Examining Physician Counselling to Promote the Adoption of Physical Activity

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ABSTRACT

Background: While the benefits of physical activity are generally recognized, over half of adult Canadians are not active enough to receive those benefits. Physicians may influence patient activity through counselling; however, research is inconsistent regarding their effectiveness in doing so. Increasing patients' use of self-regulatory skills in managing their activity and additional telephone support are suggested as two means of improving physician counselling. When assessing the effectiveness of physician counselling, it may be important to measure both outcome and treatment adherence. We compared physician-directed activity counselling (modified PACE protocol) with a modified PACE protocol augmented with telephone-based counselling for patient support for both outcome and treatment adherence.

Methods: Physicians counselled 90 patients using a modified PACE protocol that included self-regulatory skills. Physical activity was assessed by questionnaire at baseline (prior to counselling) and one month later. Participants were divided into two groups: counselling (modified PACE counselling) and enhanced counselling (modified PACE counselling plus telephone support).

Results: The main outcome (mean energy expenditure) and secondary outcomes of treatment adherence (frequency, frequency of moderate activity, and duration) significantly increased over time ($p < 0.05$). No significant interactions between group and time were found.

Interpretation: Our results support the effectiveness of physician counselling for activity that included the use of self-regulation skills. The effectiveness of telephone support over and above that of physician counselling was not supported. Our results demonstrate that assessing treatment adherence provides a means of discerning whether the counselling intervention was delivered as intended.

Key words: Directive counselling; exercise; physicians

La traduction du résumé se trouve à la fin de l'article.

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When the benefits of being active^{1,2} are coupled with the fact that 59% of adult Canadians are not active enough to achieve health benefits,³ the call for increases in physical activity in the Canadian population may not be surprising.⁴

The College of Family Physicians of Canada has acknowledged its role in promoting physical activity by launching an online training module (PACE CANADA).⁵ Notwithstanding this, examination of current controlled studies suggests there is insufficient evidence to recommend either for or against physical activity counselling by physicians.^{6,7} Two research suggestions made to improve future studies were addressed in this intervention and included modifying the PACE counselling so that physicians were taught to incorporate counselling that encouraged greater patient self-regulation⁸⁻¹⁰ as well as augmenting the counselling with additional telephone support.^{11,12}

We compared physician-directed activity counselling (modified PACE protocol) with the same counselling augmented with telephone-based counselling. Given the modified PACE counselling encouraged greater self-regulation, our first hypothesis was that all patients would show an increase in physical activity over a one-month period. The second hypothesis was that those in the modified PACE plus telephone support condition would show a greater increase in physical activity over a one-month period than patients in the modified PACE alone condition.

In addition to examining activity, we were interested in treatment adherence given that many individuals who are prescribed exercise do not comply,^{13,14} and a perceived lack of patient willingness to adhere to activity counselling advice is often reported by health care providers as a barrier to counselling.¹⁵ To examine treatment adherence, a number of measures congruent with the modified PACE protocol were assessed. Accordingly, our third hypothesis was that patients in both conditions would report more activity bouts of at least 10 minutes, more daily minutes of activity, and a higher intensity of activity post-counselling than at baseline.

METHODS

Participants and design

Participants were 90 adults who were not regularly active but were thinking about

increasing their activity level ('contemplators' as outlined in the PACE protocol). The study used a 2 (treatment group) by 2 (pre-post) mixed-model factorial design. All participants received a *common* physician-directed modified PACE counselling session, after which they were randomly assigned (using random numbers table) to two groups: "counselling" (physician-directed – modified PACE protocol) or "enhanced counselling" (physician-directed – modified PACE protocol – augmented by telephone counselling).*

Procedure

This study was approved by the University of Saskatchewan Research Ethics Board. Family physicians (N=200) in a mid-sized Canadian city who were interested in activity counselling were recruited either following a presentation at a monthly professional meeting or through a mailed invitation. Physicians who volunteered (N=24) completed a 3-hour training session on the modified PACE protocol.¹⁶ The protocol is described elsewhere.^{17,18}

The basic design called for the recruitment of family physicians, who were responsible for recruiting the participants. Physicians were asked to recruit ambulatory patients who were scheduled for a complete physical examination within the next three months. Office staff identified these patients and called them to invite participation. When volunteers arrived for their appointment, they completed a consent form, a questionnaire assessing their physical activity readiness (i.e., PACE stages of change) and self-reported levels of physical activity. Participants then received counselling from their physician (i.e., modified PACE protocol), which was designed to take about five minutes during the appointment.

The PACE protocol involved assessing a patient's stage of change¹⁹ and current physical activity level followed by physical activity counselling. The modification to the PACE protocol involved including examples of how to plan, schedule, and implement strategies (i.e., self-regulation skills) to avoid the barriers that typically minimize activity. Through examples,

physicians counselled their patients on how to build activity bouts of at least 10 minutes into their lifestyle (e.g., plan to get off the bus two stops early and walk for 10 minutes to workplace). Following counselling, a prescription for physical activity was formulated by the physician, and signed by the physician and patient. The prescription recommended a program of light or moderate activities with the goal of accumulating 30 to 60 minutes of moderate activity daily in bouts of at least 10 minutes.

Participants in the enhanced counselling group received an additional 15-minute telephone call one week after the physician counselling. During the call, a research assistant reviewed the participants' understanding of their individual physical activity prescription as well as collaborated with participants to create a plan to overcome any potential barriers (i.e., reinforce self-regulatory skills) to initiating activity.

The post-test physical activity questionnaire was administered over the telephone to participants in both groups one month after the physician counselling by an assistant who was blinded to condition.

Measures

Physical Activity

To assess physical activity levels, the Modified Activity Questionnaire (MAQ) was used. The instrument has been shown to be a reliable and valid measure of self-reported physical activity.²⁰ Participants identified all leisure activities done over the last week as light, moderate, or vigorous intensity.

Primary outcome: Energy expenditure

For each activity listed by a participant on the MAQ, the product of the metabolic cost (METs), average duration in minutes, and frequency for the week was calculated, and then divided by the number of days in the week. The value for each activity was summed to yield a total KKD (kcal/kg/day) value for each participant.

Secondary outcomes: Adherence

Frequency: Activity frequency was calculated by counting the number of bouts of at least 10 minutes per week.

Intensity: For each intensity level, separate frequencies were calculated by count-

ing the number of light, moderate, and vigorous activity bouts of at least 10 minutes per week.

Duration: Minutes of reported physical activity were summed to provide a total number of minutes of physical activity per week.

Analytical approach

A repeated measures ANOVA was used to test for differences in energy expenditure from baseline to post counselling (hypothesis 1) as well as the interaction of groups and time (hypothesis 2). For the third hypothesis, repeated measures ANOVAs were used to test for differences on the adherence measures of frequency of activity bouts of at least 10 minutes, activity intensities of light, moderate and vigorous, and activity duration from baseline to post counselling.

RESULTS

Participants missing data ($n = 4$) or those whose activity levels were viewed as outliers (z -scores > 3.29 , $n = 3$) were excluded, leaving 41 participants in the counselling and 42 in the enhanced counselling groups (mean age = 43.1 years, $SD = 11.8$ with a range of 19-73 years). As can be seen in Table I, there were no differences between the groups for any baseline characteristics ($p > 0.05$).

Primary outcome

For hypothesis one, ANOVA results for physical activity revealed only a main effect for time ($F(1, 81) = 12.64$, $p = 0.001$), with energy expenditure increasing from baseline to 1 month (see Table II). The ANOVA results for the second hypothesis revealed that the interaction between time and treatment group was not significant ($p > 0.05$). In terms of power, assuming a moderate effect size ($ES = 0.30$), a correlation = 0.3, and $p < 0.05$, 45 participants per group would be required for power = 0.80,²¹ which is only slightly above our final sample.

Secondary outcomes

Results from an ANOVA revealed frequency of physical activity bouts of at least 10 minutes increased significantly ($F(1, 81) = 4.68$, $p = 0.03$) from baseline to 1 month (see Table II).

* Overall 232 patients were recruited by the physicians and randomly assigned to either the physical activity counselling or enhanced counselling group. However, only contemplators (N=90) were used in this study.

Examination of activity intensity was done using 3 separate ANOVAs. Only the frequency of moderate activity bouts of at least 10 minutes increased significantly ($F(1, 81) = 20.35, p < 0.001$) from baseline to 1 month (see Table II).

ANOVA results for duration of activity (minutes per week) revealed a main effect for time ($F(1, 81) = 11.49, p = 0.001$), with weekly minutes increasing from baseline to 1 month (see Table II).

DISCUSSION

This study examined changes in physical activity level when comparing physician-directed physical activity counselling (modified PACE protocol) to the same protocol augmented by telephone counselling.

After counselling, the mean level of self-reported physical activity for all participants increased significantly from 1.7 to 2.7 KKD over a one-month period, supporting our first hypothesis. This finding is important as it supports the idea that physician counselling may be an important avenue for improving adult activity levels over a short period of time. Also, our finding using the modified PACE protocol appears to be consistent with other studies using the original PACE protocol, which have established a positive relationship between physician counselling and changes in activity levels.¹⁷

While main effects for time were found, the enhanced treatment effect of additional telephone support was not supported (i.e., second hypothesis). Although unexpected, some possible explanations can be offered. One possibility might simply be that more calls were needed.²² A second possibility is that the content of the calls may require more specific tailoring for each participant so that the messages are congruent with the participant's psychological style of processing health information.²³

Regarding secondary outcomes, adherence to the treatment was high across all measures for both conditions, supporting our third hypothesis. The frequency of activity bouts of at least 10 minutes increased significantly. Second, the mean duration increased significantly to an average of 40 minutes/day, which was consistent with the physician advocacy of at least 30 minutes of activity per day. Finally, the

TABLE I

Baseline Characteristics by Counselling Group (n=41) and Enhanced Counselling Group (n=42)

		Counselling (n=41) Mean (SD) 42.0 (13.8)	Enhanced (n=42) Mean (SD) 44.2 (9.5)
Age (years)			
Sex	Male	Frequency (%) 7 (17.1)	Frequency (%) 8 (19.0)
	Female	34 (82.9)	34 (81.0)
Marital Status	Single	17 (41.5)	16 (38.1)
	Married	24 (58.5)	26 (61.9)
Employment	Employed	27 (65.9)	27 (64.3)
	Homemaker	7 (17.1)	5 (11.9)
	Unemployed	3 (7.3)	1 (2.4)
	Student	0 (0)	4 (9.5)
	Other (e.g., retired)	4 (9.8)	5 (11.9)
Education	Grade 12	5 (12.2)	5 (11.9)
	Some post secondary	14 (34.1)	15 (35.7)
	Completed post secondary	18 (43.9)	16 (38.1)
	Graduate degree	1 (2.4)	3 (7.1)
	Other	3 (7.3)	3 (7.1)

Note: There were no significant differences on any of the baseline characteristics between groups ($p > 0.05$)

TABLE II

Summary of Primary and Secondary Outcomes at Baseline and 1 Month

	Baseline (SD)	1 Month (SD)
Primary Outcome		
Energy Expenditure (KKD)		
All participants (N=83)*	1.7 (1.5)	2.7 (2.6)
Counselling (n=41)	1.6 (1.6)	2.2 (1.7)
Enhanced counselling (n=42)	1.7 (1.3)	3.2 (3.2)
Secondary Outcomes		
Frequency of ≥ 10 min. bouts (per week)		
All participants (N=83)†	5.3 (3.9)	6.8 (5.5)
Counselling (n=41)	4.7 (3.4)	6.6 (5.5)
Enhanced counselling (n=42)	5.8 (4.3)	7.0 (5.6)
Frequency of Light Bouts (per week)		
All participants (N=83)	3.7 (2.7)	2.9 (3.5)
Counselling (n=41)	3.3 (2.4)	2.8 (2.9)
Enhanced counselling (n=42)	4.1 (3.0)	3.0 (4.1)
Frequency of Moderate Bouts (per week)		
All participants (N=83)*	0.9 (1.7)	2.7 (3.6)
Counselling (n=41)	1.0 (2.1)	2.5 (3.8)
Enhanced counselling (n=42)	0.8 (1.2)	3.0 (3.4)
Frequency of Vigorous Bouts (per week)		
All participants (N=83)	0.2 (0.8)	0.4 (1.4)
Counselling (n=41)	0.3 (1.0)	0.4 (1.4)
Enhanced counselling (n=42)	0.2 (0.7)	0.4 (1.4)
Duration (min. per week)		
All participants (N=83)*	178.8 (144.9)	281.0 (266.2)
Counselling (n=41)	165.9 (145.8)	236.2 (168.4)
Enhanced counselling (n=42)	191.4 (144.7)	324.8 (331.9)

* $p \leq 0.001$

† $p < 0.05$

preponderance of activities done by participants at baseline was at light intensity. After counselling, participants engaged in moderate-intensity activity as frequently as light-intensity activities. This was due to an increase in moderate activities, which was consistent with the physician-directed counselling encouraging increased moderate-intensity activities.

Taken together, the results for the secondary outcomes suggest that there was adherence to the modified PACE physician-directed counselling. To our knowledge, this is the first PACE study to examine treatment adherence. The results of our modification of the PACE counselling sug-

gest that we may be able to begin to address the concern that patients fail to adhere to the advice of health care providers.¹⁵

A unique aspect of the counselling in this study was to facilitate the patients' greater involvement in applying their physician's activity advice. Patients were given "how-to" examples suggesting that they could partake in multiple bouts of moderate-intensity activity lasting at least 10 minutes in order to obtain the recommended 30 minutes per day. Thus, rather than passively following physician advice, patients had greater choice in how to apply physician suggestions to their own

lifestyles, which is consistent with recommendations of adherence experts.¹⁰ Another unique feature of the examples used in counselling was that they included aspects of self-regulatory skills (i.e., planning, adjusting goals) that bridged the original PACE protocol's "how-to" gap between listing barriers and following the physician's prescription.¹⁰ This focus on counselling with examples addressing self-regulatory skills may be one of the key reasons why we observed a change of 1 KKD that is not always observed.²⁴ If replicated, the modified PACE approach to physician counselling could be used to inform future counselling interventions.

Although this field study has several strengths, it is not without limitations. One concern is the generalizability of the findings. Given this sample consisted primarily of well-educated, employed females, it would not be prudent to generalize beyond this population. However, it does suggest that a future examination of a male sample, as well as samples of the less educated or the unemployed is necessary.

A second possible limitation concerns the fact that hypothesis one was tested without a control group, as we chose to view the PACE protocol as "normal practice" given that the College of Family Physicians has acknowledged its role in promoting physical activity. A further justification for using the counselling protocol for both groups resides in the fact that physicians were recruited on the basis of the value of counselling for activity, and it would have been difficult to get a group of "control" physicians to commit to not providing counselling to patients. Thus, we favoured ecological validity over a fully controlled design. Further, the impact of this limitation may have been lessened as results of a survey using the same activity questionnaire conducted in the same community revealed that levels of regular physical activity remained stable over the period of the study.²⁵ Survey results also found frequency of light- and moderate-intensity activities increased and decreased, respectively, which was different from what we found. Although not a true control group, these survey findings provide some evidence that external factors did not contribute to the increase in physical activity found in this study.

Notwithstanding these limitations, this study has several strengths. First, PACE counselling was modified to include a

focus on self-regulatory skills as per recommendations for facilitating treatment adherence.¹⁰ Second, the uniform results in both treatments suggest that primary care physician advice for increasing physical activity may be effective at least for the duration examined in this study. Third, behavioural adherence to the PACE physician prescription was examined and this represents an advancement in the PACE research literature. Taken together, this first study on the Canadian version of PACE reflects some promising results and raises some interesting questions for future investigation.

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RÉSUMÉ

Contexte : Bien que les avantages de l'activité physique soient généralement reconnus, plus de la moitié des Canadiens adultes n'en tirent pas parti, car ils ne sont pas suffisamment actifs. Les médecins peuvent influencer le niveau d'activité de leurs patients par des conseils, mais les chercheurs ne s'entendent pas sur l'efficacité de ce counseling. Deux moyens sont suggérés pour améliorer les conseils des médecins : accroître l'utilisation des techniques d'autorégulation du conditionnement physique par les patients et leur offrir un soutien téléphonique supplémentaire. Lorsqu'on évalue l'efficacité du counselling des médecins, il peut être important de mesurer à la fois les résultats et l'assiduité au traitement. Nous avons donc comparé les conseils sur l'activité physique donnés par les médecins (selon un protocole PACE¹ modifié) et les mêmes conseils agrémentés d'un soutien téléphonique aux patients, en mesurant à la fois les résultats obtenus et l'assiduité au traitement.

Méthode : Des médecins ont conseillé 90 patients à l'aide d'un protocole PACE modifié incluant des techniques d'autorégulation. Les niveaux d'activité physique ont été évalués au moyen d'un questionnaire de départ (avant le counselling) et un mois plus tard. Les participants ont été divisés en deux groupes, selon qu'ils avaient reçu le counselling PACE modifié ou le counselling amélioré (protocole PACE modifié et soutien téléphonique).

Résultats : Le résultat principal (la force moyenne dépensée) et les résultats secondaires, liés à l'assiduité au traitement (fréquence, fréquence des activités physiques d'intensité modérée, durée), ont considérablement augmenté au fil du temps ($p < 0,05$). Aucune interaction significative n'a été observée entre les données selon le groupe et les données selon la date d'administration du questionnaire.

Interprétation : Les résultats confirment l'efficacité des conseils des médecins en matière d'activité physique lorsqu'ils incluent des techniques d'autorégulation. L'efficacité du soutien téléphonique en plus des conseils des médecins n'est pas confirmée. Ces résultats montrent que l'évaluation de l'assiduité au traitement est un moyen de déterminer si l'intervention de counselling a été offerte comme il le fallait.

Mots clés : counselling directif; conditionnement; médecins

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