Reducing Obesity Indicators Through Brief Physical Activity Counseling (PACE) in Italian Primary Care Settings

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ABSTRACT

Background: *There is an alarming prevalence of obesity and sedentariness in Western countries. An ideal context for health promotion and preventive medicine seems to be the setting of primary care provided by the general practitioner (GP).* ***Purpose:*** *Therefore, this study evaluated the impact of GPs' brief physical activity counseling for overweight and obese patients.* ***Methods:*** *Individuals recruited during routine physician visits were randomly split into an experimental (n = 48) group that received the Patient-centered Assessment and Counseling for Exercise (PACE) protocol, and a usual-care control (n = 48) group. Body mass index (BMI) and abdominal girth were assessed as objective biometrical parameters. Patients in the experimental group self-reported their readiness for physical activity and self-efficacy.* ***Results:*** *The experimental group had significantly better BMI and abdominal girth compared with the control group after a 5- to 6-month follow-up. Furthermore, the experimental group progressed in their stage of physical activity readiness and increased their self-efficacy.* ***Conclusions:*** *The GPs' counseling for physical activity using the PACE protocol influenced mediators and biometrical outcomes in an Italian primary care context.*

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INTRODUCTION

In 1997, the World Health Organization concluded that obesity is turning into an epidemic, necessitating a call for action (1). Relatedly, some of the main objectives of the 1998–2000 Italian National Health Plan (2) are the prevention of health risks (overweight, lack of physical activity, alcohol abuse, smoking), the promotion of healthy lifestyles and behaviors, and maintenance of healthy habits. Increasing physical activity may reduce the risks associated with obesity; favorably distribute the body weight; and provide a wide range of positive effects related to psychological and physical health, even when no weight loss occurs (3). Despite this, physical inactivity continues to be prevalent among adults and, even more, among obese or overweight people. In terms of the body mass index (BMI), the following divisions have been put forth: a BMI between 25 and 29.9 kg/m^2 represents overweight; a BMI between 30 and 34.9 kg/m^2 represents obesity—1st degree; and a BMI > 35 kg/m^2 represents severe obesity—2nd and 3rd degree (1). It has been recently shown that a high BMI increases the risks of developing cardiovascular and metabolic diseases, cancer, and other chronic diseases (4).

Another clinical marker of obesity is abdominal girth, which helps distinguish between the patients who are at risk due to an accumulation of fat in the abdomen and those who are at risk as a result of peripheral obesity. The values that the World Health Organization outlined for Caucasian populations, which show an increased morbidity risk, range from 94 to 102 cm in the male population and from 80 to 88 cm in the female population (1). A number of longitudinal studies have shown that when obesity is located in the upper part of the body (abdominal obesity), individuals have higher morbidity and mortality from stroke, diabetes, and cardiovascular disease, irrespective of the degree of obesity (3,5).

A decrease in weight also leads to a modification of many risk factors, including cholesterol levels and blood pressure (3). Pharmacological and medical interventions are extremely important but do not seem to account for all the variance. In the

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treatment of obesity, the reduction of calories has recently been combined with cognitive–behavioral techniques that aim to modify people's sedentary lifestyle through the adoption of a regular physical activity (3,6).

Physical activity increases the effectiveness of behavioral programs for weight reduction (6). In addition, the behavioral cognitions of obese or overweight people play an important role in treatment compliance and success. Theoretical models focusing on cognitive and behavioral determinants (e.g., self-efficacy, stages of change, decision making, and intentions) are being increasingly used in the development of interventions aimed at promoting regular physical activity (7,8).

The Patient-centered Assessment and Counseling for Exercise (PACE) Program incorporates concepts from social cognitive theory and the Transtheoretical Model, such as the stages of change, decisional balance, and self-efficacy (9–12). The stages of change, the core of the Transtheoretical Model, are the temporal dimension of behavioral change, and progression can be achieved by stage-matched intervention strategies (13). This model proposes that individuals progress through a series of five stages. *Precontemplators* have no intention to change, whereas *contemplators* intend to change their behavior in the near future, generally within the next 6 months. Individuals in the *preparation* stage intend to change their behavior in the near future (within 1 month). *Action* stage people have adopted the new behaviors within the last 6 months, and those in *maintenance* have kept to the change for 6 months or more. Self-efficacy, the confidence in one's ability to perform a behavior given certain circumstances, and decisional balance, the pros and cons of engaging in a behavior, are deemed important for behavior change (13). The Transtheoretical Model has been successfully used, even with people who have no intention of changing behavior (14,15). According to Sonstroem (8), the Transtheoretical Model is well suited to understand the procedures related to the adoption and maintenance of a physical activity, as physical activity is regarded as a transitional and intentional process.

Because general practitioners (GPs) are generally trusted regarding health issues by their own patients, they can successfully play the role of change agents and, by offering counseling on physical activity, may increase life expectancy and decrease health-related costs (15). A suggestion concerning health is more likely to be accepted if it comes from the GP, one who has recurrent contacts with his or her patients—rather than from an anonymous, mass media source. To maximize the impact of the intervention and improve the effectiveness of patient–GP dialogue, the physician can build a relationship that aims at teaching patients how to make aware choices and how to cope with their health problem (16). The PACE protocol is an important resource that (a) helps GPs overcome barriers to physical activity counseling, because it informs, evaluates, explains, supports and offers therapeutic help and (b) provides a valid structure for the counseling of physical activity. This specific program gives the GP clear guidelines to provide physical activity counseling through an easily applicable communication technique that makes up for potential lack of training and improves the GP's abilities and knowledge concerning exercise. The protocol provides patients with the basic information to adopt and maintain their own physical activity program. Moreover, it aims at being assimilated within the short time in which visits take place.

Therefore, the purpose of this study was to evaluate the GPs' counseling impact, through PACE, in overweight and obese patients. This investigation targeted obesity indicators, and physical activity stage change. This is the first application of the Transtheoretical Model to physical activity and, more specifically, the PACE protocol, in a clinical setting targeting objective (BMI and abdominal girth) and subjective (stage and self-efficacy) parameters in an at-risk Italian sample of overweight and obese people. We hypothesized that, over time, the PACE intervention would positively influence the obesity indicators compared with the control group and that the PACE intervention would facilitate physical activity stage progression and improve self-efficacy.

METHOD

Sample

The sample consisted of either overweight or obese/severely obese adult patients (55/group). Fourteen patients (12.77%) were lost to follow-up (we speculate this is due either to their choice to drop out or change GP). Therefore, the sample completing both assessments consisted of 96 patients (no dropout = 48/group; age range = 21–70; 53.1% female; 83.3% married) generally mirroring the education levels of the population (see Table 1). There were more women (62.5%) in the control group compared with the experimental group (43.7%). The excluded patients did not differ from the remaining sample in terms of demographics (age, gender, and education, $p > .05$).

Design

This study had a two-group design with random assignment to experimental or usual-care control group using the following

TABLE 1
Demographics by Group

	Entire Sample		*Control*		*Experimental*	
Variable	*n*	*%*	*n*	*%*	*n*	*%*
Age						
21–30	8	8.3	3	6.3	5	10.4
31–40	18	18.8	7	14.6	11	22.9
41–50	26	27.1	14	29.2	12	25.0
51–60	29	30.2	14	29.2	15	31.3
61–70	15	15.6	10	20.8	5	10.4
Gender[a]						
Male	45	46.9	18	37.5	27	56.3
Female	51	53.1	30	62.5	21	43.8
Education						
Primary	27	28.1	16	33.3	11	22.9
Junior high	36	37.5	18	37.5	18	37.5
High school	29	30.2	12	25.0	17	35.4
University degree	4	4.2	2	4.2	2	4.2

[a]More men and fewer women were in the experimental group compared to the control group ($p < .05$).

sequence: baseline assessment–random assignment–intervention–5- to 6-month follow-up assessment.

Measures

Biometric assessments (objective). BMI (Queteled index) is obtained by dividing the weight by the height squared (kg/m^2). Height and weight are obtained by using a standard balance scale with patients in their undergarments. BMI is highly correlated with percentage body fat (calculated on the basis of body density), especially when age is taken into account (17).

For abdominal girth, waist circumference was measured with a metric tape measure halfway between last rib and the anterior superior iliac spine with patients in their undergarments and any obstructive clothing removed. Associated risk increases with a waist measurement of over 40 in. (102 cm) in men and over 35 in. (88 cm) in women (1).

Self-report assessment (subjective). For stage of change for physical activity, included in the PACE protocol only (12), the patients reported their stage of readiness to be physically active (precontemplation, contemplation, preparation, action, and maintenance). To maintain congruency with the PACE counseling protocols, the contemplation and preparation stages as well as the action and maintenance stages were combined (precontemplation = 1; contemplation and preparation = 2; action and maintenance = 3). Participants were asked about their leisure time physical activity, as occupational physical activity is not entirely volitional.

For self-efficacy, included in the PACE protocol only (12), patients responded to three items regarding how confident they perceived themselves to be in regularly adopting and maintaining their physical activity. These were scored on a Likert-type scale from 1 (*total lack of confidence*) to 2 (*some degree of confidence*) to 3 (*very confident*).

Any adverse events due to the protocols were reported by the patients to the GP.

Procedure

In May 2000, eight male GPs from the District of Cesena (AUSL 39) in Emilia Romagna, Italy, were contacted. Each GP had actively practiced for more than 20 years, and all were asked to take part while performing their usual activities. After receiving information about the objectives, methods, and standardized training, they agreed to contribute to project. The standardized training consisted of three consecutive specific evenings with each GP, explaining the biometric assessments and each of the stage-based PACE protocols, and focusing on how to conduct brief counseling. The GPs were asked to do three things: (a) recruit overweight patients (BMI > 25), obese patients (BMI > 30—1st class), and severely obese patients (BMI > 35—2nd and 3rd class) for 1 month; (b) follow ethics-board-approved procedures, including written informed consent; and (c) collect the data. Every GP administered participants from each group, and the ratio of participants to provider ranged from 4 to 20 patients, according to the availability of the GP. The patients were screened using the Physical Activity Readiness Questionnaire, to identify those patients for whom the adoption of a physical activity is contraindicated (18).

Measures were collected at the beginning (May 2000) and after 5 to 6 months (end of October/beginning of November 2000), during a visit to the GP. After baseline data collection, participants were randomly split into the experimental and control groups by picking a number from a random number table and putting those who selected a number with an even last digit into one group. All individuals in the experimental group received physical activity counseling through PACE, and the control group received usual care.

PACE Protocol: Experimental Group

The PACE protocol is an innovative method of physical activity counseling (9,10,12) incorporating objectives of the U.S. Department of Health and Human Service's Healthy People 2000. It is based on the stages-of-change model and includes preliminary assessment and subsequent standardized protocols that help to increase the adoption, frequency, and adequacy of exercise counseling within primary care (11). The GPs should spend less effort with precontemplators and individuals in the active stages (action and maintenance) and should devote most of their attention to those individuals who are ready to adopt physical activity (contemplation and preparation). Because these patients are ready to change their behavior, they need more assistance. Before seeing the counselor, the patient is given a PACE assessment form, which takes 1 min to complete. The PACE protocol requires about 2 to 5 min of interaction between counselor and patient and is recorded in the patient's medical chart. In addition, a 2- to 3-week follow-up is conducted, by telephone or through the mail, focused on reinforcing the themes within the stage specific protocol.

On the basis of the stage chosen on the PACE assessment form, a specific counseling protocol is followed. The individual protocols are used to offer advice tailored specifically to the patient's stage of readiness. For patients classified as precontemplators (who are not active and not ready to change), the protocol "Stand Up From the Chair" is used. This protocol allows the counselor and the patient to detect the barriers of physical activity adoption, in order to overcome them. The counselor tries to increase the pros of change, providing clear explanations on the advantages and beneficial effects of exercise (19). The goal for precontemplators is a consideration of the adoption physical activity. The protocol "Planning the First Step" is used for contemplators or preparers (not regularly active, but ready to change). Patients are asked to plan a realistic physical activity program, specifying the kind of physical activity and the time, place, and support they need. It is also useful to identify the potential barriers, so that the counselor may take steps to decrease the cons (19). Once the physical activity plan is devised, both patient and counselor sign their names, thus declaring their willingness to carry it out, and they start to devise the follow-up. Patients are provided with a diary in which they are asked to record the kind of physical activity in which they engage and the time devoted to it, plus any obstacles that arise. The goal for contemplators and preparers is to adopt regular physical activity. The

third protocol, called "Keeping to the Objectives," is used for active individuals, who are congratulated and provided with useful information for physical activity maintenance and injury prevention. For people in this stage, the most important task is to prevent relapse through the development of strategies to overcome the possible barriers (19). The goal for people in the action and maintenance stages is to maintain their physical activity quantitatively and increase their activity qualitatively.

Control Group

Usual care was provided for the control group, which is a general recommendation strategy. The control patients did not receive an assessment prior to the visit. Therefore, the GPs did not have any information on the stage of change when seeing a control group patient. The time of the usual care was not different from the experimental group; each visit lasted about 15 min, with usually 2 to 5 min devoted to a discussion of healthy lifestyles.

RESULTS

No major adverse events compromising exercise capacity were documented. Baseline and follow-up BMI and abdominal girth results by sex and study group are reported in Table 2. Male patients in the control and the intervention groups marginally differed at baseline in BMI, $F(1, 43) = 3.11$, $p = .09$. To control for these differences, an analysis of covariance was conducted, with BMI at baseline as a covariate and group and gender as factors. This analysis of covariance revealed a significant covariate and group effect, $F(1, 95) = 10.60$, $p < .01$, $\eta^2 = .10$. In both sex groups, the control group increased in BMI, and the intervention group decreased in BMI. Although the changes in men were stronger then in women, no interaction with gender was found ($p = .31$, $\eta^2 = .01$).

The same results transpired for abdominal girth (see Table 2). After controlling for the baseline in girth, the groups differed significantly at the follow-up, $F(1, 95) = 10.06$, $p < .01$, $\eta^2 = .10$. The interaction with gender was not substantial ($p = .41$, $\eta^2 = .01$). Both male and female patients in the control group increased their abdominal girth slightly, whereas the individuals in the intervention group decreased their abdominal girth.

Additional Findings Within the Experimental Group

To examine whether the PACE intervention was effective in moving patients forward in stages, the stages at the baseline and at the follow-up measurement point were compared (see Table 3). The majority of the former inactive patients moved forward, 60% of the patients in Stage 1 (not active and not ready) and 51.4% of the individuals in Stage 2 (not active, but ready). That is, over 50% of patients who either were not ready or who were ready (Stages 1 and 2) progressed, and none of these patients in these two stages of readiness (0%) regressed. Furthermore, 75% of the patients who were physically active at baseline stayed active. Also specific to the experimental group, self-efficacy increased significantly from the first to the second contact (Hodge's $d = 0.72$). The effect was stronger in male participants than in female patients (see Table 4).

To investigate whether patients who became or stayed active decreased in BMI and abdominal girth, the intervention group was divided into active ($n = 24$) and the inactive patients ($n = 24$) at follow-up. A repeated measures multivariate analysis of variance was conducted, with BMI and abdominal girth at baseline and follow-up and being active at the follow-up and sex as factors. From the baseline to follow-up, there was a marginal multivariate Time × Group effect, Wilks's $\Lambda = .88$, $F(1, 47) = 2.93$, $p = .06$, $\eta^2 = .12$.

TABLE 3
Intervention Group Physical Activity Stage Distributions at Baseline and Follow-Up

	Follow-Up							
	Stage 1		*Stage 2*		*Stage 3*		*Total*	
	n	*%*	*n*	*%*	*n*	*%*	*N*	*%*
Baseline								
Stage 1	2	40.0	3	60.0	0	0	5	10.4
Stage 2	0	0	17	8.6	18	51.4	35	72.9
Stage 3	0	0	2	25.0	6	75.0	8	16.7
Total	2	4.2	22	45.8	24	50.0	48	100.0

Note. Stage 1: not active and not ready; Stage 2: not active but ready; Stage 3: active.

TABLE 2
Baseline and Follow-Up BMI and Abdominal Girth by Gender and Intervention Group

			BMI (kg/m²)[a]				*Abdominal Girth (cm)*[a]			
			Baseline		*Follow-Up*		*Baseline*		*Follow-Up*	
Gender	*Group*	*n*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Male	Control	18	31.86	0.82	32.43	0.87	109.72	2.92	110.44	2.67
	Intervention	27	30.26	0.67	29.48	0.71	108.81	2.38	102.74	2.18
Female	Control	30	30.69	0.64	30.99	0.67	104.42	2.26	106.12	2.06
	Intervention	21	30.61	0.76	30.16	0.80	104.43	2.70	101.91	2.47

Note. BMI = body mass index.

[a]Significant differences between the intervention and control groups after controlling for baseline differences are significant for men and women ($p < .05$); there was no gender effect ($p > .05$) and no Gender × Group interaction ($p > .05$).

TABLE 4
Self-Efficacy by Gender and by Time for the Experimental Group

	Baseline		*Follow-Up*			
Gender	*M*	*SD*	*M*	*SD*	*F*	*p*
Male	1.93	0.60	2.41	0.50	8.859	< .01
Female	1.90	0.63	2.24	0.53	4.016	.05
Both	1.92	0.61	2.33	0.52	12.912	< .01

By inspecting the univariate effects for the two dependent variables, BMI was associated with the significant interaction, $F(1, 47) = 5.86$, $p = .02$, $\eta^2 = .12$. For abdominal girth, there was only a significant time effect, $F(1, 47) = 6.76$, $p = .01$, $\eta^2 = .13$, but no interaction. The pattern of means for BMI and abdominal girth within the active and inactive groups is displayed in Figure 1. On average, the active patients had a significant decrease in BMI, whereas the inactive patients did not increase their BMI. Independent of exercise behavior, the intervention group decreased in abdominal girth.

DISCUSSION

The present study examined GPs' PACE counseling effect in a sample of obese and overweight patients. Supporting our primary hypotheses, the counseling had a significant impact on biometrical objective parameters (BMI and abdominal girth) compared with the control group. The BMI and abdominal girth decrease obtained through the GPs' counseling may play an important role for diminishing the risks of contracting severe diseases that might affect mortality and morbidity (e.g., cardiac diseases and metabolic diseases; 20,21). Additional findings within the experimental group indicated improvement in subjective parameters (stage of physical activity and self-efficacy) over time. These additional findings provide potential explanatory mechanisms for the findings regarding BMI and abdominal girth. However, caution is warranted in this interpretation, as there was no control comparison for the subjective parameters.

The study highlighted the utility of the PACE protocol in helping GPs overcome the barriers that prevent them from offering adequate advice. PACE is helpful because it minimizes the duration of intervention while improving the GP's knowledge and abilities. Several issues relevant to GPs' situations, which this study had to overcome, included lack of motivation (due to the lack of reimbursements) and little time available for the optimization of the GPs' counseling (the GP is usually heavily burdened with bureaucratic tasks that prevent recurring contacts with patients in order to provide an adequate follow-up).

The hypothesized success of the physical activity counseling was most likely due to the targeted counseling, as evidenced by the stage progression and maintenance. The impact on BMI and abdominal girth was most likely due to the substantial proportion of patients in contemplation and preparation (not active but ready) who adopted regular activity and the active individuals who maintained their physical activity levels. The stage progression result from the small group of precontemplators is important to note, as a single stage progression doubles the likelihood of taking action (22). Participants in all stages seem to be positively affected by the counseling intervention, because these individuals increased their self-efficacy. Previous studies also found that self-efficacy was among the strongest predictors of physical activity adoption (23,24). In terms of adopting regular physical activity, patients in contemplation and preparation (not active but ready) responded to the counseling most favorably, as expected.

This study compares favorably to other brief physician-based interventions targeting physical activity (25,26). Norris et al.'s (26) study had a positive effect on stage of change; however, it included a large proportion of active patients, limiting the potential impact on behavior. The Physically Active for Life (PAL) study produced short-term (6 weeks) but not long-term (8 month) results in mediators and physical activity outcomes (25,27). Differences compared to this study may be due to the physician training (1 hr for the PAL study vs. 3 evenings in this study) or sample (general patient sample for the PAL study vs. overweight and obese individuals in this study). Our study findings seem to support the conclusions that brief physician intervention to discuss physical activity need not take more than 3 to 5 min during an office visit but can play a critical role in patient implementation (28).

This study is not without limitations. First, no information on the counseling quality (what the physician actually was do-

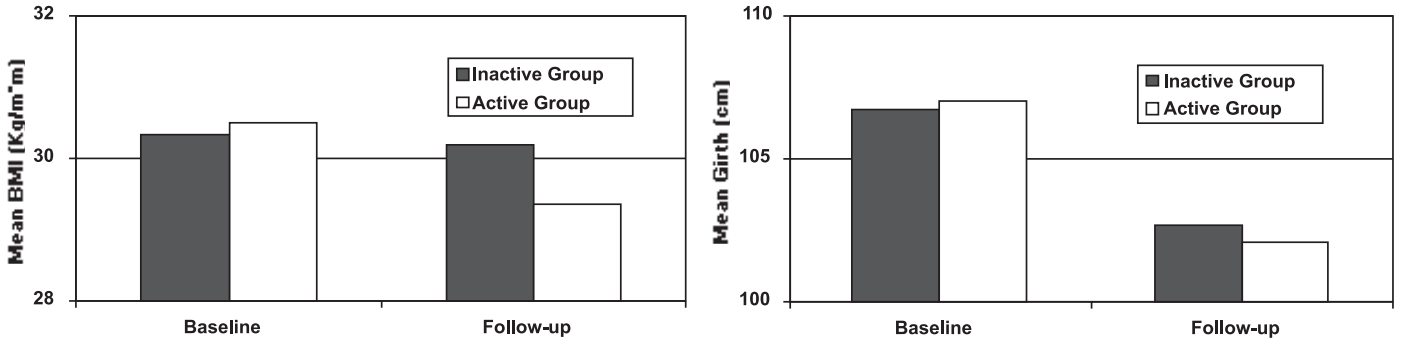

FIGURE 1 Pattern of means for body mass index and abdominal girth within the active ($n = 24$) and inactive ($n = 24$) individuals of the experimental group.

ing; 29) and how the patients received the counseling was obtained, limiting treatment fidelity discussions. Second, because of the select sample (overweight/obese patients of eight GPs), the generalizability of the findings is not clear. Third, data collection was not blind, as the GPs delivered the intervention and collected the data. However, this is not deemed a serious limitation, as GPs routinely assess patients. Fourth, no information on the intensity, duration, or time and type of physical activity was included for either group (only physical activity stage was assessed in the experimental group), making it impossible to determine what the physical activity characteristics were that influenced the biometric changes. It is worth noting that this research used subjective and objective measures, thus avoiding the limitation of many other self-report Transtheoretical Model studies.

Although not significant, the gender-specific analyses hint at the conclusion that Italian female patients may be less influenced by the physical activity counseling compared with their male counterparts. The Activity Counseling Trial (30) showed that American women were more likely to change behavior when given more intense (more time and contacts with the GP) than brief interventions compared with men. Further contributing factors were that fewer women were recruited to the experimental group (43.8%); they all were between 40 and 60 years old; and 19 (90.5%) of them were married and had children. Because of these demographics and cultural reasons (deeply rooted lifestyles and family situations), Italian women may find it more difficult to combine their housework and job tasks with the adoption of leisure time physical activity. In addition, Italian women usually have fatalistic attitudes whenever they deal with health problems and health management (31). Male patients, on the contrary, besides being prevalent in the experimental group, probably managed to combine the adoption of physical activity with their social and professional tasks, thus obtaining a higher reinforcement on their own capability to keep on active.

At the end of this project, the majority (6/8) of the participating GPs indicated that they will be more ready to apply the counseling to obese patients and track the objective and subjective parameters regularly. Three of the eight doctors involved also adopted regular activity during the study, indirectly benefiting from the counseling and potentially becoming a role model for patients. The remaining two physicians did not feel that PACE added to what they were already doing.

This study adds to the growing evidence supporting the motivational tailoring of interventions, such as a specific counseling protocol (e.g., PACE), and can be a very useful tool to understand how and why an individual starts physical activity (14). To this end, we recommend that the specific mechanisms of these interventions be investigated. One of the main implications of these findings is that it is counterproductive to consider the individuals who do not exercise as a homogeneous group in terms of readiness to exercise, both in the research domain and within the clinical interventions.

It is possible to obtain a meaningful classification and tailor brief counseling protocols according to regular physical activity staging in different cultures. This study extends the effectiveness and importance of short motivational physical activity counseling intervention to an Italian primary care context with objective measurements that are highly relevant to several health issues. By providing GPs with PACE evidence-based medicine, patients can effectively be supported in changing behavior.

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