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Promoting physical activity in Australian general practices: a randomised trial of health promotion advice versus hypertension management

Alison L. Marshall [a,*], Michael L. Booth [b], Adrian E. Bauman [c]

[a] School of Human Movement Studies, The University of Queensland, Connell Building, St. Lucia, Brisbane, Qld 4072, Australia
[b] Centre for Research into Adolescents' Health, The University of Sydney at The Children's Hospital at Westmead, Sydney, NSW, Australia
[c] NSW Centre for Physical Activity and Health, School of Public Health, The University of Sydney, Sydney, NSW, Australia

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Abstract

A randomised controlled trial was conducted to determine if physicians' advice to promote physical activity to patients was more effective if the advice was tailored to the management of hypertension, compared with more general health promotion advice. Participants included inactive 40- to 70-year-old patients visiting the physicians' during study recruitment period. Physicians provided verbal physical activity advice and written materials, both tailored to either general health promotion messages or specifically as a means for treating or managing hypertension. Seventy-five physicians and 98% (767/780) of screened eligible patients participated in the study. Differences between intervention and control groups self-reported physical activity were assessed over 6 months. Follow-up response rates were 92 and 84% at the 2- and 6-month assessments. There were no consistent, significant differences between groups at the 2- or 6-month assessments. Thus, neither intervention strategy resulted in significant changes in patients self-reported physical activity, regardless of the whether the advice was tailored to hypertension management or general health promotion advice.

Keywords: Physical activity; Intervention; Primary care; General practice; Behaviour modification

1. Introduction

Physical inactivity and low cardio-respiratory fitness are associated with substantial increases in diabetes and cardiovascular disease risk [1]. Adults of any age who start to participate in regular moderate-intensity physical activity can improve quality of life, [2] and reduce the risk of subsequent mortality [3]. In addition, being active reduces the risk of falls and injuries among older people and may improve mental health [4,5]. Thus, physical activity is an important component of any prevention strategy, yet in most developed countries the high prevalence of physical inactivity has not changed in recent years [6,7].

Primary care is a recognised and widely preferred setting for the promotion of physical activity [8,9]. Family physicians have a unique opportunity to provide clear health promotion messages to their patients, but few routinely counsel their patients about becoming more active [9–12]. Physicians tend to offer advice only to those they judge would benefit from being more active [13].

A variety of physical activity counselling and brief advice interventions have been evaluated in the United States [10,14–16], United Kingdom [17–20], New Zealand [21], Australia [22,23], and Canada [24]. Cumulatively, these studies suggest that patients' physical activity may increase in the short-term (up to 12 weeks), but not long-term (>6 months), following advice from a primary care physician, and effects can be enhanced by the provision of written materials or the use of tailored 'activity prescriptions'. Other studies have suggested that advice should be given by other health professionals [16–20,25]. Regardless, the net effects of physical activity interventions conducted in primary care are modest [26]. However, most studies conducted to date have adopted a primary prevention approach, whereby physical activity promotion has been closely linked to overall health gain and illness prevention for all attending patients.

It is thought that physicians are more likely to counsel patients to be more active as a form of secondary prevention [11]. Kreuter et al. [27], in a cross-sectional analytic study, found that patients who presented with obesity, hypertension or hypercholesterolaemia were more likely to be counselled about physical activity. However, few interventions have specifically examined the effectiveness of a physician

* Corresponding author. Tel.: +61-7-33656380; fax: +61-7-33656877.
E-mail address: alisonm@hms.uq.edu.au (A.L. Marshall).

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providing advice to patients with a known health risk factor. It is quite plausible that, in the context of a visit to a family physician, patients may be more responsive to advice to be more active if it is delivered as part of a treatment regimen for an existing health problem.

The epidemiological evidence, based on a meta-analysis of studies involving middle-aged and older adults, shows that moderate-intensity physical activity can reduce elevated systolic and diastolic blood pressure [28]. With this in mind, the aim of this study was to determine if physicians' advice to promote physical activity to patients was more effective if the advice was 'medicalised' or tailored to the management of hypertension, compared with more general health promotion advice delivered to undifferentiated patient samples. It was hypothesised that patients with a known cardiovascular disease risk factor may be more responsive to advice from their physicians to increase their physical activity as a way of dealing with their health issue.

2. Methods

2.1. Design and recruitment

This study was a randomised controlled trial that used general practices as the unit of randomisation. The University of Sydney Human Ethics Committee approved the study. Physicians were invited to participate through regional General Practice organisations. As an incentive to participate, physicians were offered Continuing Medical Education credits if they completed the study. Seventy-five physicians were trained by the authors to assess their patients' eligibility for the study and their physical activity participation, either in-group ($n = 53$) or in individual training sessions. Each practice was randomised to one of four groups: Health Promotion intervention group (HP intervention); Health Promotion control group (HP control); Risk Factor intervention group (RF intervention); or, Risk Factor control group (RF control), resulting in 20 physicians being allocated to the HP intervention group, 25 to the RF intervention group and 15 each to the two corresponding control groups (Fig. 1).

Each physician was asked to recruit at least 20 patients to the study. The target population comprised inactive 40- to 70-year-old patients consulting with a study physician between August and October 1999. Reception staff were asked to identify patients in the age range and give them the Information Sheet and Informed Consent Form prior to the patient seeing the physician. The physician then assessed consenting patients for eligibility. Patients were eligible for the study if they were: attending the surgery for themselves; literate in English; insufficiently physically active; able to walk independently for at least 10 min; and not suffering any medical contra-indications for moderate-intensity physical activity (e.g., severe cardiac or chronic airways diseases or cognitive problems). In addition to these criteria, patients to be recruited to the RF intervention or RF control groups had to have a history of hypertension. Thereafter, patients in the two intervention arms of the study received the intervention and those recruited to one of the control arms of the study were informed that they would be contacted in 2 and 6 months time by research staff. The usual clinical consultation then took place.

2.2. Intervention materials and process

The intervention strategy was similar across the two intervention groups; the only difference was in the focus of the advice given. Patients recruited to the HP intervention group received materials and advice that encouraged them to be more active in order to protect or promote their general health. Patients recruited to the RF intervention group received materials and 'medicalised' advice which focussed on encouraging them to be more active as an adjunct to managing their hypertension. Physicians were encouraged to discuss the benefits of physical activity, to identify the patient's preferred types of activity, and to negotiate a program of activity which was then recorded on an 'Active Prescription'. The advice and prescription were then supplemented with one of two self-help booklets. The two control groups, HP control and RF control received only usual medical care from their physician.

The 'Active Prescription' was the same as that used by Smith et al. [22]. With the appearance of a clinical prescription; it included a precise prescription of the type, duration and frequency of activity suggested, plus additional space for other comments, a recommended review date and the physician's signature. Carbon copy duplicates could be kept in the patient's clinical notes to prompt review during subsequent consultations.

Two separate booklets were designed; one to reinforce the health benefits of physical activity and one to emphasise the role of physical activity in hypertension control. Both booklets were guided by the stage of motivational readiness for physical activity [29,30], and included behavioural support strategies [29,30]. The booklets used in this study were adapted from booklets previously evaluated in the community [31,32], and primary care settings [22].

2.3. Measures

Trained physicians assessed their patients' physical activity participation at the time of recruitment using the short form IPAQ usual week questions and provided demographic information (age, gender and hypertension status). The IPAQ has satisfactory measurement properties [33], and collects separate frequency and duration data for walking, vigorous- and moderate-intensity physical activities. Weighted MET minutes per week (MET min per week) were calculated as duration × frequency per week × MET intensity for each activity type (four METs for moderate-intensity activity and walking and eight METs for vigorous-intensity activity) duplicating the methods used previously to analyse IPAQ data

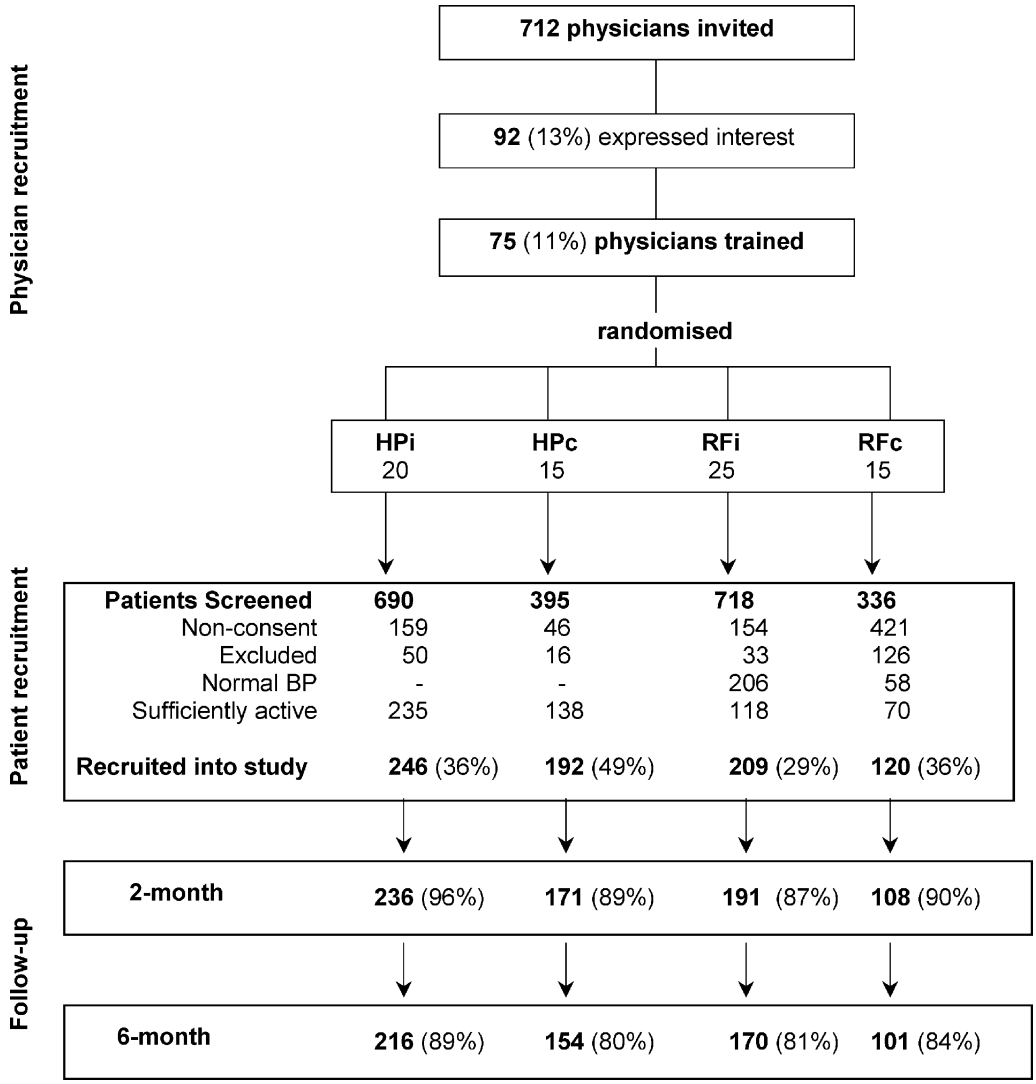

Fig. 1. Physician and patient recruitment and progress though the phases of the trial.

[33]. MET min per week data from each activity category were then summed to produce an overall estimate of total physical activity and is the preferred method of producing a comparable criterion of sufficient physical activity across genders as it is independent of body weight [34]. Patients were categorised as 'insufficiently active' if they accumulated <700 MET min per week and became study participants. Patients reporting ≥ 700 MET min per week were classified as 'sufficiently active' and were not recruited to the study.

Follow-up data were collected at 2- and 6-month follow-up assessments by trained telephone interviewers who were blind to the patients' group allocation. The same physical activity recall questions were used at baseline and both follow-up assessments. Process evaluation questions previously used by Marshall et al. [31,32], designed to evaluate receipt and perceived usefulness of the intervention materials were also administered. Each interview took approximately five minutes. Up to 12 call backs were made to ensure adequate follow-up data were collected.

2.4. Data analysis

All data were double-entered into Epi-Info 6.0 and any discrepancies corrected from the original interview data sheets. The analyses are limited to the patients' self-reported data collected at the 2 and 6 month follow-up surveys because we could not be certain that the GP administered physical activity assessment was comparable with the data collected by telephone interview during the two follow-up surveys.

Bivariate cluster adjusted analyses were conducted to compare the differences between study groups in terms of reported and perceived physical activity levels at the 2- and 6-month follow-ups. The SAS (version 8.0) Proc Genmod was used, using Generalised estimating equations to account for the correlated structure within practices/practitioners.

Table 1
Characteristics of the study groups at the baseline assessment

	Health promotion intervention ($n = 246$)	Health promotion control ($n = 192$)	Risk factor intervention ($n = 209$)	Risk factor control ($n = 120$)
Age (mean ± S.D.)	53.5 ± 8.3	54.7± 8.9	56.6 ± 8.0*	56.9 ± 8.5*
Male (%)	36.6	38.5	46.4	35.8
Hypertension (%)				
No	76.5	64.4	0	0
Yes, controlled	23.0	33.5	81.3	89.2
Yes, sub-optimally managed	0.4	2.1	18.7	10.8

* $P < 0.01$ between the 'Risk Factor' groups and the 'Health Promotion Intervention' group.

The results are expressed as odds ratios for the outcomes adjusted for the clustering of patients within practices.

Replicating previous methods [22,31,32], both intention-to-treat and intervention received analyses were conducted. The intention-to-treat analyses assumed patients lost to follow-up did not change their behaviour, thus baseline data were substituted for values lost to follow-up. The intervention-received analysis only included those patients who recalled receiving physician advice, the 'Active Prescription' and the 'Active Living booklet'. Significance was set at $P < 0.05$ for all analyses.

3. Results

3.1. Sample characteristics and follow-up response rates

Of the 75 participating physicians, 12 did not recruit any patients to the study. Of the remaining 63 physicians, 27 recruited $n \geq 17$ patients to the study and 36 recruited $n \leq 14$ patients to the study. Therefore, fewer patients were recruited than was anticipated (Table 1).

Overall, the sample was 40% male, had a mean age of 55.2 (±8.5) years, and all were classified as 'insufficiently active' as assessed by their physician at baseline. The study groups had similar gender proportions, except the RF intervention group included slightly more men ($\chi^2 = 5.78$; $P = 0.12$). Both RF groups were older than the HP intervention group ($F_{3,761} = 6.9$; $P < 0.01$, with post hoc Scheffe contrasts indicating the differences were significant between the HP and the RF intervention groups). For the RF groups, the proportions of patients with controlled (treated) and sub-optimally managed hypertension were not significantly different.

Over 92 and 84% of the baseline sample were followed-up at the 2- and 6-month assessments, respectively (Fig. 1). The greatest loss of patients to follow-up was from the HP control group (20%).

3.2. Intention-to-treat analysis

3.2.1. Differences in self-reported physical activity

At the two-month assessment, over 50% of participants reported participating in sufficient physical activity (Table 2). No statistically significant difference was observed between either the two intervention groups ($P = 0.31$) or between the intervention groups and their respective control groups.

At the 6-month follow-up assessment, more than 63% of participants were classified as sufficiently active in both RF

Table 2
Proportion of patients who reported sufficient physical activity at the 2- and 6-month follow-up assessments (intention-to-treat analysis)

	Follow-up assessments			
	2-month		6-month	
	Proportion	*P*-values and odds ratio*	Proportion	*P*-values and odds ratio*
Sufficient physical activity[a]				
HP intervention ($n = 236$)	55.0		66.2	
HP control ($n = 171$)	50.3	0.38 and 1.20 (0.80–1.83)	53.9	0.009 and 1.63 (1.12–2.37)
RF intervention ($n = 192$)	56.5		63.4	
RF control ($n = 108$)	59.9	0.58 and 1.16 (0.70–1.93)	63.3	0.99 and 0.99 (0.59–1.66)
Perceived change in activity[b]				
HP intervention ($n = 236$)	51.7		46.8	
HP control ($n = 171$)	26.9	<0.001 and 2.92 (1.78–4.76)	29.9	0.001 and 2.05 (1.33–3.16)
RF intervention ($n = 192$)	45.3		38.8	
RF control ($n = 108$)	24.1	<0.001 and 2.66 (1.57–4.52)	33.7	0.29 and 1.28 (0.80–2.06)

[a] Proportions meeting the sufficient physical activity criterion (≥700 MET min per week).
[b] Proportions reporting they were 'more' or 'much more' active than at baseline.
* *P*-values and odds ratio and 95% CI adjusted for clustering within practices/practitioners.

groups and the HP intervention group, but only 54% of participants in the HP control group were classified as sufficiently active. The difference between the proportions of the two intervention groups who were classified as sufficiently active at the 6-month assessment was not statistically significant ($P = 0.56$) and neither was the difference between the RF control and RF intervention groups (Table 2). However, the difference between the proportions of the HP intervention and HP control groups who were classified as sufficiently active at the 6-month assessment was statistically significant (Table 2).

3.2.2. Perceived change in physical activity

Significantly greater proportions of the HP intervention group felt they were 'more' or 'much more' active than they were at baseline, compared with the HP control group at the 2- and 6-month assessments (Table 2). Similarly, a significantly greater proportion of the RF intervention group felt they were 'more' or 'much more' active than they were at baseline compared with the RF control group at the 2-month follow-up, but not at the 6-month follow-up. There was no significant difference between the HP and RF intervention groups in terms of the proportions who felt they were 'more' or 'much more' active than they were at baseline at either the 2-month ($P = 0.18$), or 6-month ($P = 0.12$) assessment.

3.3. Process evaluation

Over two-thirds of the intervention group participants reported that their physician had discussed physical activity with them and had given them the Active Prescription (64% HP intervention and 68% RF intervention group). Fewer patients recalled receiving the Active Living booklets (41% HP intervention and 43% RF intervention). Some of the control group patients also recalled receiving the Active Prescription (4% HP control and 1% RF control) and Active Living booklets (5% RF control and 6% HP control).

Only 30% of the HP intervention and 34% of the RF intervention group reported receiving all components of the intervention (physical activity advice from the physician as well as the Active Prescription and Active Living Booklet) at the 2-month assessment. The difference in proportions between the two intervention groups was not statistically significant ($P = 0.46$). One per cent of the HP control group and none of the RF control group recalled all aspects of the intervention.

Most intervention group patients reported that their physician's advice was helpful (76%), and that they tried to follow it (72%). Of those who recalled receiving some physician advice, 12% reported the advice was no help and they did not try to follow it; 13% reported the advice was no help, but tried to followed it; 16% reported the advice helped, but they did not follow it; and 59% reported the advice helped, and they tried to follow it.

3.4. Intervention-received analysis

Data from those in the intervention groups who recalled receiving all three intervention components are presented in Table 3.

3.4.1. Difference in self-reported physical activity

The differences in the proportions of participants who were sufficiently active at the 2-month assessment between the two intervention groups ($P = 0.24$) and between the intervention groups and their respective control groups were not statistically significant (Table 3). Similarly, none of the differences between groups were statistically significant at the 6-month assessment.

Table 3
Proportion of patients who a reported sufficient physical activity at 2- and 6-month follow-up assessments (intervention received analysis[a])

	Follow-up assessments			
	2-month		6-month	
	Proportion	*P*-values and odds ratios*	Proportion	*P*-values and odds ratios*
Sufficient physical activity[b]				
HP intervention ($n = 74$)	45.9		64.8	
HP control ($n = 192$)	50.3	0.46 and 0.84 [0.52–1.34]	53.9	0.09 and 1.52 [0.93–2.48]
RF intervention ($n = 70$)	55.7		61.3	
RF control ($n = 120$)	56.5	0.92 and 0.97 [0.54–1.75]	63.3	0.78 and 1.09 [0.58–2.05]
Perceived change in activity[c]				
HP intervention ($n = 74$)	58.1		52.1	
HP control ($n = 171$)	26.9	<0.001 and 3.78 [2.02–7.08]	29.9	<0.001 and 2.50 [1.48–4.26]
RF intervention ($n = 70$)	65.7		51.6	
RF control ($n = 108$)	24.1	<0.001 and 6.05 [3.43–10.68]	33.7	0.005 and 2.70 [1.27–3.81]

[a] Includes only those participants who recalled all components of the intervention (physician advice, Active Prescription and Active Living booklet).
[b] Proportions meeting the sufficient physical activity criterion (≥700 MET min per week).
[c] Proportions reporting they were 'more' or 'much more' active than at baseline.
* *P*-values and odds ratio and 95% CI adjusted for clustering within practices/practitioners.

3.5. Perceived change in physical activity

The difference between the two intervention groups in the proportions of participants who felt they were 'more' or 'much more' active at the follow-up assessments compared with the baseline assessment were not statistically significant at the 2-month ($P = 0.34$) or the 6-month ($P = 0.95$) assessment. However, the differences in perceived changes in physical activity between the intervention groups and their respective control groups were statistically significant at the 2- and 6-month assessments (Table 3).

4. Discussion

Recent research suggests that physicians are more likely to counsel patients to be more active as a form of secondary or tertiary prevention [11], particularly if they feel the patient has a specific condition that could be improved by physical activity [14]. This 6-month RCT assessed whether physicians' advice to patients to be more physically active was more effective if the advice was 'medicalised' or tailored to the management of a health condition (hypertension) compared with advice to be more physically active to promote health generally.

In terms of the intention-to-treat analyses, there were no significant differences between any of the groups at the 2-month assessment in the proportions of patients who reported being sufficiently active. At the 6-month assessment, 66% of the HP intervention group were active compared with 54% of the HP control group, suggesting that the intervention was effective in the longer term. However, 63% of the RF control and intervention groups were also sufficiently active. The significant result appears to be due to a lower prevalence of physical activity in the HP control group, rather than to a higher prevalence in the intervention group.

The intervention-received analyses showed a similar pattern of findings. The only significant findings occurred for perceived change in physical activity between the two pairs of intervention and control groups at the 6-month assessments, suggesting that participants who recalled the intervention were more likely to report that they believed they were more active than they were 6 months previously. This suggests that intervention group participants may have been contemplating or trialling greater activity, but not to the extent that they became sufficiently physically active. Another possible explanation for the change in the intervention participants' perceived physical activity is they wanted to appear to comply with their physician's advice (i.e., a Hawthorne Effect occurred). Based on this pattern of results, and the fact that there were no significant findings between groups at the 2-month assessment, we conclude that neither intervention was effective at promoting increases in physical activity participation.

While the increase in the proportion of control group patients who were sufficiently active appears to be high, the phenomenon is widely reported in the literature. In two previous Australian studies, 40% [22] and 31% [23] of the control groups were classified as active at the 6- and 8-month assessments. Furthermore, a study conducted in the UK by Harland et al. [18] reported that 23% of the control group increased their physical activity after one year and a study conducted by Stevens et al. [17] reported that 13% of the control group were physically active after 8 months. A higher prevalence of self-reported physical activity in control groups is likely to be a result of measurement error, a social desirability effect, normal fluctuations in physical activity participation, or some combination of all three. Because study participants were recruited during a visit to a physician they were more likely to be acutely unwell at the time and less active than usual. One would expect many of these participants to have recovered two months later and to be more active.

4.1. Limitations

Although most of the intervention participants recalled receiving physical activity advice and the 'Active Prescription' from their physician, only about a third recalled receiving the accompanying 'Active Living' booklet. We are unable to determine if a large number of participants did not actually receive the booklets from their physicians or they did and did not attend to them. In either case, the finding suggests that asking busy physicians to distribute written materials to their patients does not result in delivery of the intervention as the developers of the intervention would hope. Distribution of written materials may be more effective if conducted by other practice staff. If most patients actually received the booklet, but did not attend to it, a booster telephone call shortly after the consultation may increase attention to and use of the booklet. The addition of brief telephone contacts to an initial face-to-face consultation with was found to increase adherence rates to a home-based physical activity program [35].

A second potential limitation was the assessment of physical activity participation using self-report, with its attendant measurement error. However, this measurement error is likely to have been equally distributed among groups, and the differences in the magnitude of the differences between the intervention and control groups were so small that they were unlikely to have been identified as statistically significant even using instruments with very low measurement error. That is, the use of more accurate instruments would have been unlikely to result in substantively different conclusions. Nevertheless, future studies would be enhanced by the use of more objective measures (e.g., pedometers or accelerometers) of physical activity participation. A third limitation was the apparent slight contamination of the control groups. However, it was of such small magnitude that it would not have had a substantial impact.

4.2. Strengths

This study was a large RCT which reduced systematic biases in the delivery of the intervention. The study groups differed very little on the variables measured at baseline which suggests that any systematic biases between the groups in participant recruitment were unlikely to have occurred. High follow-up response rates were achieved, with over 80% of study participants being re-contacted at the 6-month assessment. This retention rate is consistent with, or better than, those achieved in earlier studies (70% [20], 83% [22], and 60% [23]) and makes systematic bias due to differential retention unlikely.

Encouraging people to adopt physical activity is a challenge. Previous research conducted in primary care has suggested that patients can be encouraged to increase their physical activity levels in the short-term [26]. This study contradicts previous findings as neither intervention strategy resulted in significant increases in patients' self-reported physical activity. Thus, there was no significant difference between physicians providing patients with verbal advice and written materials to promote physical activity regardless of the whether the advice was tailored to hypertension management or general health promotion advice.

4.3. Practice implications

Previous research conducted in primary care has suggested that patients' physical activity may increase in the short-term in response to health promotion interventions, but that behavioural changes are sustained by few who receive the intervention. This study found that physicians' advice to promote physical activity to patients was no more effective if the advice was delivered as an adjunct to the management of a health problem. Alternate methods of reinforcing physician counselling for physical activity need to be fully explored, such as referral to exercise specialists [25,36].

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