in healthcare.(6) This entails an increase from a current 1 in 6 workers. All the extra care provided also needs to be paid for which brings us to the societal burden. In Europe and America, 70-80% of all healthcare costs are currently spent on chronic diseases.(7, 8) This constitutes an enormous portion of all healthcare costs which is estimated to only increase further with the increasing number of NCDs.

Given the disease burden and the financial impact a solution to non-communicable disease is of high importance. Alas, no "magic bullet" to solve the underlying factors of chronic disease has been found yet.(9) However an effective solution is readily available, namely lifestyle improvement.(10-15) The WHO estimates that at least 80% of CVD and T2D can be prevented by tackling major risk factors such as tobacco use, unhealthy diets and physical inactivity. (16) Therefore, adopting a healthier lifestyle on a global scale can have significant positive impact on individual health and wellbeing, as well as pressure on healthcare professionals and healthcare costs. A healthy lifestyle can be described using six dimensions: a healthy diet, adequate physical activity, restorative sleep, stress management, avoidance of risky substances and a positive connection with yourself, the people close to you and your job.(17) Unfortunately, current healthy lifestyle practices fall woefully short in practically all these domains.(18-23)

The dreadful state of lifestyle behaviour

In the Netherlands still 1 in 5 adults smoked in 2019.(18) More than half of these people will die from this addiction.(18) In the Netherlands this accounts for over 19.000 untimely deaths that could be prevented each year.(24) Worldwide, 39% of adults is overweight and 13% is obese. Obesity incidence has nearly tripled since 1975.(19) The situation in The Netherlands is similar where half of people is overweight of which one third is obese.(25) In general, obesity is caused

by consuming more energy than one burns off through physical activity. We exercise too little and diets worldwide are still far from healthy and did not show improvement over the last decade.(26) In the last decade, physical inactivity in Europe has risen to an unacceptable 46% of all adults.(21, 27) Regarding diet, not even 1 in 8 people in Europe consume the recommended five servings of fruit and vegetables daily.(28) Other lifestyle dimensions do not fare much better.

Approximately 1 in 4 people does not sleep the recommended amount of hours which is worse in adolescents where between 5 and 7 out of 10 do not meet the recommended amount of sleep hours.(22) Furthermore, perceived stress at work has been on the rise since 1995. (23) A study in the UK stated that around 17 million work days were lost in 2022 due to work related stress.(29) Separately, all lifestyle dimensions already have a huge impact on health and wellbeing. However, they also have an interdependent and synergistic effect. For example, physical activity, diet and stress influence sleep quality.(30, 31) Consequences of decreased sleep quality are a heightened stress response, a disrupted satiation gradient and can lead to obesity in the longer term.(32, 33) In turn, the amount of perceived stress influences eating behaviour and is associated with BMI and waist circumference.(34, 35) Obesity and physical inactivity negatively affect psychological wellbeing.(36) So, lifestyle factors are not separate behaviours but influence each other. However, even worse than this self-enhancing cascade, is the one thing all these lifestyle dimensions have in common, namely that they lead to a systemic low grade inflammation.(37-43) This will be further discussed in the dissertation but in short, it is a chronic sub-clinical production of inflammatory factors that increase the risk for many chronic diseases including cardiovascular disease and type 2 diabetes.(37) On the other side, lifestyle behaviour, such as a healthy diet, adequate physical activity or stress reduction can dampen this chronic inflammation. (44-46) This means that lifestyle behaviour offers many non-invasive, non-drug opportunities to combat and prevent multiple lifestyle-related chronic diseases.

The vast potential of a healthy lifestyle

Smoking cessation is an effective way of reducing the relative risk of morbidity and mortality. (47) Of the 10 years of life expectancy lost as a smoker, one regains 10, 9, and 6 years by quitting at 30, 40, or 50 years of age, respectively.(47) On a societal level in the Netherlands, reducing the amount of smokers by 1 percentage point, could lead to a reduction of annual health care costs of around €650 million (1.6% of the total expenditure).(48) This sounds like the easiest and most straightforward way of lifestyle medicine. However, smoking cessation is known to be extremely challenging. It can take up to 30 or more times to successfully quit smoking.(49) Nonetheless, 30.9% of Dutch smokers seriously attempted (> 24 hours) to quit smoking in 2021.

A study in the Lancet showed that, in 2017, worldwide a total of 255 million DALYs were attributable to dietary risk factors such as high intake of sodium, low intake of whole grains or low intake of fruits.(50) That means, that with a life expectancy of 80 years, unhealthy diets wipe out 9000 lives every single day. For cardiovascular disease, an unhealthy diet is

the second largest risk factor only after hypertension.(51)It is known that diets rich in fresh fruits, vegetables, whole grains, legumes, seeds and nuts and low in (ultra)processed foods are healthier.(52, 53) Therefore, guidelines of the European Society of Cardiology and the European Association for the Study of Diabetes advocate healthy diets to prevent, lessen, stabilize or bring into remission chronic diseases such as CVD and T2D.(54, 55) But despite these guidelines, adherence to healthy diets is abominable. When looking at fruit and vegetable consumption we see that only 4 EU member states meet the recommendations.(56) In the Netherlands, only 20-30% of adults consume the recommended amounts of fruits and vegetables.(20) This is especially disconcerting when one realizes that consumption of fruits and vegetables scores relatively high compared to other components of a healthy diet such as fatty fish or legumes.

Lifestyle medicine

Our current lifestyle behaviour has enormous impact on individual health and wellbeing, societal financial burden and the healthcare system. However, we must remember that not one specific individual or entity is to blame for these alarming rates of unhealthy lifestyle behaviours. Individuals, healthcare professionals, policymakers, employers, teachers, food industry and government officials can, and should, collectively work towards healthier habits. For example, governments can stimulate physical activity by introducing cycle friendly neighbourhoods or car free zones. Policy makers can introduce taxes such as the sugar tax or a meat tax to stimulate healthier dietary choices. And schools could normalize healthy meals in cafeteria and educate on all six dimensions of a healthy lifestyle. However, stimulating lifestyle behaviour change is especially relevant in healthcare. Healthcare facilities have an exemplary position when it comes to health norms.(57) With this, hospitals, nursing homes, and other institutes for health have the power to improve lifestyle behaviour on a broad scale. Also, on an individual level a hospital admission can serve as a 'teachable moment'. A teachable moment is a timepoint in the life of a patient where they are more receptive for lifestyle advice and are more inclined to change lifestyle behaviour.(58) Thus, the brief advice of a healthcare professional can significantly influence the long-term behaviour of patients.(59)So capitalizing on these teachable moments can positively influence the healthy lifestyle behaviour of admitted patients. Therefore, this thesis will focus on lifestyle practices in clinical care.

Integrating the lifestyle dimensions mentioned previously into routine clinical care aiming to treat, reverse or prevent disease is called lifestyle medicine. Lifestyle medicine can focus on different dimensions of a healthy lifestyle. Regarding smoking for example, we know that brief advice to quit smoking from a healthcare professional can increase long-term smoking abstinence by 47%.(59) Yet, when patients are asked, only a third of patients reports that they have been advised to quit.(60) Furthermore, we know that health care professionals actively connecting smoking patients to smoking cessation counselling increases the enrolment rate 13-fold.(61) However, only a meagre 7.8-11.8% of identified smokers is connected to specialized care.(61, 62)

With regard to diet, an previous study showed that food endorsed by healthcare facilities influences the attitudes of patients and visitors toward that type of food.(57) This evidence indicates that healthcare facilities can nudge patients into making healthier dietary choices. Nudges are environmental cues that can influence people into making healthier dietary choices. Examples of effective nudges in hospitals are traffic light labelling systems, economic incentives, and point of purchase prompts.(63-65) Thus, hospitals, nursing homes and other institutes for health, have the potential power to improve lifestyle behaviours on a broad scale with relatively small interventions. However, even though there are some exceptions, many hospitals in Europe still offer unhealthy diets to hospitalized patients, visitors and staff thereby progressing the detrimental impact of unhealthy diets.(66, 67)

Studies show that there is great potential in integrating several lifestyle dimensions at once in healthcare. For example, 6-month multicomponent health management programs for type 2 diabetes, incorporating physical activity, nutritional advice, self-management training, personal coaching and social support, show that 28% of participants was still off of all diabetes medication at 24 months follow-up.(68) Furthermore, 71% of insulin users was still off insulin at 24 months and quality of life had significantly improved.(68) Yet, initiatives such as these are still sparse and comprehensive lifestyle interventions are still not widely integrated into routine clinical care.(1, 68) Knowing the impact and potential of lifestyle medicine, it should at least earn a place in healthcare at the same level as medication and surgical treatment. Recent years show some progress in this regard but there is still a lot to be done.

In short, unhealthy lifestyle behaviour severely impacts individual health and wellbeing, societal finances and the healthcare system. The healthcare system has great potential to improve lifestyle behaviours of people due to their exemplary function, the authoritative position of healthcare professionals, and the fact that health events can become 'teachable moments'. The initial examples of lifestyle medicine in clinical care show promising effects. Integrating lifestyle medicine into routine clinical care can improve lifestyle behaviours in large populations and can contribute to improving individual health and wellbeing, societal finances, and relieve pressure from the healthcare system.

Objective and outline of this thesis

The aim of this thesis is to provide new insights into the opportunities, impediments and practical integration of lifestyle medicine in clinical care with specific focus on smoking, diet, cardiovascular disease and type 2 diabetes. Part I of this thesis will focus on the importance of lifestyle medicine in healthcare. In chapter 2, the relationship between healthy lifestyle behaviour and acute medical conditions such as COVID-19. Chapter 3 will dive deeper into the relationship between lifestyle and the immune system.

Part II will focus on smoking cessation practice in healthcare. Chapter 4 will focus on optimizing smoking cessation support in a clinical care and outpatient setting. In chapter 5 the options of adding mobile phone app the Stopcoach to certified smoking cessation counselling are explored.

In part III, the relevance, practical implications and effects of healthy diets in healthcare are assessed. Chapter 6 is a commentary on how relevant healthy diets in hospitals currently are. It advocates the inclusion of healthy meals in current and future clinical prevention guidelines for cardiovascular disease. As more healthcare facilities gear towards healthier diets it becomes important to evaluate the impact on patients. In chapter 7, the development, reliability and validity of a tool to assess the intention of patients to eat a healthier diet is discussed. Chapter 8 uses this tool to identify barriers and facilitators to adopting healthier dietary choices in clinical care. Subsequently, chapter 9 will reveal the significant impact of a simple dietary nudging intervention on the dietary choices of patients admitted to the hospital.

Part IV will present a practical, holistic example of integrating multiple lifestyle components into clinical care. Chapter 10 outlines the development of the Diabetes Box, a new way of educating patients in disease management using remote care.

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PART I: THE RELEVANCE OF LIFESTYLE MEDICINE IN HEALTHCARE