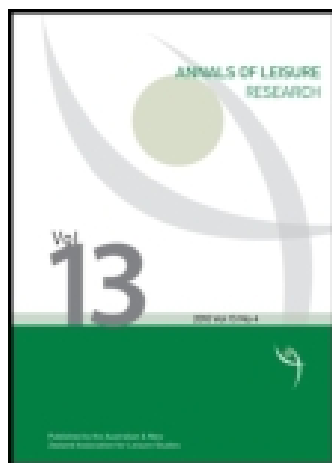


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Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Annals of Leisure Research

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/ranz20>

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Published online: 19 Jun 2012.

To cite this article: Catherine Crofts, Grant Schofield & Geoff Dickson (2012) Women-only mass participation sporting events: does participation facilitate changes in physical activity?, *Annals of Leisure Research*, 15:2, 148-159, DOI: [10.1080/11745398.2012.685297](https://doi.org/10.1080/11745398.2012.685297)

To link to this article: <http://dx.doi.org/10.1080/11745398.2012.685297>

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Women-only mass participation sporting events: does participation facilitate changes in physical activity?

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There is little evidence supporting the claim that mass participation sporting events (MPSE) increase the population's physical activity (PA). This research aimed to identify the demographic, motivational and PA profile of participants in a women-only non-elite triathlon race series. It also aimed to identify whether PA in previously insufficiently active participants increased before the event, and remained elevated three months after the event. Participants were surveyed before (n = 452) and three months after their event (n = 95). The results showed that the participants were predominantly sufficiently active prior to the event. Although PA levels decreased post-event, they remained predominantly sufficient. Nearly 50% of the inactive women pre-event remained sufficiently active three months after their event. Challenge and competition were key motivators for participation. MPSEs facilitate previously inactive women into sufficient levels of PA. Further research should explore their capacity to facilitate long-term maintenance of PA.

Keywords: women; participation; sporting events; physical activity; triathlon

New Zealanders are following the global trend of becoming less active. Approximately 50% of all New Zealand adults are not engaging in sufficient physical activity to maintain good health and this figure is consistent with other countries (Marcus et al. 2000; Ministry of Health 2008; Sullivan et al. 2003). 'Sufficiently active' is defined as more than 30 minutes of physical activity per day on at least five days per week (Sullivan et al. 2003). This decline in PA is due to multiple reasons including a high level of dependency on motorized transportation. In the United States, 86% of all person trips are by private motor vehicle (Bell et al. 2002). Even an activity as fundamental as 'walking to school' is in decline (Merom et al. 2005; Merom et al. 2006). Labour-saving technologies – washing machines, lawnmowers, escalators or elevators provide fewer opportunities for PA (Paffenbarger et al. 2001). Passive leisure devices – televisions, computers, and gaming consoles – encourage sedentary behaviour (Crespo et al. 2001). Children who spend more than two hours per day watching television or computer screen have lower levels of aerobic fitness and higher levels of obesity compared to those who watch fewer hours (Crespo et al. 2001; NZPA 2009).

Many occupations are becoming more sedentary and less physically demanding (Shatkin 2007). Workers with a sedentary occupation do not necessarily compensate for their lack of PA by an increase in active leisure time (Jans et al. 2007).

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Consequently, there is a concern that the recommended level of 30 minutes of moderate PA per day is insufficient to prevent diabetes and obesity for people with sedentary occupations (Macey 2007). The factors describe above show how work and home-based PA opportunities have decreased due to labour-saving devices and a decrease in manual technology. Incidental activity, that is the small incremental amounts of PA gained during activities such as walking to work or to school, have also decreased due to newer technologies including the motor car. This leaves leisure time PA as the main form of PA for many people.

Non-elite mass participation sporting events (MPSE) are widely accessible in New Zealand, and other developed countries. MPSE are community-based open-entry events that require participants to engage in moderate-to-high levels of energy expenditure. Marathons and other distance running events, cycling events and triathlons are common MPSE. Non-elite MPSE may be defined as any MPSE 'where the primary focus is on promoting participation and engagement rather than the significance of the sporting outcome' (Coleman and Ramchandani 2010, 25). MPSE can attract both elite and non-elite participants. For example, the London and New York Marathons attract some of the world's best athletes, but the majority of entrants are non-elite, and simply there to participate.

Recent literature has started to focus on the non-elite MPSE, such as the recent special issue of the *International Journal of Sports Marketing and Sponsorship* that focused specifically on non-elite MPSE (Phelps and Dickson 2010). Despite these efforts, much more remains unknown about MPSE participants. It is widely accepted that encouraging participation in non-elite MPSE will provide health benefits by increasing population PA. However, there is little evidence to support this claim (Bauman et al. 2009; Murphy and Bauman 2007). Are MPSE a catalyst for insufficiently active people becoming more active? Or are race directors simply 'preaching to the converted', that is, those who are already sufficiently active. Bowles et al. (2006) investigated whether participating in a non-elite mass cycling event would affect cycling behaviour. The key findings were an increase in riding frequency one month following the event. This was particularly noticeable in respondents who had rated their cycling ability as 'low' prior to the event. Although these results showed an increase in cycling behaviour, the results were modest with an increase of between two and three rides per month. Although the evidence was tentative, they showed that MPSE can facilitate increased levels of PA. The authors recommended further research to investigate the public health potential of such events and that events specifically aimed at novices should be explored. Lane et al. (2010) surveyed participants in the 2007 and 2009 Irish Flora mini-marathons. This is an annual woman-only 10 km fun-run held in Dublin and Cork. The event was a 'spur to action' as almost 85% of their Dublin respondents started to train in the 'weeks to months' leading up to the event. However, about a third of their Cork respondents did not do any training before the event, suggesting that public health benefits might be limited.

Understanding the demographic profile of participants will assist planning and/or marketing events and allow event leveraging for other areas. For example, Bowles et al. (2006) suggest that partnerships between event organizers and public health agencies may provide novel approaches to targeting inactive populations (p. 6). These events may also allow for health education opportunities such as providing information on health screening campaigns.

If MPSE are a catalyst for converting the physically inactive into a more active state, understanding the participants' motivations towards PA will enable more

efficient resource targeting. Previous research has developed tools such as the Exercise Motivations Inventory (EMI-2) or Motivations for Marathoners Scales (MOMS) for measuring motivation (Ingledew and Markland 2008; Markland and Ingledew 1997; Masters et al. 1993). Previous research has suggested that exercise, which can be defined as a *planned* subset of PA (Caspersen et al. 1985), is mainly motivated by extrinsic factors such as appearance and weight management (Kilpatrick et al. 2005). Conversely, sport has been linked to intrinsic motivations such as enjoyment (Kilpatrick et al. 2005). While investigations of the motivations of long-distance runners has shown that rookie marathon runners are motivated by health and weight concerns, these runners are also motivated by the challenge of the event (Masters and Ogles 1995). A review of elite and non-elite members of an Australian triathlon club showed that both groups were motivated by personal goal achievement and competition. However, running a marathon or joining a triathlon club generally takes a reasonable amount of preparation and/or commitment. As noted by Masters and Ogles (1995) it is hard to generalize the motivations of these groups to those insufficiently active individuals preparing to undertake a much shorter MPSE. Understanding the motivations that encourage participation in short-distance mass events will benefit researchers and leisure industry practitioners alike.

To conclude, this paper contributes to the growing literature on non-elite MPSE participants. The focus of the research is to understand who participates, why they participate and to objectively measure PA changes associated with the event.

Methods

The objectives of this study were to: (1) establish a demographic, PA and motivational profile of participants in a women-only MPSE; and (2) determine changes to participants' PA levels from the time of entry until three months after the event. The first objective assessed the event's ability to attract participants who were recently insufficiently active. The second objective assessed the event's ability to facilitate a sustained increase in PA. Although this study uses a women-only event, it is not intended to be a commentary on women's active leisure.

Research design

A sample of 95 participants in a women-only triathlon series in New Zealand completed three online surveys covering four time points. These surveys collected data on time spent in and motivations towards PA, and demographics. The More FM Triwoman series comprises 10 events held in different locations throughout New Zealand. This series is clearly marketed to non-elite athletes as the race distances are at the short end of the triathlon continuum (i.e. 300 m swim, 10 km cycle, and 3 km run/walk) and the event offers no awards or prize money. The Triwoman series is popular with numbers in excess of 5000 annually. Participants can either complete the race as an individual or as part of a two or three person team. Promotional material for the event emphasized fun, social interaction and the benefits of exercise. Participants were invited to take part in the pre-event survey (survey 1) by the race director upon registration. Survey 1 covered two time points – when preparation for the event commenced (T0) and race entry (T1). This distinction was required as participants vary as to when they begin preparation for the event and

when they actually enter the event. Respondents were also asked to specify their first event in the series as many indicated that they would participate in multiple events through the summer. Respondents were contacted to complete survey 2 one week after their first event and survey 3, three months after their first event. These two surveys reassessed motivations towards PA. PA was only reassessed during survey 3 due to the confounding effect of the event itself. Practical considerations lent to the final collection of survey data at three months post-event. A longer time period would increase the potential for confounding variables such as decreased daylight hours and the onset of winter. This time period was also used by Lane et al. (2008) in their follow-up with the Irish Flora mini marathon participants.

Study participants

All participants aged 20 years and older who completed the online survey at least seven days prior to their first event were included in this study. The purpose of the seven-day exclusion criterion was to balance the confounding features of falsely high PA levels while maximizing participant numbers. Only individual entrants and team captains entering online were invited to the survey. It is unknown how many participants received the invitation or how many participants were excluded by entering within seven days of their event.

There were no significant statistical differences in the demographics of participants who completed survey 1 (n=452), survey 2, (n=135) and survey 3 (n=95). As there were no significant statistical differences in the motivational profiles between surveys two and three, it was decided to exclude survey 2 data from further analysis. Reasons for the large dropout rate between survey 1 and survey 2 were not explored. There were no significant differences in pre-event PA or motivational profiles between those who completed survey 1 and survey 3.

Instrument design

Survey 1 provided the demographic, PA and motivational profile of participants. Data describing age, household status, employment status, and highest educational qualification were collected. In this section of the survey, the question prompts emphasized 'At the time you began preparation for the event . . .' (i.e. T0). PA at the time preparation for the event commenced was retrospectively self-assessed as being 'sufficiently active for at least the last six months'; 'sufficiently active for less than six months' or 'not yet sufficiently active.' Consistent with New Zealand-based recommendations (Sullivan et al., 2003), 'sufficiently active' was defined in the survey as 'at least 30 minutes per day on five or more days per week.'. The target group for analysis were those women sufficiently active for less than six months (both moderately and vigorously active) and those women insufficiently active (Sullivan et al. 2003). The women's motivations towards PA at the time preparation for the event commenced were assessed using an abbreviated form of the Exercise Motivations Inventory (EMI-2) survey (Markland and Ingledew 1997). At 52 items across 14 subscales, the full EMI-2 was impractical given the other scales in the survey. Three academics with PA motivation expertise developed an abbreviated version of the EMI-2. The abbreviated version excluded the Nimbleness, Revitalization, and Health Pressures subscales and combined Ill-health Avoidance and Positive Health subscales into a single construct called Health. The panel also identified the

items within each of the subscales best suited to the study. The abbreviated EMI-2 consisted of 11 subscales and 23 items: (1) Challenge (To give me goals to work towards, To give me personal challenges to face); (2) Competition, (Because I enjoy competing, Because I enjoy physical competition); (3) Enjoyment, (Because I enjoy the feeling of exerting myself, For enjoyment of the experience of exercising, Because I feel at my best when exercising); (4) Positive Health, (Because I want to maintain good health, To feel more healthy); (5) Ill Health Avoidance, (To avoid ill-health, To prevent health problems); (6) Stress Management, (Because it helps to reduce tension, To help manage stress); (7) Strength and Endurance, (To build up my strength); (8) Weight Management, (To help control my weight, Because exercise helps me to burn calories); (9) Appearance, (To improve my appearance, To look more attractive); (10) Social Recognition, (To show my worth to others, To gain recognition for my accomplishments); (11) Affiliation, (To spend time with friends, To enjoy the social aspects of exercising, To make new friends). This abbreviated surveys all had satisfactory internal validity, with Cronbach scores all exceeding 0.7 (Nunnally 1978).

In addition to the commencement-of-preparation data, survey 1 also collected race entry data (i.e. T1). All questions from T0 were repeated with the question prompt now emphasizing 'At the current time . . .'. The one exception to this was the retrospective self-assessment of PA, which was replaced by the well-validated New Zealand Physical Activity Questionnaire-Short Form (NZPAQ-SF) (Sullivan et al. 2003). Time spent in PA is the primary outcome variable for the NZPAQ-SF. Participants were classified, in accordance with New Zealand recommendations, as sufficiently active (i.e. > 30 min of PA on five or more days per week), insufficiently active (i.e. > 30 min of PA per week but less than sufficiently active threshold), or sedentary (i.e. < 30 min of PA over the week). The NZPAQ-SF was not suitable for use in the T0 section of the survey because participants could not be expected to recall their minutes of PA with any level of accuracy.

Survey 3, administered three months after the first event (i.e. T3), used the T1 questions from survey 1 (i.e. NZPAQ-SF, EMI-2) with the addition of the PA self-assessment question from T0. Survey 2 and survey 3 question prompts emphasized 'At the current time . . .'

Analysis

All demographic data were analysed from survey 1 (n = 452). PA results are reported in minutes. Consistent with IPAQ (2005) guidelines, NZPAQ activity time was truncated to 180 minutes per day per activity. Recognizing the benefits conferred by more intense PA, the minutes of vigorous activity were weighted by a factor of two (Armstrong et al. 2000). Repeated measure analysis of variance with Tukey's *post-hoc* test determined the differences within variables (e.g., demographic, motivational and PA data) between the three PA levels. No significant statistical differences were established between those 'sufficiently active for less than six months' and those 'not yet sufficiently active,' in any variable; therefore these categories were combined. The final categories for the NZPAQ analysis are termed 'long-term active' (i.e. those sufficiently active for more than six months) and 'short-term /insufficiently active.' The latter effectively combined people categorized as 'not yet sufficiently active' with those categorized as being 'sufficiently active but for less than six months'. Matched analysis (n = 95) compared PA data at T0 and T3 for the PA statement and also

compared the NZPAQ-SF at T1 and T3. Differences between time points were analysed with t-tests. All data were analysed using SPSS (Version 16).

Results

A summary of the demographics is presented in Table 1. Using New Zealand census data as a benchmark, the results suggest that a number of demographic segments of New Zealand's female population are overrepresented among the event's participants (Triwoman participants vs NZ census data). This is evident in the proportion of women aged 30–44 years (57% vs 23%), women with educational qualification beyond high school (73.6% vs 29%) and women in fulltime employment (59.5% vs 34%). The majority of participants live with their partners (78%) while 58% live with their children. Most participants (63%) were sufficiently active before preparing for this event. Taken together, just over one-third of participants were either 'not yet sufficiently active' (12%) or had been sufficiently active for less than six months (25%). Complementing these relatively low levels of physical inactivity are data indicating that 84% of participants were previous event participants.

Key motivations towards PA were defined as one in which more than 50% of participants scored 'High,' or a mean of greater than 5, for the motivation construct.

Table 1. Triwoman participant characteristics at time of entry (n = 452).

Demographics	Participants (n = 452)	
	Frequency	Percentage
Age group		
< 29	76	17%
30–44	259	57%
45–59	102	23%
≥ 60	15	3%
Highest educational qualification		
None	13	3%
Secondary school	106	23%
Tertiary	224	50%
Other complete qualification	109	24%
Household composition		
Partner only	118	26%
Partner and children	234	52%
Children only	25	6%
Other	75	16%
Employment status		
Working full-time	269	60%
Working part-time	88	19%
Full-time mother	74	16%
At home/retired	7	2%
Unemployed	3	1%
Student	11	2%
Baseline physical activity status		
Sufficiently active – more than six months	284	63%
Sufficiently active – less than six months	112	25%
Not yet sufficiently active	56	12%

The key motivations when event preparation commenced were Challenge (81% scored 'High'), Competition (70%), Enjoyment (67%), Health (64%), and Stress Management (55%). With the exception of Enjoyment, there were no significant differences between the long-term active group compared to the short-term/insufficiently active group.

The second research question sought to determine changes to participants' PA levels from the time of entry (T1) until three months after the event (T3). Participants' PA levels were high at T1 then declined by T3 (See Figure 1). Participants at T1 were, on average, active for 709 minutes (SD = 604) over at least five days during the week. At T3, participants averaged 186 minutes (SD = 156) over only 4.6 days of the week. This decline was further evidenced by the weighted minutes, which declined from 913 minutes (SD = 807) to 232 minutes (SD = 170). Interestingly, activity days and sessions only declined to approximately 80% of pre-race levels with activity days declining from a mean of 5.06 days (SD = 1.77) to 4.55 days (SD = 1.79). The number of sessions also declined from a mean of 9.06 (SD = 4.37) to 7.28 (SD = 4.09).

At T1, using New Zealand PA recommendations, long-term active group participants were 50% more likely to be sufficiently active compared to those in the short-term/insufficiently active group. The long-term active group's engagement in 34% more activity sessions and 42% more activity minutes underpins this difference.

The number of women who reported being sufficiently active for at least six months increased approximately by 15% between T0 and T3. Some positive results were observed regarding the small number of women ($n = 18$) who were active for less than six months prior to their first event. At T3, 11 of these 18 women now described themselves as 'active for at least six months.' This represents a 61% maintenance rate. Furthermore, at the time of race entry, 13 women were insufficiently active. However, at T3, six of these women (46%) had transitioned into being sufficiently active for more than six months.

Discussion

The results indicate that the events attracted predominantly middle-aged women who live with their partners and children. These women possess post-high school qualifications and are in fulltime employment. The relationships between socio-economic status (SES), education and fulltime employment on healthy behaviours are well established (Isaacs and Schroeder 2004). This research did not investigate the link between SES and the motivation to enter this particular race series. However, the event-related financial costs (e.g. entry and bicycle) would be prohibitive for some women.

The participant profile for this event showed that 58% lived with their children. When considered alongside of the age of participants, it is likely that the majority of these children are less than 11 years of age. Previous research demonstrates that mothers of young children are the least likely to achieve sufficient levels of PA required for good health (Miller and Brown 2005). However, despite being in this high-risk group for low PA levels, participants in the Triwoman series achieved high levels of PA. Miller and Brown (2005) also showed that women who enjoyed PA and viewed it as part of their responsibilities as a wife and mother were more likely to achieve higher levels of PA. Promotional material for the Triwoman event

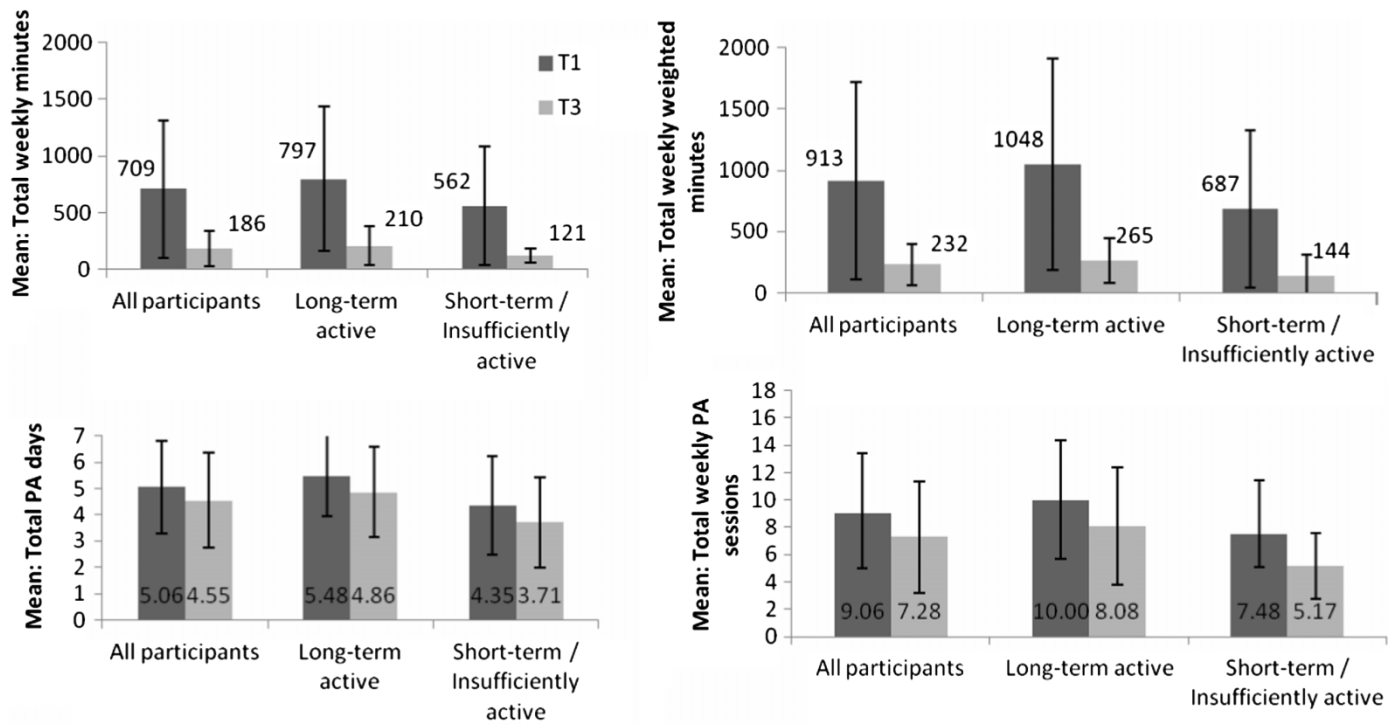


Figure 1. Physical activity from NZPAQ-SF measured over the seven days preceding T1 and T3 (n = 95).

emphasized fun, health and wellbeing. The material also highlighted practical ways for the women to be a positive health role-model and how to engage their families so that they could find the necessary time for event preparation and training.

Challenge and competition were the key motivations. This corresponds with earlier research that found that challenge and competition were the two greatest motivations for both elite and non-elite triathletes (Croft et al. 1999). Enjoyment was the only motivating factor that significantly differed between the long-term active and short-term/insufficiently groups. Consistent with previous research (Hagberg et al. 2009), these results highlight that those people who enjoy PA are those most likely to sustain their PA. These results also suggest that participants in the long-term active cohort are more intrinsically motivated towards PA. There is a clear implication for event promotion. MPSE should be positioned as enjoyable, social and challenging activities. The promotion of health benefits does not need to be made explicit, as the health benefits of exercise are well known. What remains less well-known and less understood by many, is that MPSE can be both fun and enjoyable.

The majority of women were physically active before preparing for the event. Therefore, the public health benefits of these races may not be as significant as some claim. However, the role that these events play in facilitating those already active into even higher levels of PA, should not be ignored. Without a behavioural intervention, 50% of people are likely to cease newly adopted PA behaviour within six months of commencement (Dishman and Buckworth 1996). For those already active, MPSE may be a 'recurring behavioural intervention' that provides opportunities for sustained, high levels of PA. Thus, the public health benefits of MPSE may be in their ability to prevent relapse in people who achieve sufficient levels of PA.

The changes to PA levels identified within this study permit a number of conclusions. First, MPSE are capable of stimulating high levels of PA prior to the event. Despite the event being expected to stimulate PA behaviours in all participants in the weeks immediately prior to the event, the number of minutes and activity sessions reported was higher than anticipated. Even those women previously sedentary or insufficiently active were on average, engaging in PA three to four times greater in duration than that recommended for health. Second, MPSE are able to stimulate long-term PA behaviours patterns. Nearly half of the previously inactive women were sufficiently active three months after the event. This finding is consistent with previous research showing an increase in PA one month following a non-competitive cycling MPSE (Bowles et al. 2006). Taken together, these two conclusions reinforce and support the advice given to British physicians that MPSE may be a useful 'prescription' to increase PA levels (Bauman et al. 2009). Third, anomalies in PA measures are problematic. For example, 92% of participants were active for more than the recommended 150 minutes of PA per week at time of race entry. In fact, the participants averaged more than 700 minutes of weekly PA. However, nearly one third of the participants were deemed to be 'not regularly active' because their PA was not distributed across *five or more days* throughout the week, as per New Zealand recommendations (Sullivan et al. 2003).

There were a number of limitations to this study. It is unknown as to the number of participants who received the survey invite as only team captains and individuals who entered the event online received the invite. Those who did not receive a survey invite included those who entered via a postal entry and team members. The survey appears to have oversampled returning participants. Eighty-three percent of our samples were returning participants, significantly higher than the 40–50% estimated

by the race directors. However, it is consistent with a previous study that suggested that active women are more likely to respond to PA survey requests (Lane et al. 2008). This may bias the results towards higher levels of PA prior to race preparation. The earliest opportunity to collect data was at time of entry, which restricts the ability to collect accurate data near the time when the decision to enter is made and when preparation commences. Furthermore, the results indicate that PA was high at the time of race entry, which was the earliest opportunity for gathering data. However, the data suggests that preparation started much earlier. There was also a significant drop out rate between survey 1(n = 452) and survey 2(n = 135). Unfortunately the reasons for the attrition rate are not determinable, although it is likely that a number of women dropped out due to being unable to attend the event.

Further research should utilize a research design that facilitates a greater understanding of the decision making of inactive participants who are contemplating participation in such an event. This is a challenge, as it requires access to people before they decide to participate. Another study is to understand how both physically active and inactive women perceive MPSE events as a mechanism to increase their PA levels. Researchers should also explore the role of entry-level MPSE as gateway events to longer, more physically demanding events. Future research should also consider qualitative methodologies. A longitudinal study incorporating in-depth interviews with prospective participants at various stages of the preparation phase, and post-event, would likely add additional insight. A longer duration between the event and the post-event survey is also recommended to determine if behaviours adopted by first-time participants are maintained, extended, become seasonal, or dropped altogether.

Conclusion

MPSE are capable of attracting small numbers of women who are 'recently active' or 'insufficiently active' prior to commencing preparation. The majority of these women are likely to sustain an increased level of PA three months after the event. For historically active people MPSE are useful because they provide an incentive to maintain high levels of PA. Enjoyment is the key motivator to sustained involvement. Event directors and public health officials should be alerted to the potential benefits of mutual partnership in targeting insufficiently active individuals. Put simply, in addition to getting inactive women 'off the couch', MPSE may have an important role in keeping active women off the couch.

Acknowledgements

The authors would like to thank Brand New Day and Triathlon New Zealand for their assistance. This project was financially supported by Sport and Recreation New Zealand.

Notes on contributors

Catherine Crofts is a graduate of Auckland University of Technology. A pharmacist and keen triathlete, her research interests focus on improved health outcomes associated with mass participation sport events.

Grant Schofield is Director of the Centre for Physical Activity and Nutrition at Auckland University of Technology. His research interests include physical activity, nutrition, and health. He investigates novel and sustainable solutions to getting people moving more and making the

world a happier and healthier place. He has particular experience and expertise in urban design, transport and health.

Geoff Dickson leads the events research program at the New Zealand Tourism Research Institute at Auckland University of Technology. His research interests include the impacts and legacy of sport events. He is an editorial board member for *Sport Management Review*, *International Journal of Sport Marketing and Management* and *International Journal of Sport Marketing and Sponsorship*.

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