

# Physical Activity Counseling Content and Competency: A Systematic Review

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**Background:** Physical activity (PA) counseling is becoming commonplace in primary care settings, although there is a high degree of variation in the quality and quantity of this intervention. The purpose of this review was to examine the theory on which the intervention is based and the level of treatment fidelity applied at all stages of the intervention. **Methods:** A systematic review was carried out for interventions that reported an element of PA counseling. Results were mapped according to a treatment fidelity framework of intervention design, training, delivery, receipt, and enactment. **Results:** Most studies were underpinned by the transtheoretical model. Few studies described the frequency or duration of PA counseling training or competence level of the interventionist. The most common outcome measures were behavioral and physiological, with few studies including a cognitive outcome measure. **Conclusions:** Most research focuses on *outcome* and *significance* rather than *intervention processes*, with limited consideration of treatment fidelity. The design, training, delivery, and receipt of PA counseling should be reported more thoroughly.

**Keywords:** treatment fidelity, behavior change counseling

Despite the favorable health benefits associated with regular physical activity (PA), inactivity levels in developed countries are alarmingly high.<sup>1</sup> Many people are in a stage of “chronic contemplation,” and the methods applied to assist in resolving this state of ambivalence have traditionally centered on providing advice and education, although this has not resulted in significant behavioral shifts.<sup>2</sup> An alternative strategy, behavior change counseling, has been proposed, although research has been slow to clearly identify which behavior change counseling techniques work and why. Central to this issue is the clear specification of the critical techniques and procedures responsible for behavior change in order that interventions can be replicated and effect sizes accurately calculated.<sup>3</sup> It has been suggested that the effectiveness of behavior change counseling might not simply be the result of who delivers it but more so the length, the intensity, the content, and the competence of the deliverer.<sup>4</sup>

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## Current Problems in PA Counseling

An increasing body of evidence supports the use of PA counseling in a variety of primary, secondary, and community health care settings<sup>5-9</sup> to the point that PA counseling is becoming part of normal health care in the prevention, treatment, and management of chronic diseases.<sup>10</sup> There is, however, a lack of clarity and consistency in terms of what exactly PA counseling consists of and how it is delivered.

In the UK, the first guidelines for conducting an exercise (or PA) consultation were produced in 1995.<sup>11</sup> Although these early guidelines filled a void, subsequent interventions applying these principles have compromised and confused the original guidelines.<sup>7,12,13</sup> The accurate description of PA interventions are often lacking with little or no detail as to the fidelity, and therefore quality, of the intervention. Moreover, there is often no standardized measurement of PA outcome, PA counseling content, technique, or patient readiness and receptiveness to the intervention.<sup>6</sup>

In PA counseling, there is often a theoretical model described as an adjunct to the PA intervention,<sup>14</sup> most common of which are self-determination theory (SDT<sup>15</sup>), the transtheoretical model (TTM<sup>16</sup>), or a specific approach such as motivational interviewing.<sup>17</sup> It has been proposed, however, that many behavior change descriptions are not specific about the intervention employed, and no clear link between the theoretical underpinning and particular behavior change techniques employed is offered.<sup>3</sup> In 1996, researchers were urging further studies regarding the training, intervention design, and evaluation of primary care PA delivery,<sup>18</sup> although this has been slow to materialize. Therefore, a critical review of current exercise and PA counseling interventions in clinical and community settings is required.

## Treatment Fidelity and the Behavior Change Consortium (BCC) Framework

There has been an increasing call for researchers to fully articulate the exact nature of their interventions for behavior change counseling, an approach which is termed *treatment fidelity*.<sup>19</sup> Indeed, health behavior change research has for some time embedded fidelity tests into counseling interventions and research<sup>20-22</sup> to preserve internal validity and enhance external validity in studies. However, this has traditionally received scant attention in research journals and training curricula.<sup>23</sup> To address the issue of treatment fidelity for behavior change settings, a consortium of health behavior change studies was gathered in the United States under the auspice of the National Institutes of Health Behavior Change Consortium (BCC). The BCC group recommended 5 areas for implementing fidelity treatment measures in behavioral trials. The 5 components are summarized as a need to encourage fidelity at the design, training, delivery, receipt, and enactment stages. An application of this to the PA setting is considered within the strategies for achieving each criterion (Table 1).

It is important to examine the potential efficacy of health behavior change fidelity measures to ensure reliable, valid, and robust interventions based on sound theoretical and scientific principles. Only by developing more powerful, scientifically based, behavior change strategies will increased success be achieved.<sup>24</sup> Intervention fidelity testing is, therefore, a key methodological requirement for research into PA behavior change counseling. It provides a systematic process for the intervention design and, when applied correctly, should ensure consistent and reliable results.<sup>25</sup>

**Table 1 Treatment Fidelity Components and Exercise Counseling Applications**

| Component of treatment fidelity | Definition and description  | Application to an exercise counseling intervention  |
|---------------------------------|---|---|
| Design                          | Treatment fidelity is applied at the design stage to ensure that the intervention can adequately test the proposed hypotheses. This is in relation to underlying theory and clinical processes.   | Intervention consistent with behavior change theory such as stages of change, self-determination, or social learning theory. Clear exercise counseling protocol developed.                  |
| Training                        | To ensure that those delivering the intervention have been satisfactorily trained, assessment is carried out of their skills and competencies in relation to the study.   | A combination of supervised role-playing, clinical supervision, and reviews of audiotapes applied as an adjunct to a training manual.   |
| Delivery                        | Treatment fidelity processes are applied to monitor that the intervention is delivered in line with the proposed design.  | Exercise counseling interventions audiotaped and reviewed using a behavioral checklist based on the study protocol. Correction of observed intervention deviations.                         |
| Receipt                         | The focus is toward the recipient of the intervention. The fidelity facet here aims to ensure that the intervention or treatment received is understood by the individual and that they can apply the intervention at a cognitive and behavioral level. | Evaluation of the effects of the exercise counseling intervention using postsession questionnaires or interviews (cognitive) and checklist of participant strategies employed (behavioral). |
| Enactment                       | An analysis is taken of the application of the treatment by the individual. This monitoring ensures that behavioral and cognitive strategies are applied in real-life settings.   | Completion of intervention strategy goals specific to the study outcomes. Clients encouraged to record accurately completed and missed sessions and to report occurrences of relapse.       |

Treatment fidelity, therefore, plays a central role in ensuring that an intervention has been accurately evaluated. A recent synopsis of research projects into behavior change fidelity has suggested that treatment fidelity requirements are only met if (1) the treatment provided was given consistently to all participants randomized to treatment, (2) there was no evidence of non-treatment-related effects, and (3) the intervention was true to the goals and theory underpinning the research.<sup>23</sup> For a

more in-depth description of each fidelity goal, description, and strategy, the reader is referred to the BCC guidelines.<sup>23</sup>

The current article, therefore, uses the BCC framework for treatment fidelity to examine, by way of a systematic review, the detail reported in PA counseling interventions. It then reports implications for future interventions and offers guidelines for designing and implementing PA counseling interventions.

## Why a Systematic Review?

A variety of interventions that have included a PA component have been applied in clinical and community settings. To assess the quality of these interventions, a systematic review of PA counseling studies was carried out to

- assess the impact of PA counseling on behavior change,
- identify the extent to which PA counseling adopts a treatment fidelity approach,
- review the use of underpinning theoretical models and frameworks in the development of the intervention,
- critically examine the interventionist and level of training before the delivery of the intervention,
- identify the opportunity for the adoption of fidelity treatment at all stages of the research process, and
- examine the outcomes measured and the results (eg, epidemiological, behavioral, and cognitive).

## Methods

### Selection of Studies for Inclusion

Two main sources were used to locate published studies: (1) electronic searches of computerized databases including SPORTdiscus, Psycinfo, Sciencedirect, Cinahl, Web of Science, PubMed and Scopus and (2) citations in papers identified by the electronic search. The review was interested in interventions that included an element of PA counseling and that required personal interaction, patient centeredness, and sound communication. Even though online and telephone adaptations are increasing in popularity, face-to-face counseling studies were selected because they remain the dominant approach in PA settings. The review did not ignore methods such as telephone contact because a number of reviewed studies included telephone follow-ups. The first exercise and PA counseling guidelines in the UK<sup>11</sup> logically provided the lower date limit for the current search (1995). Key search terms were *physical activity counseling*, *physical activity consultation*, *exercise counseling*, and *exercise consultation*. Articles retrieved using these search terms were included in the review if they met the following criteria:

1. English language
2. Published in a peer-reviewed journal
3. Randomized controlled trials (RCTs) or quasi-experimental designs based explicitly on physical activity/exercise behavior change counseling or

consultation and not as an adjunct to a larger behavior change intervention or in conjunction with other lifestyle behaviors (Trials in which the physical activity counseling or consultation is conducted as part of a larger intervention or in conjunction with another health behavior cannot demonstrate the absolute effect of the exercise counseling or consultation.)

4. Individually adapted (ie, not group), face-to-face (ie, not telephone or mail) behavior change interventions
5. Interventions that aim to increase physical activity and include behavioral or cognitive outcome measures (the effect of a physical activity behavior change intervention can be measured by observing differences in physical activity levels or by evaluating cognitive processes that determine behavior change [eg, stage of change, self-efficacy, perceived benefits of physical activity])
6. Publication between 1995 and 2006 inclusive
7. Adult population (age  $\geq 16$  years)

## Procedure

Searches generated a total of 924 articles. After duplicates were removed, 76 abstracts were retrieved. Forty-six abstracts were deemed relevant, and full-text articles were obtained. Closer inspection of these identified that 27 were relevant for inclusion in this review. Hard copies of those publications that met the inclusion criteria were analyzed based on the aims of the review. The process was applied independently by JB and AH to ascertain whether studies met the inclusion criteria. Any discrepancies between the reviewers were agreed by discussion of the original papers and, where necessary, the use of LH as a moderator. Main outcomes were analyzed as were theoretical frameworks and treatment fidelity regimens for each study. Once selected, corresponding authors were contacted to fully examine procedures (regarding PA counseling training and competence). This was done to clarify whether the PA counseling competence had been assessed though omitted because of page limits, assessed and published or reported elsewhere, or whether no assessment of practitioner PA counseling competence had been applied.

## Data Extraction

In addition to the quality assessment of each study, the following data were extracted using a structured form (Table 2): design, treatments, consultation (theoretical framework), consultant (interventionist), intensity (and follow-up), duration, training and competence assessed, outcome measures, and outcome results. Based on the BCC framework, a descriptive account was formulated to identify the strengths and weaknesses in the literature, with specific references to the BCC components of treatment fidelity (Table 1).

## Results

The initial search elicited 924 hits, and once repeat hits had been eliminated, appropriate abstracts were reviewed, which identified 27 articles that examined the efficacy of PA/exercise counseling or consultations. In addition, direct responses

were received from 13 of the 27 (48%) studies authors. As a result, 1 study<sup>26</sup> was eliminated following additional detail and clarification of its methods from the author. Table 2 shows a summary of the main characteristics of the remaining studies that met the inclusion criteria.

Some studies did involve telephone counseling as part of the intervention.<sup>27-29</sup> However, because the main counseling intervention was face to face, these studies were included. Although the search criteria were for studies between 1995 and 2006, only 1 of the included studies was published before 2000.<sup>30</sup> Fifteen of the 26 studies (58%) included were published after 2003.

## Outcome for Design and Treatment

RCTs were found to be the dominant design. These followed a very prescriptive, positivistic (medical model) approach with cause-and-effect outcome measures defined within behavioral dimensions and time constraints. When mapping the BCC framework for “design,” same treatment dose is assumed, but none of the studies highlighted how this was achieved nor the strategy employed. Although some offered good descriptions of the interventions involved,<sup>31-33</sup> some merely identified a style or framework such as motivational interviewing<sup>30,34</sup> or the 5 A’s framework,<sup>29,35</sup> with very brief descriptions of the methods. In some cases detailed descriptions regarding the processes involved in the interventions were included, such as setting goals or planning for future barriers.<sup>27,36</sup> No studies provided information regarding the specific “interpersonal style” or “core conditions” of the counseling interventions (eg, client centered, empathetic understanding, or congruence and understanding<sup>37</sup>).

## Outcome for Counseling Type, Provider, and Training

A wide variety of descriptive terms were used to define the type of counseling used in each study. The most common were *counseling*<sup>31,32</sup> and *physical activity counseling*,<sup>38</sup> although terms such as *brief advice*,<sup>27</sup> *behavioral counseling*,<sup>39</sup> and *physical activity consultations*<sup>40</sup> were also used. The lack of consistency in describing the exact nature of the counseling delivered made it difficult to identify differences between interventions. In some studies researchers even used multiple terminologies such as *counseling* and *consultation* when describing the same intervention.<sup>12,32</sup>

The providers or interventionists in the reviewed studies represented researchers,<sup>38,40</sup> primary care workers,<sup>28,41</sup> exercise scientists,<sup>8</sup> and other health professionals.<sup>34</sup> A number of studies failed to identify who the intervention was delivered by.<sup>39,42-44</sup>

Of the 26 studies, 15 (58%) identified that providers received training (eg,<sup>29,35,36</sup>). However, only 7 of these<sup>13,27,29,35,36,45,46</sup> included any information concerning the frequency, duration, and content of training. Of those 7 studies, training ranged from 1 session of 45 minutes<sup>29</sup> to 11 hours of training spread over 4 sessions.<sup>45</sup> Following the review (and author feedback), 5 studies<sup>27,35,24,45,46</sup> administered and reported the training and competence of the interventionist. These involved checklists,<sup>27</sup> reviewing audiotapes,<sup>27</sup> and providing certification of competence.<sup>42</sup> However, the details of these procedures were not clear, and the reasons for conducting assessments of practitioner competence were not specified.

**Table 2 Systematic Review of Studies Including a Physical Activity Counseling Component**

| Study                                    | Year | Journal Design           | Treatments   | Consultation (theoretical framework)                             | Consultant (interventionist)                                       | Competence of interventionist assessed (Yes/No) | Intensity   | Study duration | Outcome measures              | Outcomes (±)   |
|--|------|--------------------------|--|--|--|---|---|----------------|-------------------------------|--|
| Harland et al                            | 1999 | <i>BMJ</i> RCT           | Brief vs intense counseling with/without vouchers, control                     | "MI"   | Health visitor trained in MI                                       | No  | 1 session (40 min) / 6 sessions over 12 wk  | 12 mo          | Behavioral                    | No sig. effects  |
| Calfas et al                             | 2000 | <i>Am J Prev Med</i> RCT | Cognitive behavioral intervention, knowledge-orientated intervention (control) | Lectures based on TTM, SCT with follow-up counseling phone calls | Trained behavioral science faculty members and counselors          | No  | 50 min weekly for 15 wk, phone/mail follow-ups for 18 mo  | 24 mo          | Phys                          | No sig. effects for PA outcomes. Behavioral processes of change (+) for intervention women |
| Norris et al                             | 2000 | <i>Prev Med</i> RCT      | PACE counseling protocol with reminder phone calls or usual care               | PACE counseling protocol based in TTM                            | Trained physician (provided with PACE training manual)             | Yes   | 1 session, unknown duration   | 6 mo           | Cognitive, behavioral, & phys | No sig. effects  |
| Activity Counseling Trial Research Group | 2001 | <i>JAMA</i> RCT          | Advice, advice plus counseling, advice plus counseling plus telephone support  | Brief advice based on national recommendations                   | Physicians / health educators trained by ACT behavioral scientists | Yes   | 1 × 30–40-min session plus 1 telephone call, further 2 × weekly (6 wk) and then monthly (1 yr) in intense group | 24 mo          | Behavioral & phys             | VO <sub>2</sub> max (+) for assistance and counseling groups vs advice group               |

|                |      |                                 |                    |   |  |  |    |  |       |                        |  |
|----------------|------|---------------------------------|--------------------|---|--|--|----|--|-------|------------------------|--|
| Kirk et al     | 2001 | <i>Diabetic Med</i>             | RCT                | Exerc consultation & exerc information, or information alone              | One-on-one discussion based on TTM                                       | Trained research assistant                         | No | 1 x 30 min                             | 5 wk  | Behavioral & cognitive | Sig. progression across stages of change & (+) in activity counts for consultation group vs controls |
| Titze et al    | 2001 | <i>Psych Sport Exerc</i>        | Quasi-Experimental | Information/actions for daily life activities/fitness sessions/counseling | "Counseling" no further details  | Exerc professional                                 | No | "Approximately" every 3 wk for 4 mo    | 4 mo  | Cognitive & behavioral | Sig. progression across the stages of change   |
| Hillsdon et al | 2002 | <i>Int J Epid</i>               | RCT                | Direct Advice, BN, control (no intervention)                              | Clearly defined BN   | Health promotion specialist                        | No | 1 x 30 min with 6 telephone follow-ups | 12 mo | Behavioral & phys      | No sig. effects  |
| Hughes et al   | 2002 | <i>J Cardio-pulmonary Rehab</i> | RCT                | Exerc consultation & standard exerc leaflet, or leaflet alone             | "Consultation / counseling" matched to stage of exercise behavior change | Researcher   | No | 1 x 30 min                             | 17 wk | Behavioral             | Short-term adherence to PA (+) for consultation group  |
| Lowther et al  | 2002 | <i>J Sport Sciences</i>         | 2 x RCTs           | Fitness assessment/control, exerc consultation/control                    | "Consultation" in accordance with Loughlan & Mutrie (1995)               | Researcher (followed a standard consultation form) | No | 1 x 30 min                             | 12 mo | Behavioral             | PA (+) for those receiving exerc consultations   |

(continued)

**Table 2 (continued)**

| Study          | Year | Journal              | Design       | Treatments  | Consultation (theoretical framework)   | Consultant (interventionist)                                    | Competence of interventionist assessed (Yes/No) | Intensity                  | Study duration | Outcome measures  | Outcomes ( $\pm$ )  |
|----------------|------|----------------------|--------------|---|--|---|---|----------------------------|----------------|-------------------|---|
| Burke et al    | 2003 | <i>J Clin Epid</i>   | RCT          | 6 module diet and PA program. High-level: 3 group session/3 mailed, low-level: all mailed, control: no intervention | Informed-based interactive approach to group sessions  | Unknown   | No  | 3 contact modules in 16 wk | 12 mo          | Phys & behavioral | Physical fitness (+) & epid measures (-) in the high-level group  |
| Proper et al   | 2003 | <i>Am J Prev Med</i> | RCT          | Individual counseling or written information  | PACE counseling protocol based on TTM  | Trained physio-therapist (Given PACE-related written materials) | No  | Up to 7 x 20 min           | 9 mo           | Phys & behavioral | Energy expenditure (+), PA during sports (+), cardio-respiratory fitness (+), % fat (-), and blood cholesterol (-) for the intervention group |
| Melanson et al | 2004 | <i>Nutrition</i>     | RCT 2-phased | Phase 1: exerc only or exerc plus diet, Phase 2: no treatment   | “Counseling” in accordance with principles put forth by the American College of Sports Medicine (ACSM) | Exerc physiologist / dietitian                                  | No  | Weekly (phase 1)           | 12/24 wk       | Phys & cognitive  | Weight & BMI (-) for diet/exerc group but not for exerc only group. Fat mass & waist circum (-) for both groups                               |

|                    |      |                           |                    |   |  |   |     |   |       |                               |  |
|--------------------|------|---------------------------|--------------------|---|--|---|-----|---|-------|-------------------------------|--|
| Kirk et al         | 2004 | <i>Am J Prev Med</i>      | RCT                | Standard leaflet plus counseling, or leaflet alone                          | Counseling/con-sultation (multi-ple terminology) based on TTM, motivational theory/CBT | Trained research assistant  | No  | 2 × 30 min (base-line and 6 mo) + 2 telephone follow-ups (1 and 3 mo) | 12 mo | Behavioral & cognitive        | PA levels (+) in experimen-tal group                               |
| Kirk et al         | 2004 | <i>Diabetologia</i>       | RCT                | Standard leaflet plus counseling, or leaflet alone                          | PA counseling was conducted in accordance with Loughlan & Mutrie (1995).               | Trained research assistant  | No  | 1 × 30 min  | 12 mo | Behavioral & phys             | PA (+) in experimental group vs control                            |
| Kim et al          | 2004 | <i>Int J Nurs Studies</i> | Quasi-Experimental | Exerc consultation plus prescription, standard educational advice (control) | Stage-matched exerc counseling strategy  | Researcher  | No  | 1 × 60–90 min with telephone follow-ups twice weekly                  | 3 mo  | Cognitive, behavioral, & phys | PA levels (+), epid measures (-) in interven-tion group vs control |
| Prochaska & Sallis | 2004 | <i>Health Psych</i>       | RCT                | PA counseling, PA plus diet counseling, control                             | Modified version of Patient-Centered Assessment and Counseling for Exerc               | Unknown   | No  | 1 × 30 min  | 3 mo  | Behavioral                    | PA (+) for boys but not girls                                      |
| Aittasalo et al    | 2004 | <i>Pat Ed Couns</i>       | RCT                | Counseling, counseling plus fitness, control                                | Goal-setting, advice giving, based on TTM, supporting self-efficacy                    | Occupational nurses, received 11 hr of training (training hand-book provided) | Yes | 4 sessions—baseline, 8 wk, 6 and 12 mo                                | 12 mo | Behavioral & cognitive        | No sig. effects  |

(continued)

**Table 2 (continued)**

| Study            | Year | Journal                | Design | Treatments   | Consultation (theoretical framework)   | Consultant (Interventionist)  | Competence of interventionist assessed (Yes/No) | Intensity   | Study duration | Outcome measures  | Outcomes (±)   |
|------------------|------|------------------------|--------|--|--|---|---|---|----------------|-------------------|--|
| Armit et al      | 2005 | <i>J Sci Med Sport</i> | RCT    | Brief verbal and written advice, counseling and follow-up phone calls with or without a pedometer  | Tailored PA counseling   | GP—verbal & written advice, exerc scientist—counseling  | No  | 1 session of 15–20 min                                  | 24 wk          | Phys              | No sig. effects  |
| Jimmy & Martin   | 2005 | <i>Pat Ed Couns</i>    | RCT    | Advice plus counseling session, control  | Flexible depending on stage of change (motivation/action orientated), no model given | Physicians & practice assistants with 6-hr training (manual outlining counseling protocol provided) | No  | 1 × 45 min + 3 phone follow-ups                         | 14 mo          | Behavioral        | PA increased for both intervention groups. No between-group effects, PA (+) for 1 intervention group vs. control |
| Fitzgibbon et al | 2005 | <i>Prev Med</i>        | RCT    | Combined exerc, diet, and breast health intervention   | Teaching/supporting PA based on social cognitive theory plus exerc training, control | Unknown, trained interventionist, certified by master trainer                                       | Yes   | 45-min session (all components) once per week for 20 wk | 20 wk          | Phys & behavioral | PA increased for both intervention groups. No between-group effects, PA (+) for 1 intervention group vs. control |
| Marshall et al   | 2005 | <i>Pat Ed Couns</i>    | RCT    | Advice/support on increasing PA to promote health (patients without hypertension) or to reduce risk factor (hypertension groups), 2 control groups | Negotiation of preferred activity plus advice, booklets on behavior change           | Physician trained for either 1 hr (individually) or 2–3 hr (group training sessions)                | No  | 1 session—unknown duration                              | 6 mo           | Behavioral        | No sig. effects  |

|                 |      |                            |     |  |  |  |     |   |                 |                               |   |
|-----------------|------|----------------------------|-----|--|--|--|-----|---|-----------------|-------------------------------|---|
| Riebe et al     | 2005 | <i>Prev Med</i>            | RCT | Weight management program, behavioral counseling, nutrition education, exercise sessions | Based on principles and processes of TTM, stage-specific strategies  | Unknown, trained interventionist                         | No  | 2-h sessions/wk for 3 mo, 8 sessions in next 3 mo (not exercise specific) | 24 mo           | Phys, behavioral, & cognitive | Epid measures (-) & PA (+)  |
| Pinto et al     | 2005 | <i>Am J Prev Med</i>       | RCT | Brief advice with follow-up telephone counseling or brief advice alone                   | HBC based on 5A's framework tailored to patient's stage of readiness | Medical students & general internists trained for 45 min | No  | 3 face-to-face PA counseling sessions, 12 PA counseling phone calls       | 9 mo            | Phys & behavioral             | Participation (+) in extended advice group vs brief advice group              |
| Kerse et al     | 2005 | <i>J Am Geriatrics Soc</i> | RCT | PA counseling or control group   | Brief activity counseling  | Primary care doctors or practice nurses                  | No  | 1 session, unknown duration, 3 follow-up phone calls                      | 12 mo follow-up | Phys & behavioral             | Activity levels & energy expenditure (+) between intervention group & control |
| Aittasalo et al | 2006 | <i>Prev Med</i>            | RCT | Prescription-based counseling, self-monitoring or control                                | Physical activity counseling based on the 5 A's framework            | Physicians trained for 2 hr (user guides were provided)  | Yes | 1 session, unknown duration   | 6 mo            | Behavioral & phys             | PA (+) for intervention group vs controls                                     |
| De Blok et al   | 2006 | <i>Pat Ed Couns</i>        | RCT | Regular rehab program plus 4 counseling sessions or regular rehab only                   | Counselors followed general principles of MI                         | Physical therapist                                       | No  | 4 sessions of 30 min spread over 11 wk                                    | 9–11 wk         | Phys, cognitive, & behavioral | PA levels (+) for expert-mental group vs control                              |

Abbreviations: PA, physical activity; HBC, health behavior counseling; TTM, transtheoretical model; SCT, social cognitive theory; BN, brief negotiation; MI, motivational interviewing; phys, physiological; BM, body mass; exerc, exercise; circum, circumference; sig., significant; GP, general practitioner; (+), significant increase; (-), significant decrease.

## Outcome for Intensity, Frequency, and Duration of Counseling Delivery

Some studies involved just one 30-minute consultation,<sup>40,43</sup> whereas other studies involved much more intensive counseling containing multiple sessions and follow-up phone calls.<sup>29</sup> Intervention durations ranged from 9 weeks to 24 months. However, PA counseling was usually conducted in the first 3 months,<sup>36,47</sup> with follow-ups ranging from 4 weeks<sup>12</sup> to 24 months.<sup>27,39,48</sup> There appears to be no consensus regarding appropriate intensity, frequency, or duration of counseling interventions.

## Outcome Measures and Results

For the purposes of this review, outcome measures were categorized into either physiological (eg, heart rate [HR], blood pressure [BP], body mass index [BMI]), behavioral (adherence), or cognitive (perceptions) outcomes. Most studies included outcome measures from more than one category. The most common outcome measures were behavioral (eg, PA questionnaires<sup>48,49</sup>) and physiological (eg, HR, BMI<sup>8,44</sup>). Only a very small proportion of the reviewed studies included cognitive outcome measures (ie, stages of change questionnaire,<sup>49</sup> processes of change questionnaire,<sup>39</sup> decisional balance measures,<sup>39</sup> or self-efficacy measures<sup>34</sup>). Six of the studies<sup>28,30,33,45,46,47</sup> reported no significant change across their sample from PA counseling. Thirteen studies reported a behavioral change (increased PA) in at least 1 intervention group (eg,<sup>9,13,31,32,40</sup>), although only 3 studies reported a cognitive shift.<sup>13,48,49</sup> All of the remaining studies reported a physiological or epidemiological change (such as reduced BMI<sup>8</sup> and increased VO<sub>2</sub>max<sup>27</sup>) in participants between at least 1 intervention group and a control. Only 5 studies reported having applied any form of treatment fidelity.<sup>27,35,42,45,46</sup> Three reported significant results,<sup>27,35,42</sup> with the remaining 2 reporting no differences as a result of the intervention(s). These findings reflected the equivocal nature of the results across the range of reviewed studies.

## Discussion

The review suggests a purposeful shift away from research that is purely outcome focused, positivistic, and with an emphasis on physiological outcomes. Moreover, there appears to be an increased awareness of the need to embed cognitive and behavioral components into PA behavior change with an appreciation of the need for greater motivation and support for PA and lifestyle change beyond merely advice and education.<sup>10</sup> Indeed, the delivery of PA counseling interventions within primary health sectors involving allied health professionals has occurred as a result of public health initiatives and policy.<sup>5</sup> However, health care systems have limited budgets and as a result cannot be expected to continue to fund and develop interventions that fail to address treatment fidelity issues. Results of the current review highlighted that none of the PA counseling interventions have addressed treatment fidelity issues. At best, PA counseling interventions reviewed here indicated a theoretical underpinning but did not fully articulate the application of theory to practice by specifically detailing how components (for example TTM) had been applied. This is, however, not a new phenomenon. As reported previously,<sup>50</sup> even when guidelines and frameworks are provided, there is often a likelihood that health professionals will not adhere to them.

## Intervention Designs

The BCC framework raised awareness of the need for a greater integration of theory to practice. It highlighted the importance of a clear design and the *processes* involved, not just the *outcomes* that result. Many of the interventions did provide some outline of the underlying theoretical construct on which the intervention was based, the dominant model being the transtheoretical model (and stages of change). Several studies cited the Loughlan and Mutrie guidelines and an approach based on the “stages of change” and the “transtheoretical model.”<sup>7,12,13,32,38</sup> Although this provides a theoretically grounded approach, it does not inform practitioners on how to interact with the client, elicit their perceptions of the need and desire for change, and how to deal with issues such as ambivalence and resistance. This illustrates that the original 1995 guidelines<sup>11</sup> have not been accurately applied and that the therapeutic alliance has been diluted or ignored altogether. Only the 5 A’s<sup>51</sup> had been presented before 1995. These were again outlines of *what* to include rather than *how* to apply the content. The search considered these guidelines by expanding the search from 1992 (rather than 1995) using the same inclusion criteria. However, no additional studies resulted from 1992 onward, and thus 1995 remained as the search start date.

The dominance of RCT designs is clearly illustrated in the current review (83% of the studies) and emphasizes the research preference for control of variables and control of extraneous factors. Although, this does not reflect well the diverse nature (and reality) of community settings where most PA interventions are delivered, and the lack of ecological validity in RCT designs is a major concern and might not reflect real-life situations.<sup>52</sup> Nor do RCTs ensure high-quality delivery of interventions, even though there is an implicit assumption that because the intervention is part of an RCT design, it is standardized.

## Training and Delivery

The internal and external validity facets of behavior change interventions are fundamental for methodological rigor. However, scant attention is paid to these in research-training curricula, and there is a perceived lack of importance in published research.<sup>23</sup> Indeed, it has been suggested that without understanding these issues, researchers’ and clinicians’ “*application of behavior change technologies is likely to be slow, with wheels being re-invented rather than re-applied.*”<sup>3(p.30)</sup> However, in-service training of general practitioners in the United States and UK has shown that a systematic patient-centered protocol for PA promotion is efficacious.<sup>5</sup> Seven of the studies reviewed described the intensity, frequency, or duration of training in PA counseling delivered to those providing the intervention. Although these suggested that the interventionists had acquired the appropriate skills, or a level of competence in the application of these skills, it is not clear how robust the assessment actually was. When compared with loose guidelines or recommendations that are not underpinned with provision or training into the *how* and *what* to deliver, clear protocols might remove ambiguity inherent in PA counseling.<sup>53</sup> There is a limited number of strategies (in health behavior change) that do embed treatment fidelity by applying treatment manuals,<sup>19</sup> mentored support,<sup>54</sup> and videotape monitoring.<sup>55</sup> The current systematic review indicated that to date there is no application of such comprehensive fidelity checks in the PA behavior change research.

## Receipt and Enactment

The BCC framework highlights the importance of ensuring the acquisition of behavior change skills and techniques by the recipient (eg, client or patient). This would ensure that the counseling recipient understands, and is able to enact, the techniques discussed in an action-planning phase of PA counseling. Although this is key to creating an autonomous and independent individual, no studies reported how well the recipient understood the intervention delivered and their ability to apply it both cognitively and behaviorally. The most common outcome measures were behavioral and epidemiological (18 studies), with only 6 of the reviewed studies including a cognitive outcome measure that might enable an assessment of the cognitive receipt and/or enactment. Other aspects such as PA and health-information recall could have been applied within follow-ups considering the relatively high number of studies that applied this design (eg, <sup>8,30,45</sup>).

Equivocal results (both behaviorally and physiologically) have resulted from PA counseling interventions. It appears that studies have not fully analyzed (or reported) the design, training of interventionists, quality of delivery of the intervention, receipt of the intervention by the patient, and the patient's ability to enact the new strategy. It is imperative that studies fully report not just what they have done but also embed monitoring and evaluation of how effective the intervention was at all stages. Only when this is commonplace can practitioners have confidence in PA counseling techniques.

Although many substance addiction and health psychology interventions are applying practitioner measures of competency, such as the behavior change counseling index (BECCI<sup>56</sup>), PA counseling has been slow to do so. The BCC framework might help to explain more accurately why an intervention has succeeded or not. However, although there appears to be an unequivocal argument for increased treatment fidelity and consistency across health behavior change interventions, a note of caution has been sounded by some authors, suggesting the demand for fidelity testing might be inappropriate for all steps.<sup>53</sup> The authors purport that the approach suggested by the BCC group ignores 2 things: first, that there are few theoretically grounded empirical studies of the processes involved in the successful attainment of this sequence, and second, that trials with perfect fidelity might produce evidence that lacks a conceptual basis for adaptation across different diseases, treatments, patients, practitioners, institutions, and cultures and might, therefore, lack applicability in clinical practice. In light of this, it is important for behavior change interventions to identify the core principles of treatment fidelity that are fundamental to achieving high-quality interventions through research design, interventionist training, and delivery, to client receipt and enactment. However, although the BCC strategies might appear exhaustive and potentially restrictive,<sup>53</sup> the BCC approach is based on validity and reliability checks from other counseling settings and offers a framework that has never been applied within the context of PA counseling.

## Implications for Policy, Practice, and Training

The focus of studies has been toward *outcome* and *significance*, with very few attending to the intervention *processes*. This has implications for practitioner competency and the design and delivery of professional accreditation programs,

which are increasingly looking to address behavior change but have often based their “evidence,” and subsequent training program content, on studies that fail to consider treatment fidelity issues. Although the treatment fidelity approach might provide clearer guidance on the training and techniques required, there is a need for a greater understanding of (1) how different forms of implementation of motivation affect training professionals, (2) how a professional’s style of delivery affects reception, and (3) how and whether differences in reception affect differences in enactment.<sup>53</sup> This may be achieved by using specialists with greater experience and assessed competency in PA counseling. Indeed, it has recently been suggested that specialist PA counselors be trained and referred to from allied health professionals and physicians because they offer the potential to be more effective because of time and knowledge issues.<sup>4</sup>

It is clear that studies incorporating PA counseling do not currently adhere to a framework for treatment fidelity, and this inevitably had an impact on the quality of the interventions at all stages. There is certainly value in the 1995 guidelines,<sup>11</sup> although subsequent studies (eg,<sup>8,57</sup>) have failed to adequately apply a detailed protocol or framework for the PA consultation. If fidelity treatment measures (such as the BCC framework) are not applied to such settings, then it appears reasonable to suggest that studies need to explain and fully justify why they have not been applied and to report alternative safeguards for quality assurance. There needs to be a greater understanding of the processes involved in the client–PA professional relationship. Examples already exist in the addictions setting in which psycholinguistic research<sup>58</sup> has explored process variables—a paradigm shift that PA counseling should consider. Recent calls have been made for an increase in RCT studies that include a PA counseling component.<sup>59</sup> However, this would currently have to occur in a research environment where the intervention is not fully understood. A greater awareness then of the *style* of the interaction, and the relationship between the PA specialist and client, might facilitate greater self-awareness and change talk from the client and provide a more appropriate, client-centered, PA consultation. Future research should consider the application of frameworks such as the BCC in PA settings and emphasize trainer competency, patient receipt of the change strategy, and a consistent PA counseling protocol that has treatment fidelity at its core.

## Review Limitations

The authors considered the value of a qualitative versus quantitative methodology for the review. Although examples of the latter<sup>60</sup> might have offered a succinct numeric alternative, the authors felt that the use of the BCC framework together with a detailed qualitative analysis offered a richer, more thorough, review. As a result, the current qualitative method assessed the aims of this systematic review appropriately. A second issue was the choice of inclusion criteria of studies reporting to have applied face-to-face PA counseling. Increasing economic and time constraints have led to an increasing popularity of “telehealth” counseling (eg, Internet, video transmission, telephone), although it is the telephone that is by far the most popular.<sup>61</sup> However, there is limited research suggesting the effectiveness of this medium, and the dominant method in this field is still that of face-to-face contact.<sup>62</sup> The reason face-to-face client contact remains popular is that it facilitates a “therapeutic” or “working” alliance, which is central to successful therapy.<sup>63</sup>

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