

## COMMENTARY



# Lifestyle care for transformation of medical care using an early life course approach

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## ABSTRACT

It is well known that a healthy lifestyle plays a key role in maintaining reproductive and general health, and preventing lifestyle-related diseases throughout the entire life course. Lifelong health is shaped during the preconception period and the first 1000 days of life. The importance of a healthy lifestyle during these periods can be emphasized by introducing the concept of the early life course, which covers from 100 days before conception until 1000 days thereafter. Although awareness of the benefits of a healthy lifestyle has grown, adherence is disappointing and the implementation of lifestyle interventions in medical care is scarce. Hence, we are convinced that now is the right time to turn the tide. The focus should shift from cure to prevention and promotion of health. The new concept of lifestyle care includes lifestyle interventions that support the adoption of a healthy lifestyle to optimize health and prevent lifestyle-related diseases, including subfertility and adverse pregnancy outcomes. In this paper, we advocate for the implementation of lifestyle care in medical care, define the early life course, elaborate on lifestyle care as part of lifestyle medicine, and provide examples towards the successful implementation of blended lifestyle care, which can be more widely implemented and transform medical care.

## INTRODUCTION

An emerging body of evidence over the last two decades has shown the importance of lifestyle in reproduction, pregnancy and general health. Lifestyle interventions can contribute to the prevention of subfertility and adverse pregnancy outcomes (*van Dijk et al. 2017*). Furthermore, lifestyle interventions reduce the incidence of non-communicable diseases, such as type 2 diabetes, that may occur at any time across the life course (*Lean et al., 2019*). Many of the non-communicable diseases originate in the periconception period and during infancy (*Barker 2007; Steegers-Theunissen et al. 2013*). We define this window of opportunity as the

early life course, covering from 100 days preconception until 1000 days thereafter.

The wide interest in lifestyle and the development of lifestyle interventions gave rise to the concept of lifestyle medicine. However, the definition and use of this concept varies and lacks precision and uniformity, which causes confusion and misinterpretation. For example, according to the American College of Lifestyle Medicine, lifestyle medicine is ‘the use of evidence-based lifestyle therapeutic interventions as primary modality, delivered by clinicians trained and certified in this specialty, to prevent, treat and often reverse chronic disease’, while the British Society of Lifestyle Medicine defines lifestyle medicine as ‘evidence-based clinical care

that supports behaviour change through person-centered techniques to improve mental wellbeing, social connection, healthy eating, physical activity, sleep and minimisation of harmful substances and behaviours’ (*British Society of Lifestyle Medicine 2022; Guthrie 2018*). A point on which these two definitions agree is that lifestyle medicine is evidence-based, which does not apply to all lifestyle interventions. An example of lifestyle used as evidence-based treatment is a weight-management program that leads to the sustained remission of type 2 diabetes (*Lean et al., 2019*). To date, examples of lifestyle medicine for treatment of diseases are, however, scarce.

The rationale of this paper is that lifestyle medicine should include lifestyle

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## KEY WORDS

Early life course  
Implementation  
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Periconception period  
eHealth

interventions for the prevention and treatment of lifestyle-related diseases. Therefore, we state that the first focus should be on lifestyle care defined as the support to adopt and sustain a healthy lifestyle using personalized lifestyle interventions. Lifestyle care aims to optimize reproduction, general health and well-being for the prevention of lifestyle-related pregnancy complications and diseases during the life course. Here, emphasis can also be placed on the opportunity to develop and implement lifestyle care in medical care using a life course approach that is individualized and focuses on health rather than disease. In this paper, the early life course and the concept lifestyle care are defined, and an example of a successful implementation of blended lifestyle care in medical care is provided.

### DEFINITION OF THE EARLY LIFE COURSE

*Barker (2007)* advocated that the first 1000 days of life shape lifelong health. However, this period does not include the preconception period, defined by

Steegers-Theunissen and colleagues (*Steegers-Theunissen et al., 2013*) as the 14 weeks (approximately 100 days) before conception. The parents' health conditions and environmental exposures in the preconception period programme the epigenome of their gametes. Despite the reprogramming in the first days after conception of the non-imprinted genes of the conceptus, the epigenome of imprinted genes is transferred and, as such, will have an impact on the offspring's health. To emphasize the importance of this preconception period with regard to prevention, the early life course is defined here as the period from 100 days before conception until 1000 days thereafter, and it is hoped that this definition will be used in research, medical care and society.

### LIFESTYLE

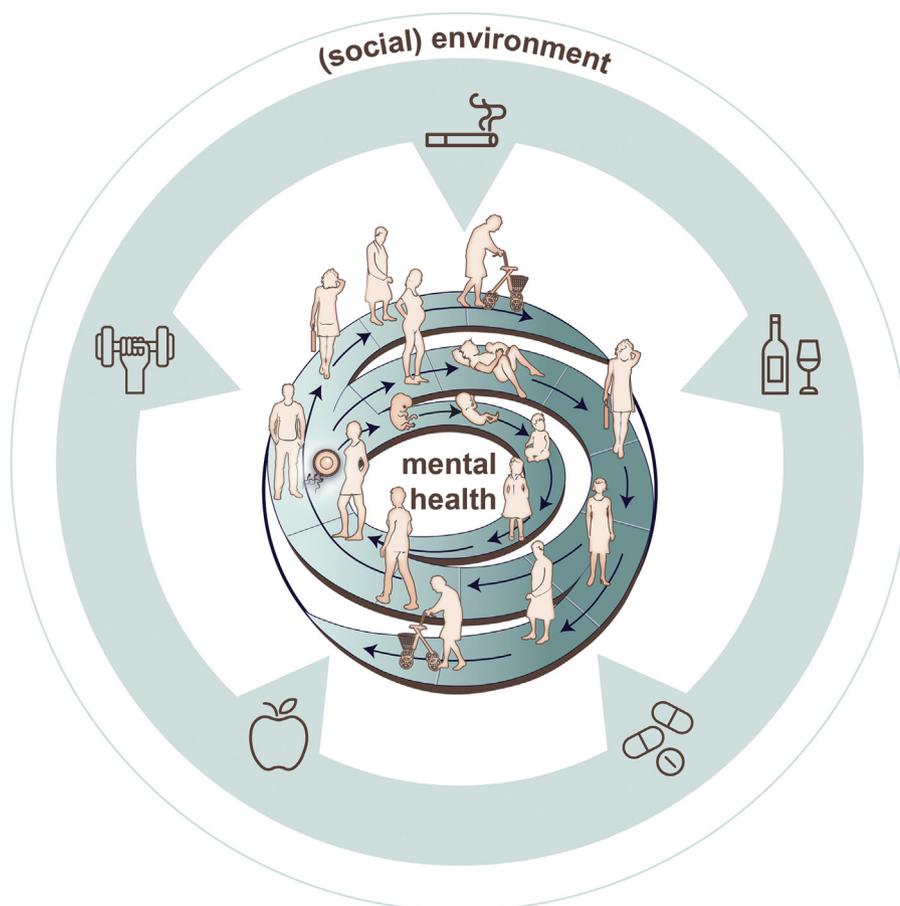
The term 'lifestyle' has been embraced by a diverse group of communities, is used in multiple research, medical and health domains, and refers to a variety of concepts. Over time, the definition of lifestyle has changed and its meaning has

broadened. The current authors' definition of lifestyle includes a complex combination of daily behaviors, personal values and preferences that can be modified and that affect reproduction, pregnancy, health and disease. In this context, lifestyle has a reciprocal relationship with mental health and social environment.

Lifestyle includes behaviors based on personal choices and opportunities in life, including smoking, alcohol consumption, drug use, diet and exercise (*FIGURE 1*). As most of these lifestyle behaviors are modifiable and rely on personal choices, they can be targeted for interventions. Given the difficulty of changing lifestyle behaviors, interventions should be personalized, life course phased and context specific.

### LIFESTYLE CARE

Lifestyle care is a rather new concept aimed at the management and maintenance of health, instead of the conventional focus on disease. Here, lifestyle care is defined as the support and help for individuals in adopting



**FIGURE 1** Lifestyle behaviors included in the definition of lifestyle across the life course. Modified with permission from *Steegers et al. (2019)*.

and sustaining a healthy lifestyle using personalized interventions to optimize reproduction, general health and well-being, and to prevent and treat lifestyle-related pregnancy complications and diseases.

Every citizen and patient benefits from changing a poor lifestyle at any moment across the life course. However, during the reproductive period lifestyle changes affect not only individual health, but also that of future offspring, and, as such, can have a transgenerational health impact (Schoenmakers et al., 2019; Steegers-Theunissen et al., 2013). Many diseases that present across the life course have their origin in early life and are affected by parental lifestyle (Schoenmakers et al., 2019; Steegers-Theunissen et al., 2013). As women and their partners are more motivated to adopt a healthy lifestyle preconceptionally and during pregnancy and early parenthood, they should be targeted to achieve the highest health benefits (Edvardsson et al., 2011).

Over the last few decades, knowledge regarding the impact of lifestyle on reproduction, health and disease has grown rapidly. Consequently, healthcare professionals as well as patients and the general population have become aware of the importance of a healthy lifestyle. This is also illustrated by the development of eHealth programmes, such as the personalized eHealth lifestyle coaching programme Smarter Pregnancy (English version: [www.smarterpregnancy.co.uk](http://www.smarterpregnancy.co.uk), Dutch version: [www.slimmerzwanger.nl](http://www.slimmerzwanger.nl)) (Oostingh et al., 2019; van der Windt et al., 2020; van Dijk et al., 2017). We are convinced that the current interest in lifestyle should be embraced and implemented in medical care.

## IMPLEMENTATION OF LIFESTYLE CARE

The implementation of innovations in healthcare is a great challenge. Therefore, we share our own experiences to map out the process of implementing lifestyle care in medical care using an early life course approach. Our lifestyle interventions target women and partners during the preconception and pregnancy period since the impact of adopting a sustainable healthy lifestyle is highest during this stage of the life course.

In 2007, as a first step towards the successful implementation of lifestyle care

in our clinical practice, an intervention was developed that included an in-person personalized preconception lifestyle counselling session at the outpatient clinic of the Department of Obstetrics and Gynecology of the Erasmus MC, University Medical Center, Rotterdam, the Netherlands (Hammiche et al., 2011; Twigt et al., 2012). Couples were offered a second counselling session after 3 months. Consequently, women consumed less alcohol, exercised more and increased their folic acid supplementation, and men consumed less alcohol. Women who attended two counselling sessions increased their fruit and fish intake, and men increased their fruit intake (Hammiche et al., 2011). Furthermore, the increased quality of a couple's preconception diet was associated with a higher chance of an ongoing pregnancy after IVF or intracytoplasmic sperm injection (ICSI) treatment within 6 months after the counselling session (Twigt et al., 2012). Although these results were promising, only a maximum of two counselling sessions could be provided because of the required costs and time.

In order to overcome this barrier and provide more continuous lifestyle care on a large scale, the eHealth lifestyle coaching programme Smarter Pregnancy was launched in 2011, acknowledged by the National Institute for Public Health and the Environment in 2020. This programme included 26 weeks of personalized lifestyle coaching by means of a mobile phone and a website, using text and email messages comprising questions, recommendations and recipes based on identified poor lifestyle behaviors (van Dijk et al., 2017). A survey among fertile couples and couples undergoing IVF/ICSI treatment demonstrated that this intervention improved not only the intake of fruit and vegetables, but also the pregnancy rate in fertile couples and couples receiving IVF/ICSI treatment (van Dijk et al., 2017). These findings were further validated by the randomized controlled trial by Ng and colleagues (Ng et al., 2021), which showed that the English version of Smarter Pregnancy ([www.smarterpregnancy.co.uk](http://www.smarterpregnancy.co.uk)) improved the same lifestyle behaviors as well as the pregnancy rate in women who were actively trying to conceive and were receiving treatment for subfertility or recurrent miscarriage.

In 2018, we introduced a new promising concept called blended care to provide

lifestyle care by offering couples contemplating pregnancy or already pregnant the eHealth lifestyle coaching programme Smarter Pregnancy and an in-person personalized preconception lifestyle counselling session at the outpatient clinic of the Department of Obstetrics and Gynecology of the Erasmus MC (van der Windt et al., 2020). The first evaluation showed that vegetable and fruit intake increased from 158 to 190 g/day and from 1.8 to 2.7 pieces/day, respectively (van der Windt, et al. 2020). Since 2020, this blended preconception lifestyle care has been implemented in our clinical practice, and is being adopted by midwifery practices and other hospitals.

## Costs

We are convinced that lifestyle care as part of lifestyle medicine, in addition to medical care, will decrease the prevalence of lifestyle-related conditions, and subsequently reduce unnecessary healthcare as well as societal costs. Our eHealth lifestyle coaching programme Smarter Pregnancy has been proven cost-effective; modelled cost savings per couple ranges from €41 to €1163 per year depending on the couple targeted and the type of intervention (Oostingh et al., 2019; Steegers-Theunissen et al., 2020). As the interventions early in life result in the highest benefits for the lowest costs, we strongly suggest investing in lifestyle interventions that focus on the early life course.

## Education

Implementing lifestyle in medical care starts with a timely and adequate education of clinicians and healthcare support workers, and providing them with counselling techniques to assist patients in making sustainable lifestyle changes. As an example, the in-person personalized preconception lifestyle counselling sessions at the outpatient clinic of the Department of Obstetrics and Gynecology of the Erasmus MC are provided by medical doctors trained in motivational interviewing. Moreover, patients are empowered with personalized information and equipped with skills to adjust their poor lifestyle. Ideally, lifestyle care becomes an integral part of the curriculum of medical students and students of other allied healthcare professionals. In conclusion, for lifestyle care to be successful and effective, it is highly recommended that professionals are trained in facilitating behavioral changes.

## Key stakeholders

Key stakeholders for the successful implementation of lifestyle care are the government, health insurance companies, hospital boards, healthcare professional and patients. It is recommended that these stakeholders are involved at an early stage to discuss their responsibilities and to identify potential problems early on, as the implementation of lifestyle care in medical care requires much effort, engagement and motivation on their behalf.

## FUTURE PERSPECTIVES

Our ambition is to contribute to improving the reproductive and general health and well-being of current and future generations. Despite the well-known health benefits of a healthy lifestyle, compliance is disappointing. To seize this opportunity and tackle this problem, we urge the implementation of lifestyle care in medical care. In our opinion, lifestyle care is a means to provide life course care, and should be used as a road map to integrate (non) medical care and social care. Lifestyle medicine should therefore be supported, the first priority being to act on optimizing and promoting health for the prevention and treatment of reproductive failure and other lifestyle-related diseases.

Because evidence-based lifestyle interventions for the treatment of diseases are scarce, more research is necessary in this field. In addition, it is proposed that the term 'lifestyle care' should be used to stimulate the development and implementation of personalized lifestyle interventions that support individuals in adopting and sustaining a healthy lifestyle. Our advice is to especially invest in lifestyle interventions targeting the early life course, as lifestyle changes during these periods affect not only individuals, but also future generations. As Heckman says: 'The earlier the investment, the greater the return on investment' (*Heckman 2012*). The right moment to implement lifestyle care in medical care is right now!

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