



Platinum Priority – Editorial

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Effective Technology-based Behaviour Change Interventions in Prostate Cancer Supportive Care: Are We There Yet?

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There is growing consensus that best-practice prostate cancer management should include support to adopt and maintain health-enhancing behaviours. While the best mechanisms for delivering this support are still being debated [1,2], an ideal solution is probably one that is multidisciplinary and personalised, so that both behavioural prescriptions and behaviour change guidance can be adequately provided and tailored to address individual needs.

The report by Kenfield et al. [3] in this issue of *European Urology* provides some of the first evidence that technology-based interventions may be an effective mechanism for encouraging dietary behaviour change among men with prostate cancer. The pilot intervention targeted multiple health behaviours, including six dietary behaviours previously associated with prostate cancer progression. Intervention effects at 12 wk were observed for four out of the six dietary outcomes. The sizes of the effects observed, as well as evidence of acceptability, were all encouraging and support the use of this modality for dietary behaviour change. Future research is now needed to demonstrate the clinical significance of the dietary changes, and address the lack of intervention effects observed for the other behaviours that were simultaneously targeted (smoking and vigorous exercise). Of note, previous research evaluating technology-based interventions targeting activity behaviours among men with prostate cancer have reported significant intervention effects on moderate to vigorous exercise [4].

The lack of effect on smoking is not surprising, as there was only one smoker included in the study. Low smoker participation has been observed in similar studies [5], and

suggests that purposeful accrual practices are probably needed to have sufficient power to test intervention effects on smoking behaviour.

Kenfield et al. [3] hypothesise that the lack of intervention effect for vigorous exercise may reflect participants' difficulty independently engaging in exercise of this intensity. Therefore, they have recently received National Institutes of Health funding to trial an extension of the intervention involving coaches who will remotely monitor and guide patients to increase exercise intensity safely. This is an exciting intervention addition, especially in terms of increasing capacity for tailored exercise prescription, greater social support, and accountability. To date, distance-based exercise interventions have not been as effective as clinic-based interventions for improving functional outcomes among cancer survivors, presumably because of less tailored exercise prescription and social contact [1]. Evidence from adjacent fields, however, shows that innovative strategies have the potential to address these limitations. For example, a recent study among cardiac rehabilitation patients [6] demonstrated that a remote monitoring exercise intervention was as effective as a centre-based intervention for improving maximal oxygen uptake and modifiable cardiovascular risk factors, while also being less expensive to deliver. Therefore, we eagerly await the results from the phase 2 trial proposed by Kenfield et al. to test a similar intervention. Alternative approaches to addressing these limitations could include the use of artificial intelligence to generate personalised exercise prescriptions, virtual reality to increase social presence, and programmes that involve partners or friends. Trials involving some of these components among men with

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prostate cancer are already under way [7]. In time, comparison of the effectiveness of these different strategies will be possible and is recommended.

We have two recommendations to researchers wishing to build on these findings in the future. First, we suggest that consideration of how interventions are likely to fit within existing or ideal care pathways is necessary and should guide intervention development, evaluation, and implementation. The intervention evaluated in the study by Kenfield et al. [3] was designed specifically to promote behavioural changes associated with a lower rate of cancer progression. For integration into practice, future iterations will probably need to expand in focus to promote behaviours associated not only with better survival rates but also with surviving well. This would be more consistent with existing health behaviour guidelines for cancer survivors and may increase the overall impact. For the upcoming trial by Kenfield et al. that will incorporate remotely delivered exercise programming, demonstration of safety and noninferiority will be essential for encouraging uptake into practice. A suggested pathway for promoting exercise among cancer survivors has recently been published [8] and it seems that face-to-face exercise programmes delivered by a qualified exercise professional are the preferred modality for delivering tailored exercise prescriptions at present. This may change as technology-based programmes evolve to deliver not only tailored behaviour-change guidance but also tailored exercise programming.

Second, it may be beneficial to undertake an optimisation process to refine intervention strategies [9]. The intervention package piloted in the study by Kenfield et al. [3] consisted of a website, text messages, a Fitbit app, and access to a Fitbit community group, each containing several behaviour change techniques. As is typical with behaviour change interventions, it is not clear if all of the components and the behaviour change techniques included are needed for efficacy, or if they are likely to work in an additive or synergistic way, or how to best improve them. Usage and acceptability data provide some insights; however, it is possible for an intervention feature to be well liked and used but to have little influence on behaviour change mechanisms and thus behaviour change [10]. Given that changing multiple behaviours may already be somewhat burdensome, it is recommended that future interventions are as lean as possible, and include only “active” intervention components. This could be achieved using engineering-inspired designs, such as factorial studies that can identify optimum intervention packages under set constraints (eg, most effective intervention for less than \$500 per person). The adoption of such methods is likely to fast track our ability to provide effective technology-based

support. Studies focused on optimising exercise interventions for breast cancer survivors are already under way [9].

Overall, the findings and future directions of this research are very promising. Although behaviour change was not observed for two of the behaviours targeted, it was encouraging to see high acceptability and engagement rates across intervention features, and changes in several dietary behaviours. This reflects repeated reports that cancer survivors are interested in, and in many cases prefer, distance-based programmes [2]. While we are not quite there yet, this study represents a step towards being able to provide patient-centred lifestyle support to men with prostate cancer at scale.

Conflicts of interest: The authors have nothing to disclose.

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