

Invited Review

Cancer survivors and adverse work outcomes: associated factors and supportive interventions

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Abstract

Introduction: The number of cancer survivors in a working age is rising. An awareness of factors associated with adverse work outcomes, and of supportive interventions, is needed.

Sources of data: A narrative review of research obtained via several databases, including Medline and PsycINFO, was conducted.

Areas of agreement: A range of factors is associated with adverse work outcomes such as prolonged sick leave, delayed return to work, disability pension and unemployment in cancer survivors. They include the cancer type and treatment, fatigue, cognitive functioning, work factors and elements of health care systems. Effective supportive interventions encompass physical and multicomponent interventions.

Areas of controversy: The role of behaviour determinants and legislative and insurance systems is unclear. It is furthermore uncertain what the optimal timing of delivering supportive interventions is.

Growing points: Further focus on vulnerable groups, including specific cancer types and those with lower income, lower educational level and in precarious employment, is needed.

Areas timely for developing research: Recent developments are tailored and timely interventions.

Key words: cancer, adverse work outcomes, intervention

Introduction

Each year, an estimated 17 million people are diagnosed with cancer worldwide.¹ Due to earlier detection of cancer and more effective treatment strategies, the number of people who survive cancer is increasing.^{1,2} In many countries, the retiring age is rising, which implies that there will be a higher incidence of cancer diagnoses in the working population. The number of cancer survivors in a working age is therefore expected to increase further in the next decades.³ An estimated 40–50% of people diagnosed with cancer are between 18 and 65 years of age and thus potentially part of the labour force.² It is increasingly recognized that remaining in work during or after treatment and/or returning to work can be a feasible and a valued goal for many cancer survivors.⁴

In this narrative review, we refer to cancer survivors as persons who have been diagnosed with cancer at some point in their life, thus including those who have been diagnosed recently, and are currently still alive.⁵ Paid work is important for most cancer survivors, as it is for individuals without cancer because it is associated with financial independence,⁴ a higher quality of life,⁶ and a sense of normality, self-esteem and personal identity.⁴ Furthermore, societies can benefit economically from facilitating cancer survivors to return to work.⁷ Despite the advantages of having paid work, cancer survivors can experience adverse work outcomes following their diagnosis and treatment. To give an example of an adverse work outcome, unemployment among cancer survivors is 40% higher than in people who have never been diagnosed with cancer,⁸ although

unemployment rates and time to return to work vary widely within and between cancer types.⁹

Adverse work outcomes contain all negative work outcomes from smaller less impacting changes such as prolonged sick leave, delayed return to work, diminished quality of work life to major long-lasting changes, such as disability pension and unemployment and everything in between. As there is much variability between and within these outcomes,¹⁰ we refer to adverse work outcomes throughout this narrative review to improve the readability.

In the past 15 years, we have seen a rapid development of the research field on cancer and work. With this narrative review, we therefore aim to provide an overview of where the research community stands and identify growing points areas for future research.

Sources of data

A narrative review of research obtained via several databases, including Medline and PsycINFO, was conducted up to March 2022, searching for literature regarding cancer survivors and adverse work outcomes, associated factors and interventions. Main findings from reviews of the scientific literature were described. When, on a certain topic, a review was not available, individual studies were described.

A commonly used model reflecting the complexity of factors related to adverse work outcomes is the ‘Arena in work disability prevention model’, developed by Loisel and colleagues,¹¹ which was adapted by replacing the centre ‘workers with disability from musculoskeletal pain’ to ‘cancer survivor’ by Greidanus¹² (Fig. 1). This model aims

to describe which factors and stakeholders may influence adverse work outcomes of a worker with disability. Seven main domains of factors associated with adverse work outcomes are distinguished in the model: (i) the cancer survivor him- or herself, (ii) the personal system, (iii) the health care system, (iv) the workplace system, (v) the legislative and insurance system, (vi) culture and politics and (vii) the overall societal context. Mapping factors related to adverse work outcomes can provide input for the selection or development of interventions to reduce adverse work outcomes of cancer survivors.¹³ Each of these domains will be discussed below in the first part of this narrative review, followed by a summary of interventions in the second part.

Factors related to adverse work outcomes

Cancer survivor

Previous systematic reviews have shown that the risk of adverse work outcomes varies by the cancer type.^{8,14,15} Lung and brain tumour survivors, as well as gastrointestinal and female reproductive cancer survivors, are at the highest risk of adverse work outcomes.^{8,14} Prostate and testicular cancer survivors have no elevated risk of adverse work outcomes compared with the general population.^{8,16} This variation in the risk of adverse work outcomes by the cancer type might be explained by differences in treatments and accompanying long-term consequences.¹⁴

A more advanced cancer stage and more extensive cancer treatments, including chemotherapy and advanced surgery, are also associated with a higher risk of adverse work outcomes.^{17–20} This can be explained by the fact that a higher cancer stage often requires more advanced treatment,²¹ which can result in more short- and long-term physical and psychological consequences, such as pain, fatigue and cognitive problems.²² Additionally, it was found that having one or more comorbidities increases the risk of adverse work outcomes among cancer survivors.¹⁹

Advantages in cancer treatment in recent years lead to an increase in the number of cancer survivors

that receive palliative treatment but live in relatively good health, which might enhance the possibilities of these patients to stay at work.²³ Recently, more attention has been given to groups of cancer survivors that can be regarded as vulnerable because they have a considerable risk of experiencing adverse work outcomes after cancer. These groups include cancer survivors with lower income, low level of education, being from a minoritized ethnic background and/or being unemployed, work disabled or in precarious employment at the time of diagnosis.^{17,20,24–26}

Personal system

The personal system of the Arena in the work disability prevention model¹¹ is subdivided into physical, cognitive, affective and social factors. One of the first literature reviews on such factors reported the negative effects of e.g. fatigue, depression on work outcomes.²⁷ These findings have been confirmed by other studies over the years.^{28,29} In particular, fatigue and depression are found to be strongly associated with adverse work outcomes.¹⁸ Three major dimensions of fatigue can be distinguished, namely physical, cognitive and emotional fatigue,³⁰ all of which have been associated with adverse work outcomes. Regarding physical fatigue, previous research found that low physical functioning is associated with work outcomes.²⁴ Two recent reviews further indicated that cancer survivors can experience adverse work outcomes due to various cognitive deficits, such as a loss of concentration, memory and executive functioning.^{31,32} Finally, emotional fatigue including a lack of motivation¹⁸ and experiencing work stress were also found to be related to adverse work outcomes.¹⁸ Behavioural determinants such as work-related self-efficacy deserve more investigation because the role of adverse work outcomes is inconsistent.^{33–35}

Health care system

Factors concerning the health care system include those related to the full trajectory from screening, diagnosis and treatment, to cancer survivorship care

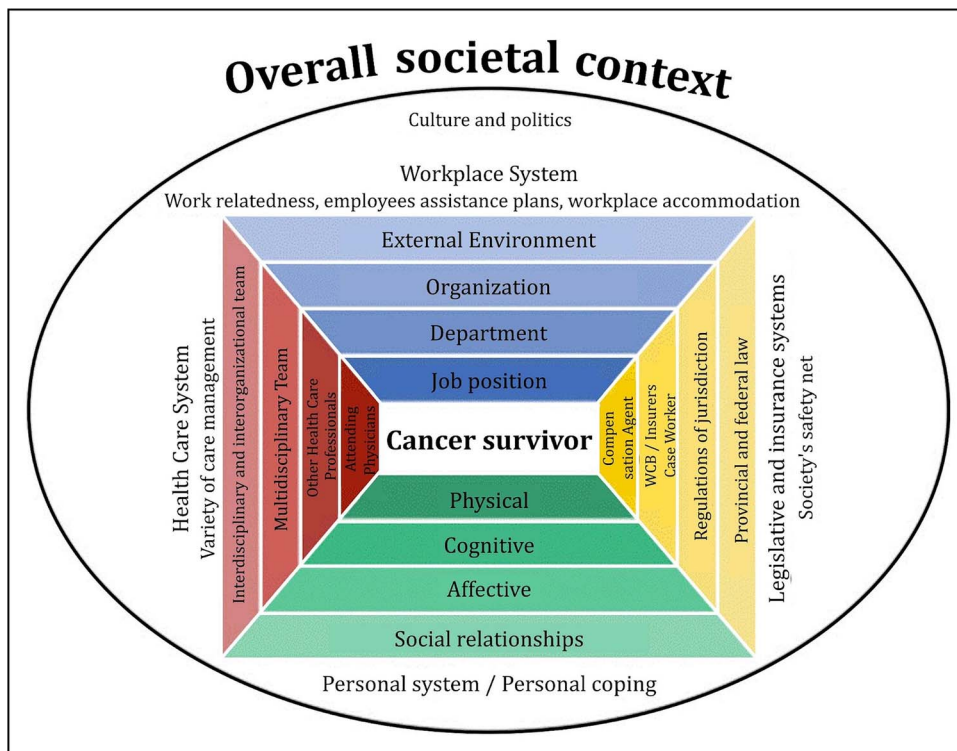


Fig. 1 Arena in the work disability prevention model.^{11,12}

including rehabilitation and reintegration in society.¹¹ There are some indications that delayed diagnosis and treatment, for instance, in the case of a rare cancer diagnosis, it may increase adverse work outcomes.³⁶

Factors concerning the health care system also include collaboration and coordination between oncological and occupational health care professionals.¹¹ Previous research has shown that there is limited attention to work in oncology health care³⁷ by general practitioners.³⁸ This is unfortunate, as such attention could prevent adverse work outcomes among cancer survivors.³⁹ Health care professionals might, however, lack specific knowledge on occupational issues related to cancer.⁴⁰ For occupational physicians, on the other hand, it might be difficult to support cancer survivors, as privacy-related legislation makes it difficult for them to access cancer survivor's medical information.⁴¹ In addition, not all cancer survivors, including

those who are self-employed, have direct access to an occupational physician.⁴² Depending on the health care and legislative system of a country, an oncological occupational physician or a return to work coordinator, playing a role in the oncological care pathway, might be well suited to bridge the gap between oncological and occupational health care.^{43,44}

Workplace system

Workplace system factors can be categorized into external environment, organization, department and job position.¹¹ Regarding the external environment, de Boer and colleagues³ noted that having a union membership increases the risk of long-term adverse work outcomes. It was further found that those working in the private sector or those having an execution function showed an increased risk of long-term adverse work outcomes.³ The impact of being

self-employed deserves more investigation, as this is a very specific and understudied population. Inconsistent results were found for the association between being self-employed and adverse work outcomes.^{3,45}

Few factors related to the worker's organization and department have shown to be associated with adverse work outcomes. Regarding the job position, factors associated with adverse work outcomes are job strain,⁴⁶ and physically and mentally demanding work.^{17,45} This is particularly problematic when functional impairments prevent cancer survivors from performing their demanding job tasks, for instance, lifting.^{18,47} In addition, decision latitude and support from supervisors or colleagues can facilitate positive work outcomes, whereas discrimination or low social support at work is associated with adverse work outcomes among cancer survivors.⁴⁵

The notion that employer accommodation has a positive effect on work outcomes of cancer survivors has consistently been reported in earlier systematic reviews.⁴⁸ Adjustments in work, such as the availability of sick leave or flexibility regarding work hours, strongly predict positive long-term work outcomes.³ This is in line with a review showing that a lack of employee benefits is associated with adverse work outcomes.²⁰ Other systematic reviews showed that a lack of job control⁴⁶ and low decision control¹⁷ were associated with adverse work outcomes.

Legislative and insurance system/culture and politics/overall societal context

Although legislative and insurance systems could have a major impact on work outcomes of cancer survivors, very little research has been performed on this association. Furthermore, the role that cancer survivors themselves and different stakeholders (e.g. employers, occupational physicians, health care professionals) play in the return-to-work process depends, to a great extent, on national and organizational socio-legal systems. For instance, the fact that medical characteristics, such as an advanced cancer stage, are associated with a higher risk of adverse work outcomes might partly be due to the fact that many Western countries routinely provide

work disability pensions to workers with advanced diseases. To cite another example, the finding that breast cancer survivors are less likely to experience adverse work outcomes in the USA when compared with other Western countries could be explained by a fear of losing health insurance, as the USA has no universal health care insurance and most workers have access to health insurance via their employer.¹⁷

Also, not much research has been conducted concerning the impact of a country's culture and politics, and its overall societal context on the adverse work outcomes of cancer survivors. Although, from cultural, psychological and anthropological research, it is known that the country's cultural context can influence the collective meaning of work⁴⁹ and how cancer survivorship⁵⁰ and work disability are perceived.⁵¹

In sum, a range of factors is associated with adverse work outcomes including the cancer type and treatment, fatigue, cognitive functioning, work factors and elements of health care systems. Mapping factors related to adverse work outcomes can provide input for the selection or development of interventions to reduce adverse work outcomes of cancer survivors.¹³

Supportive interventions to diminish adverse work outcomes in cancer survivors

Adverse work outcomes experienced by cancer survivors can be diminished by supportive interventions targeting one or more of abovementioned amendable factors. Based on the non-amendable factors, groups of cancer survivors who need such supportive interventions most can be identified.⁵² Generally, four types of interventions are identified in the scientific literature: psycho-educational, vocational, physical and multicomponent interventions.⁵³

Psycho-educational interventions

Psycho-educational interventions include elements such as patient counselling and education, which could, for example, promote health behaviours and

coping skills of cancer survivors. These interventions aim to diminish adverse work outcomes by targeting the negative psychological consequences of cancer and its treatment. Therefore, psycho-educational interventions are merely focused on the personal system of the Arena in the work disability model.¹¹ For example, in a randomized controlled trial by Purcell and colleagues,⁵⁴ the effects of pre- and/or post-radiotherapy education on fatigue were investigated. Compared with usual care, no significant improvements in work outcomes were seen in cancer survivors receiving this education. However, this might not be that surprising as the training did not address self-care behaviours related to the return to work.

In another study, Bains and colleagues⁵⁵ investigated the feasibility of an educational leaflet and a face-to-face return to work consultation aimed at colorectal cancer survivors. The leaflet and consultation were focussed on the communication with the employer, work ability during and after the treatment, and symptom management at work, aimed at improving coping and self-management skills. The authors concluded that the study was feasible and the effectiveness of the intervention for work outcomes of cancer survivors is to be determined in future research.

Vocational interventions

Vocational interventions focus on the workplace system of the Arena in work disability model.¹¹ These interventions aim to diminish adverse work outcomes by supporting cancer survivors with work modifications, such as changes in work hours, work tasks and workplace environment, or by increasing knowledge and adjusting communication strategies among the cancer survivor and his/her managers and colleagues. An example of a vocational intervention is the MiLES intervention that supports employers during all phases of the return to work of cancer survivors.⁵⁶ The intervention is web-based and includes, among others, interactive communication videos, conversation checklists and succinct information and tips. A feasibility study among 31 employers indicated that the MiLES intervention provides

employers with a useful tool. The effectiveness of the MiLES intervention for work outcomes of cancer survivors is to be determined in future research.⁵⁷ A vocational intervention can include components related to both the cancer survivor and his/her work. For example, Stapelfeldt *et al.*⁵⁸ studied the effectiveness of an intervention aimed at enhancing cancer survivors' readiness for return to work. This intervention was provided by social workers who confronted and helped cancer survivors with clarifying their personal values and needs and enhanced their commitment to return to work (cancer survivor-directed component). The social workers also discussed work adjustments, such as work hours or tasks, with the cancer survivor's employer (work-directed components). The authors found a high return to work rates in both the intervention and the usual care group that were only significantly different within breast cancer survivors (and not within the other diagnosis categories).

Physical interventions

Physical interventions include elements such as physical training or exercise. These interventions aim to improve the cancer survivors' physical functioning and counteract the negative physical consequences of cancer and its treatment. Physical interventions are therefore focused on the personal system of the 'arena in work disability model',¹¹ which could also have positive effects on work outcomes. For example, in a randomized controlled trial by Jong and colleagues,⁵⁹ the effects of a yoga program on adverse work outcomes was investigated in breast cancer survivors undergoing adjuvant chemotherapy.⁶⁰ Compared with care as usual, better work outcomes were found for cancer survivors in the yoga group. Van Waart *et al.*⁶¹ showed that cancer survivors in the usual care group reported more adverse work outcomes than those receiving a physical activity program.⁶¹

Multicomponent interventions

Multicomponent interventions combine elements of psycho-educational, vocational and/or physical

interventions to ameliorate adverse work outcomes in cancer survivors, thereby focussing on a combination of systems of the Arena in the work disability model.¹¹ As an example, the intervention developed by Tamminga *et al.*⁶² was provided by an oncology nurse or social worker and included vocational support, counselling, education and return to work advice. Berglund *et al.*⁶³ combined physical training with a training of the cancer survivor's coping skills. Although the effectiveness of these multicomponent interventions was not always shown in individual studies, a meta-analysis of five multicomponent interventions for cancer survivors concluded that such interventions likely diminish adverse work outcomes in cancer survivors compared with care as usual.⁵³

Clinical recommendations

Derived from the current evidence on supportive interventions, we have formulated the following clinical recommendations:

1. Talk with the cancer survivor about his/her/their work.
2. Organize within a multidisciplinary team by whom and how work-related support can be provided within the context of local regulations, national legislation and guidelines.
3. Advise patients to stay physically active and/or offer patients a physical exercise program if possible.

In sum, effective supportive interventions encompass physical and multicomponent interventions. This narrative review ends with identifying growing points and areas timely for developing research.

Growing points and areas timely for developing research

We identified a range of factors associated with adverse work outcomes in cancer survivors, facilitating the identification of cancer survivors at the risk of adverse work outcomes and facilitating the development of interventions on the basis of survivors' risk

factors. We found a limited number of supportive interventions and even less that are proven effective in diminishing adverse work outcomes. Based on these findings, we identified the following growing points and areas for developing research: (i) tailor interventions; (ii) develop interventions for vulnerable groups; (iii) aim for a better understanding of the impact of the health care and legislative system, and cultural context on adverse work outcomes of cancer survivors; (iv) aim for a better understanding of the complex interplay of factors associated with adverse work outcomes. [Figure 2](#) reflects upon the timeline of cancer treatment and cancer survivorship care, and possible supportive intervention considerations regarding risk assessment, and choosing and executing supportive interventions, in order to support sustainable work participation.

Tailoring interventions

Some cancer survivors experience fatigue, whereas others suffer from diminished cognitive functioning and/or specific physical complaints. When a return to work intervention is better tailored to such individual problems, both in terms of type, timing and intensity, instead of applying a 'one-size-fits-all' approach, the intervention might be more effective. This also means (i) that the setting and the professionals involved should be tailored to the cancer survivor's needs, (ii) that the cancer survivor's individual return to work progress should be monitored and (iii) that the intervention intensity should be adjusted if progress is not as expected. In all cases, the intervention should incorporate key stakeholders and pay attention to communication and coordination of responsibilities.⁶⁴ When developing such an intervention, lessons can be learned from other cancer survivorship interventions that are personalized, such as OncoKompas.⁶⁵ Another example of how an intervention can be tailored to the needs of specific cancer survivors is the STEPS intervention,⁶⁶ in which a behavioural change framework is used to adapt a work participation intervention to the 'stage of change' a particular cancer survivor is in.

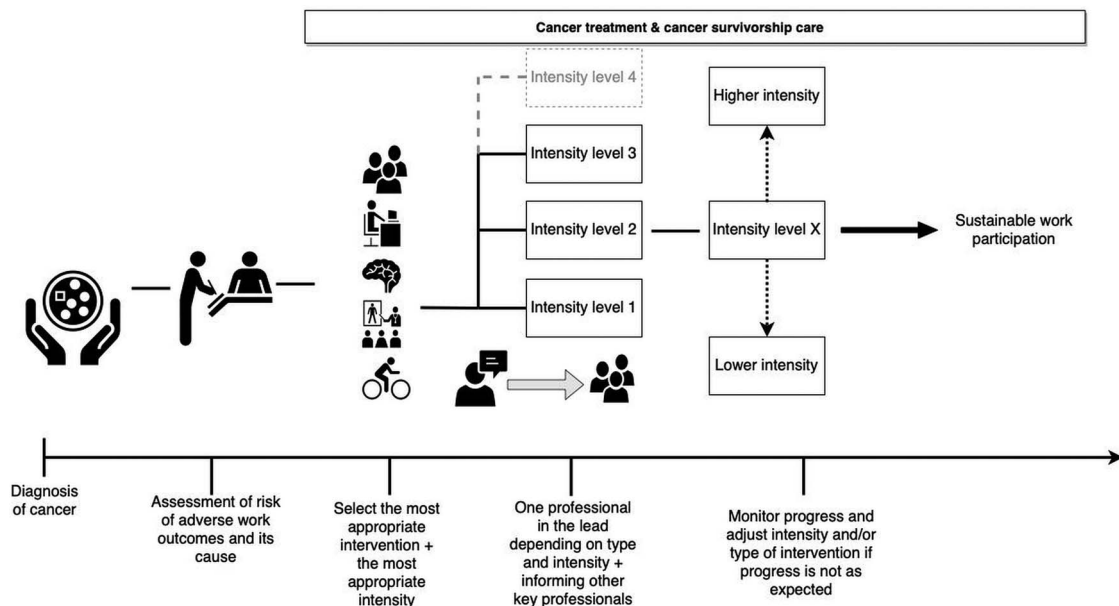


Fig. 2 Interventions to support sustainable work participation: timeline.

A potential disadvantage of tailoring interventions may be that health care professionals and employers are insufficiently equipped to tailor their support to the individual needs of the cancer survivor. In addition, it might be a disadvantage for cancer survivors that it is less clear what they can expect from the intervention because its content is not yet determined. This might lead to health care professionals being reluctant in their advice and support, which might negatively impact work participation.³⁹ As an example, a personalized m/eHealth algorithm based on the most prominent risk factors that provide convalescence and return to work recommendations might overcome this. This has been successfully applied among cancer survivors that received gynaecological surgery for benign diseases in enhancing their return to work.⁶⁷

Interventions for vulnerable groups

Risk factors associated with adverse work outcomes, such as low income, low level of education, being from a minoritized ethnic background and/or being unemployed, work disabled or in precarious

employment at the time of diagnosis, can help us understand which cancer survivors need support most. Ideally, interventions focus on specific risk factor(s) and, when designing such interventions, it can be built on proven effective interventions in adults with other health conditions. For instance, Individual Placement and Support, which is proven effective in obtaining competitive employment in adults with serious mental illness,⁶⁸ might be promising for cancer survivors who are unemployed as well.

The number of cancer survivors living longer in relatively good health despite the rise in palliative treatment.^{23,69} Interviews with Brazilian palliative cancer survivors revealed that, although their quality of life was heavily affected, some survivors indicated that they wished to remain working and that interventions should be developed to support this.²³ This means that we need to broaden our view of which cancer survivors should be supported. When designing interventions for survivors who receive palliative treatment, shared decision making regarding whether the return to work is desirable or not may become more important.

Better understanding of the role of health care and legislative systems and culture contexts

Understanding the impact of differences in the health care and legislative system, and the overall cultural context on adverse work outcomes of cancer survivors is challenging but important. One possibility is to compare two or more countries or jurisdictions in a quasi-experimental design.⁷⁰ In such a design, systems can be compared that have many similarities (or can be matched to reach similarity), but differ on one aspect that is being studied such as having an universal health insurance system versus a health insurance via the employer.

Better understanding the complex interplay of factors associated with adverse work outcomes

The ‘Arena in work disability prevention model’ provides a structure to describing factors and stakeholders that may be associated with adverse work outcomes of disabled workers.¹¹ It does not aim to unravel how subsystems influence each other or the exact interplay of factors. This is challenging, given a number of factors: the way in which factors are measured and the large variability of how ‘adverse work outcomes’ are operationalized and measured. However, such a model would help us better understand how to support cancer survivors with individual, tailored interventions and whether different interventions are needed for difference work outcomes (e.g. preventing unemployment versus preventing a decline in the quality of work life). One possibility is to conduct an individual participant data meta-analysis, another to combine evidence from systematic reviews with expert knowledge⁷¹ and/or to reach consensus on how adverse work outcomes should be measured across countries.¹⁰

Conclusion

In this narrative review, we identified a range of factors associated with adverse work outcomes,

including the cancer type, treatment, fatigue, cognitive functioning, health care system and work environment. We found that effective interventions include physical and multicomponent interventions, whereas the effects of purely psycho-educational and vocational interventions are yet unclear.

Recent developments are interventions tailored to the needs of individual cancer survivors, and the focus on vulnerable groups of cancer survivors with risk factors, including fatigue, cognitive or physical symptoms, ageing cancer survivors, those with job loss, lower income, lower education and precarious jobs. It is important to include these groups in future research and pay attention to them in practice. This is not only beneficial for the cancer survivors themselves, but will also provide a sustainable model for modern ageing societies.

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Conflict of interest statement

The authors have no potential conflicts of interest.

Data Availability

No new data were generated or analysed in support of this review.

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