KARINA COUTO FURLANETTO

REDUÇÃO DO NÍVEL DE ATIVIDADE FÍSICA NA VIDA DIÁRIA E SEUS FATORES DETERMINANTES EM TABAGISTAS SEM OBSTRUÇÃO AO FLUXO AÉREO

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Dissertação apresentada ao Programa de Pós-Graduação em Ciências da Reabilitação (Programa Associado entre Universidade Estadual de Londrina [UEL] e Universidade Norte do Paraná [UNOPAR]), como requisito parcial à obtenção do título de Mestre em Ciências da Reabilitação.

Orientador: Prof. Dr. Fabio de Oliveira Pitta

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BANCA EXAMINADORA

Fabio de Oliveira Pitta

_____

Prof. Orientador
Universidade Estadual de Londrina

Denilson de Castro Teixeira

_____

Prof. Componente da Banca
Universidade Estadual de Londrina

Shirley Aparecida Fabris Souza

_____

Prof. Componente da Banca
Universidade Estadual de Londrina

Londrina, 19 de novembro de 2013.

Dedico este trabalho aos queridos amigos e familiares que acreditaram junto comigo na conquista do mestrado.

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“Cada um que passa em nossa vida, passa sozinho, pois cada pessoa é única e nenhuma substitui a outra. Cada um que passa em nossa vida, passa sozinho, mas não vai só nem nos deixa só. Leva um pouco de si mesmo. Há os que levam muito, mas não há os que não levam nada.”

(Antoine de Saint-Exupéry)

FURLANETTO, Karina Couto. **Redução do nível de atividade física na vida diária e seus fatores determinantes em tabagistas sem obstrução ao fluxo aéreo**. 2013. 99 páginas. Dissertação de mestrado (Programa de Pós-Graduação em Ciências da Reabilitação - Programa Associado entre UEL e UNOPAR) – Universidade Estadual de Londrina, Londrina, 2013.

RESUMO

Introdução: A quantificação detalhada, objetiva e controlada do nível de inatividade física na vida diária em tabagistas sem obstrução ao fluxo aéreo ainda não foi realizada. O presente estudo objetivou avaliar o nível de atividade física na vida diária de tabagistas adultos sem obstrução ao fluxo aéreo em comparação com uma amostra pareada de não tabagistas, assim como investigar seus determinantes em tabagistas. **Métodos:** Sessenta tabagistas (idade 50[39-54] anos) e 50 não tabagistas (idade 48[40-53] anos) pareados por gênero, idade, características antropométricas, grau de escolaridade, tipo de emprego e estações do ano no período de avaliação. Foram avaliados nesse estudo transversal considerando seu nível de atividade física na vida diária com um contador de passos (pedômetro Yamax Digiwalker SW-200), além da avaliação de função pulmonar, capacidade funcional de exercício (teste da caminhada de 6 minutos, TC6), qualidade de vida (questionário SF-36), ansiedade (State-Trait Anxiety Inventory), depressão (Beck Depression Inventory), nível de monóxido de carbono expirado, dependência nicotínica (escala de Fagerström) e hábitos tabágicos. **Resultados:** Tabagistas caminharam menos na vida diária do que não tabagistas (7923±3558 *vs* 9553±3637 passos/dia, respectivamente), além de apresentar também pior função pulmonar, TC6, qualidade de vida, ansiedade e depressão (p<0.05 para todos). A análise de regressão linear múltipla identificou o TC6min, escala de Borg (fadiga), o auto relato de motivação e comportamento de atividade física e de doença cardíaca como determinantes do número de passos/dia em tabagistas (r^2 parcial=0.12, 0.14, 0.13 e 0.05; b=17, -1120, 1097 e -2330 passos/dia, respectivamente; p<0.002 para todos; r^2 ajustado total do modelo=0.34; p<0.001). **Conclusões:** Tabagistas adultos sem obstrução ao fluxo aéreo apresentam redução do nível de atividade física diária. Capacidade funcional de exercício, sensação prolongada de fadiga, aspectos de motivação e comportamento de atividade física e doença cardíaca são determinantes significativos da atividade física na vida diária em tabagistas.

Palavras-chave: Exercício; Monitorização; Atividade motora; Hábito de fumar; Tabaco

FURLANETTO, Karina Couto. ***Reduction of physical activity in daily life and its determinants in smokers without airflow obstruction***. 2013. 99 páginas. Dissertação de mestrado (Programa de Pós-Graduação em Ciências da Reabilitação - Programa Associado entre UEL e UNOPAR) – Universidade Estadual de Londrina, Londrina, 2013.

ABSTRACT

Background: Detailed, objective and controlled quantification of the level of physical inactivity in daily life in smokers without airflow obstruction was never performed. This study aimed to objectively assess the level of physical activity in daily life in adult smokers without airflow obstruction in comparison to a matched sample of non-smokers, as well as to investigate its determinants in smokers. **Methods:** Sixty smokers (age 50[39-54] years) and 50 non-smokers (age 48[40-53] years) matched for gender, age, anthropometric characteristics, educational level, employment status and seasons of the year assessment period were cross-sectionally assessed regarding their daily physical activity with a step counter (pedometer Yamax Digiwalker SW-200), besides assessment of lung function, functional exercise capacity (6-minute walking test, 6MWT), quality of life (SF-36 questionnaire), anxiety (State-Trait Anxiety Inventory), depression (Beck Depression Inventory), carbon monoxide level, nicotine dependence (Fagerström scale) and smoking habits. **Results:** Smokers walked less in daily life than non-smokers (7923±3558 *vs* 9553±3637 steps/day, respectively), besides presenting also worse lung function, 6MWT, quality of life, anxiety and depression ($p<0.05$ for all). Multiple regression analyses identified 6MWT, Borg fatigue scale, self-reported motivation and physical activity behavior and self-reported cardiac disease as determinants of steps/day in smokers (partial $r^2=0.12$, 0.14, 0.13 and 0.05; $b=17$, -1120, 1097 and -2330 steps/day, respectively; $p<0.002$ for all; overall fit of the model $r^2=0.34$; $p<0.001$). **Conclusions:** Adult smokers without airflow obstruction present reduced level of daily physical activity. Functional exercise capacity, extended fatigue sensation, aspects of motivation and physical activity behavior and cardiac disease are significant determinants of physical activity in daily life in smokers.

Key-words: exercise; monitoring; motor activity; smoking; tobacco

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6MWT	Six-minute walking test
AFVD	Atividade Física na Vida Diária
COPD	Chronic Obstructive Pulmonary Disease
DPOC	Doença Pulmonar Obstrutiva Crônica
FEV_1	Forced Expiratory Volume in the first second
Mot/Be.PA	Motivation / Behavior Physical Activity
OMS	Organização Mundial da Saúde
TC6min	Teste da Caminhada de 6 minutos

SUMÁRIO

1 INTRODUÇÃO

De acordo com a Organização Mundial da Saúde (OMS), o tabagismo está entre as principais causas evitáveis de morte. A cada ano, a epidemia mundial do cigarro mata cerca de 6 milhões de pessoas[1]. O tabagismo, também é o principal fator de risco para desenvolver a doença pulmonar obstrutiva crônica (DPOC)[2, 3], e mais do que previamente reconhecido, atualmente sabe-se que até 50% dos tabagistas de longa data desenvolvem a doença[4].

Um tópico de discussão crescente na literatura é a associação entre o tabagismo e a inatividade física. Muitos estudos suportam a evidência de que a inatividade física está marcadamente presente em pacientes com DPOC [5-7]. No entanto, resultados contraditórios são encontrados nos diversos estudos sobre inatividade física e tabagismo disponíveis na literatura[8, 9]. Alguns estudos sugerem que o tabagismo está associado a um menor nível de atividade física na vida diária (AFVD) em adultos[8]. Entretanto, a grande maioria dos estudos realizados com tabagistas avaliaram o nível de AFVD com questionários, e atualmente é indiscutível que a avaliação objetiva da atividade física é preferível, pois esta oferece uma quantifição mais acurada do nível de AFVD do que questionários[10].

Interessantemente, alguns estudos mais recentes mostraram que o comportamento de atividade física do tabagista, mesmo antes do diagnóstico da DPOC, é um importante fator associado com a doença[11-13]. Um importante estudo de coorte mostrou que tabagistas com níveis mais altos de atividade física apresentam menor redução da função pulmonar ao longo de 6 anos e consequentemente menor risco de desenvolver DPOC[11]. Um outro

estudo do tipo caso-controle mostrou que existe uma associação inversa entre o nível de atividade física ao longo da vida e o risco dos indivíduos apresentarem sintomas de dispneia e desenvolverem DPOC[12]. Adicionalmente, um estudo ainda mais recente[13] mostrou que dentre os pacientes com DPOC que eram tabagistas, a redução da atividade física foi a primeira característica observada ao longo do desenvolvimento da DPOC, e os autores desse estudo hipotetizam que o tabagismo pode apresentar efeitos deletérios também na atividade física.

Tendo em vista esses indícios de que tabagistas já apresentam redução do nível de AFVD mesmo antes da detecção da DPOC, nós buscamos na literatura estudos que comparavam o nível de AFVD (avaliada objetivamente) de tabagistas e não tabagistas que poderiam garantir que a inatividade física estava realmente presente nessa população. No entanto, ainda não foi realizado um estudo com design específico para comparar tabagistas e não tabagistas pareados para os principais fatores capazes de contribuir para o nível de AFVD. E devido à importância desse tema, consideramos estudar o nível de atividade física dos tabagistas em profundidade, com a hipótese de que os tabagistas mesmo sem obstrução detectável ao fluxo aéreo seriam inativos fisicamente quando comparados com não tabagistas. Com base nessa hipótese, os objetivos da presente dissertação foram (1) avaliar objetivamente o nível de atividade física na vida diária de tabagistas adultos sem obstrução ao fluxo aéreo e comparar com não tabagistas pareados por possíveis fatores que contribuem para o nível de AFVD; e (2) investigar os fatores determinantes da atividade física em tabagistas.

2 REVISÃO DE LITERATURA – CONTEXTUALIZAÇÃO

2.1 TABAGISMO E DOENÇA PULMONAR OBSTRUTIVA CRÔNICA

Segundo a Organização Mundial de Saúde (OMS), o tabagismo é considerado uma doença crônica causada pela dependência da nicotina, sendo a principal causa de morte evitável no mundo[1]. Há indícios de que aproximadamente 6 milhões de pessoas no mundo morrem anualmente por causas relacionadas ao tabaco, e esse número pode atingir 8,3 milhões dentro dos próximos 20 anos[1]. Sabe-se que o tabagismo é o principal fator de risco da DPOC[2, 3], que é caracterizada por uma limitação persistente ao fluxo aéreo que é usualmente progressiva e associada a um aumento crônico da resposta inflamatória das vias aéreas e dos pulmões a partículas nocivas ou gases[2]. De acordo com estimativas da OMS, atualmente a DPOC é considerada a quarta principal causa de morte no mundo, e provavelmente ocupará a terceira posição dentro dos próximos 20 anos[14].

Apesar de uma pequena porcentagem de não-fumantes também serem acometidos pela DPOC por diversas outras causas como deficiência da alfa-1 antitripsina, poluição do ar, exposição ocupacional a poeiras, asma ou infecções respiratórias na infância, entre outras[15], cerca de 80% dos pacientes que são diagnosticados com a doença já foram ou ainda são fumantes (de forma ativa ou passiva)[15]. A fumaça do cigarro causa danos diretos ao epitélio celular das vias aéreas[3]. Diferentes estudos[16] têm demonstrado que alterações estruturais como redução da viabilidade celular, indução de apoptose em células ciliadas respiratórias, prejuízos na regeneração epitelial frente a injúrias, além de espessamento e reação

inflamatória da mucosa respiratória, podem ser induzidas pelo cigarro. E além das alterações estruturais, alterações funcionais como déficit do transporte mucociliar e nos mecanismos de produção de muco também são relatados[16].

Concomitantemente, apesar dos indivíduos tabagistas serem a população com maior risco de desenvolver DPOC, nem todos desenvolvem a doença, e esse número pode chegar a 50% dos fumantes[4]. No entanto, existem evidências de que indivíduos tabagistas adultos (mesmo sem o diagnóstico de DPOC) apresentam comprometimentos em diferentes aspectos de saúde quando comparados com indivíduos não tabagistas. Estudos prévios confirmam que tabagistas apresentam maior risco de desenvolver doenças cardiovasculares[17], pior tolerância ao exercício[18], alterações na musculatura periférica[19], maiores níveis de ansiedade[20], depressão[20] e pior qualidade de vida[21] do que indivíduos não tabagistas. Além disso, sabe-se que a redução de volumes pulmonares que ocorre devido ao tabagismo tem sido associada com um aumento de todas as causas de mortalidade nessa população[22].

2.2 Tabagismo e Aspectos Psicossociais

Sabe-se que os fatores pscicossociais se correlacionam com o tabagismo[23, 24]. A qualidade de vida de tabgistas é reconhecidamente pior do que de não-tabagistas, e associação entre a qualidade de vida de um tabagista e o tabagismo está relacionada com a sua capacidade de reduzir o número de cigarros ou até mesmo conseguir parar de fumar[21]. Indivíduos que pararam de fumar há mais de um ano são considerados mais felizes do que indivíduos tabagistas correntes e tão felizes quanto indivíduos que nunca fumaram[25].

Assim como a qualidade de vida, os níveis de ansiedade e depressão são considerados piores em tabagistas quando comparados com não-tabagistas[20]. A relação causa e efeito do tabagismo e fatores psicossociais é um ponto de discussão na literatura, e interessantemente, um estudo recente concluiu que o tabagismo não pode ser considerado causa de ansiedade e depressão, apesar da prevalência dessas desordens pscicológicas estarem associadas positivamente com o relato de tabagismo[26].

Além da qualidade de vida, ansiedade e depressão, o comportamento de fumar está fortemente relacionado ao stress[23], à capacidade do indivíduo de enfrentar situações problemáticas[23], à chance de consumo de outras substâncias (*eg.* bebidas alcoólicas)[24] e a problemas de saúde mental em geral[24]. Por esses e outros motivos, eesta população tem recebido cada vez mais atenção para tratamentos de cessação tabágica visto que os efeitos deletérios do tabagismo são amplos.

Atingir uma resposta positiva de mudança de comportamento em tabagistas é considerado um desafio, e uma forma simples e cada vez mais utilizada para se estudar esta mudança é por meio do modelo transteórico[27-29], que foi desenvolvido com o objetivo de promover ou parar um determinado tipo de comportamento através de estágios de mudança. Para isso, as características diferenciadas dessa população devem ser levadas em consideração, e portanto, necessitam ser investigadas[23].

2.3 TABAGISMO E INATIVIDADE FÍSICA

Um importante estudo de Garcia-Aymerich et al.[11] mostrou que, em tabagistas, atividade física regular está associada com menor declínio da função pulmonar ao longo do tempo, e consequentemente com menor risco de desenvolvimento de DPOC. Evidências científicas já estabeleceram o conceito de que pacientes portadores de DPOC são significantemente menos ativos fisicamente quando comparados à idosos saudáveis[5-7]. Mais recentemente, foi mostrado que a redução do nível de atividade física de pacientes com DPOC (avaliada por meio de questionários com perguntas retrospectivas) já está presente nessa população mesmo antes do diagnóstico da doença, e uma hipótese dos autores desse estudo foi que o tabagismo pode apresentar efeitos deletérios também na atividade física[13]. No entanto, apesar de diversos estudos que investigam a relação entre atividade física e tabagismo estarem disponíveis na literatura[8, 9], atualmente não se pode afirmar solidamente que tabagistas sem obstrução pulmonar são menos ativos fisicamente do que não tabagistas pois resultados contraditórios ainda são encontrados.

Um estudo brasileiro que se utilizou de estudantes de graduação como amostra[30] mostrou que a inatividade física estava presente na mesma proporção entre tabagistas e não tabagistas, não sendo observada associação entre o tabagismo e a inatividade física dos indivíduos. No entanto, a avaliação de atividade física foi feita por meio do auto-relato (questionários) e além disso, os indivíduos deste estudo eram relativamente jovens. Por outro lado, um estudo que avaliou atividade física na população da China utilizando-se de acelerometria[31] mostrou que os indivíduos tabagistas apresentavam níveis reduzidos de atividade física quando comparados com os não

tabagistas. Porém, nesse estudo os grupos não foram pareados para os principais fatores que influenciam o nível de AFVD, o que não permitiu excluir a presença desses fatores de confusão ao comparar os grupos.

Uma revisão de literatura de Kaczynski et al.,[8] sobre atividade física e tabagismo mostrou que dos 32 estudos incluídos, cerca de 60% encontrou uma correlação negativa entre o hábito de fumar e o nível de atividade física em tabagistas adultos, enquanto que os 40% restantes descreveram não haver correlação ou encontraram correlações positivas. A atividade física de adultos é influenciada por muitos fatores[32], e a diversidade nos resultados desses estudos entre atividade física e tabagismo reflete a necessidade de investigações mais profundas especificamente da população de tabagistas, com metodologias mais acuradas e designs elaborados especificamente para esse objetivo.

2.4 Monitorização Objetiva da Atividade Física na Vida Diária

2.4.1 Atividade Física na Vida Diária

O termo “atividade física” é definido como qualquer movimento corporal produzido pelos músculos esqueléticos que resulta em gasto energético[33], enquanto “atividade física na vida diária (AFVD)” se refere à totalidade de movimentos voluntários produzidos pelos músculos esqueléticos durante atividades cotidianas[34].

Sabe-se que o estilo de vida, incluindo a inatividade física na vida diária, tem um papel importante no desenvolvimento de morbidades e nas taxas de mortalidade de diversas doenças crônicas[35]. Em pacientes com DPOC, o nível de AFVD é o principal preditor de todas as causas de mortalidade da doença[36]. Para a população em geral, especialistas recomendam que sejam realizados, no mínimo, 30 minutos de atividade física de intensidade moderada em pelo menos 5 dias da semana para se obter os benefícios desejados[35]. Devido à importância reconhecida desse tópico, a correta quantificação da AFVD tem recebido cada vez mais destaque no meio científico.

2.4.2 Formas de Quantificar Atividade Física na Vida Diária

A quantificação da AFVD pode ser realizada por meio de questionários, medidas do gasto energético, observação direta e utilização de sensores de movimento[10]. O uso de questionários, apesar de ser o método mais simples, barato e fácil, não é tão acurado e por isso outras formas de

quantificar objetivamente o nível de AFVD tem sido recomendadas[10]. A mensuração de gasto energético pode ser realizada por meio da água duplamente marcada[37, 38] e calorimetria (direta ou indireta)[38, 39], que apesar de serem métodos “padrão ouro”, são relativamente caros e exigem treinamento específico devido a sua manipulação complexa, dificultando sua aplicabilidade. A observação direta é a que reflete da maneira mais próxima do real o nível de AFVD dos indivíduos; porém, este método exige longo tempo para sua realização e invade a privacidade do paciente, o que também dificulta sua aplicação prática[10]. Portanto, é cada vez maior o interesse dos pesquisadores em sensores de movimento, que são instrumentos capazes de detectar os movimentos corporais, e quantificar objetivamente o nível de AFVD.

Atualmente, existem várias opções no mercado de sensores de movimentos e eles são classificados em basicamente dois tipos: acelerômetros ou pedômetros. Os acelerômetros são instrumentos tecnologicamente mais avançados que os pedômetros por serem capazes de registrar a quantidade e a intensidade dos movimentos durante longos períodos de tempo[34]. Acelerômetros são preferíveis para a avaliação da AFVD de pacientes com doenças crônicas que caminham mais lentamente, pois pedômetros podem ser inacurados nessa população[40].

Pedômetros são aparelhos pequenos, leves, portáteis e de baixo custo que quantificam a atividade física realizada por um indivíduo por meio da contagem do número de passos em um determinado período de tempo[10]. Na população adulta, pedômetros são instrumentos validados e acurados[41-43] para a contagem de passos. Considerando-se que caminhar é a forma mais comum de realizar as atividades de intensidade moderada na vida

diária, a utilização de pedômetros para estimar a AFVD por meio da contagem de passos/dia[44] pode ser realizada e indicada para a população adulta.

ARTIGO

REDUCTION OF PHYSICAL ACTIVITY IN DAILY LIFE AND ITS DETERMINANTS IN SMOKERS WITHOUT AIRFLOW OBSTRUCTION

(Aceito para publicação no periódico Respirology)

Karina Couto Furlanetto, PT[1]; Leandro Cruz Mantoani, MSc[1]; Gianna Bisca, PT[1]; Andrea Akemi Morita, PT[1]; Juliana Zabatiero MSc[1]; Mahara Proença, MSc[1]; Demétria Kovelis, MSc[1]; Fabio Pitta, PhD[1].

[1] Laboratory of Research in Respiratory Physiotherapy (LFIP), Departament of Physiotherapy, Universidade Estadual de Londrina (UEL), Londrina, Brazil.

SUMMARY AT A GLANCE:

This is the first study to show that smokers are less physically active than non-smokers matched for the main factors influencing daily physical activity. Significant determinants of daily physical activity objectively assessed in smokers are: functional exercise capacity, fatigue sensation and self-reported motivation/physical activity behavior and cardiac disease.

Corresponding Author:
Prof. Fabio Pitta
Departamento de Fisioterapia – CCS, Hospital Universitário de Londrina
Av. Robert Koch, 60 – Vila Operaria, 86038-350 – Londrina, Paraná, Brazil.
Phone.: +55 43 3371 2288; Fax: +55 43 3371 2459.
E-mail: fabiopitta@uol.com.br

SHORT TITLE: Early physical inactivity in smokers

CONTRIBUTOR STATEMENT

All authors (KCF, LCM, GB, AAM, JZ, MP, DK and FP) contributed to the conception, design, subjects recruitment and data collection of the present study. Analysis and interpretation of data and preparation of manuscript: KCF, FP.

ABBREVIATIONS LIST

COPD: chronic obstructive pulmonary disease

FEV_1: forced expiratory volume in the first second

Mot/Be.PA: motivation / behavior physical activity

6MWT: six-minute walking test

ABSTRACT

Background: In smokers without airflow obstruction, detailed, objective and controlled quantification of the level of physical inactivity in daily life has never been performed. This study aimed to objectively assess the level of physical activity in daily life in adult smokers without airflow obstruction in comparison to a matched sample of non-smokers, as well as to investigate the determinants for daily physical activity in smokers.

Methods: Sixty smokers (aged 50[39-54] years) and 50 non-smokers (aged 48[40-53] years) matched for gender, age, anthropometric characteristics, educational level, employment status and seasons of the year assessment period were cross-sectionally assessed regarding their daily physical activity with a step counter (pedometer Yamax Digiwalker SW-200), besides assessment of lung function, functional exercise capacity, quality of life, anxiety, depression, self-reported comorbidities carbon monoxide level, nicotine dependence and smoking habits.

Results: When compared to non-smokers, smokers walked less in daily life (7923±3558 *vs* 9553±3637 steps/day, respectively), presented worse lung function, functional exercise capacity, quality of life, anxiety and depression ($p<0.05$ for all). Multiple regression analyses identified functional exercise capacity, Borg fatigue, self-reported motivation/physical activity behavior and cardiac disease as significant determinants of number of steps/day in smokers (partial $r^2=0.10$, 0.12, 0.16 and 0.05; $b=15$, -997, 1207 and -2330 steps/day, respectively; overall fit of the model $R^2=0.38$; $p<0.001$).

Conclusions: Adult smokers without airflow obstruction presented reduced level of daily physical activity. Functional exercise capacity, extended fatigue

sensation, aspects of motivation/physical activity behavior and self-reported cardiac disease are significant determinants of physical activity in daily life in smokers.

Key-words: exercise; monitoring; motor activity; smoking; tobacco

BACKGROUND:

The association between physical inactivity and smoking has been increasingly discussed in the literature. Tobacco smoking has been shown to be the most important risk factor for developing chronic obstructive pulmonary disease (COPD)[1,2]. There is also abundant evidence demonstrating that physical inactivity is a feature of COPD[3-5]. Interestingly, a few questionnaire-based studies[6-8] have already shown that physical activity level in smokers is an important factor associated with the disease, even before the diagnosis of COPD,. A landmark cohort study[6] demonstrated that higher levels of regular physical activity are associated with reduced lung function decline and lower risk of developing COPD among smokers. A case-control-study found an inverse association between life-long physical activity and the risk of COPD and breathlessness[7]. Furthermore, it has recently been suggested that the reduction of daily physical activity is the first feature in the time-course development of COPD, and perhaps cigarette smoking had a deleterious effect on physical activity even before the onset of the disease[8]. However, a specific study design comparing objectively measured physical activity of smokers and non-smokers matched for various important factors influencing daily physical activity has not yet been performed.

Despite the importance of this issue, physical activity level and its negative correlation with smoking habits in this ‘at-risk’ population of smokers have been mostly studied with questionnaires to assess daily physical activity[9], while it is known that highly accurate information about daily physical activity is more likely to be obtained with objective assessment than with questionnaires[10]. Walking is the most common form of performing moderate-intensity physical

activity in daily life, and pedometers are valid devices[11-13] which are able to count the number of steps/day and consequently estimate physical activity levels[14].

Therefore, in view of the scarce literature concerning objective assessment of physical activity in daily life to study the deleterious association of decrease in physical activity and smoking, we hypothesized that smokers with not-yet-clinical-nor-spirometrical COPD are less physically active than non-smokers matched for factors known to be possible contributors to the level of physical activity in daily life. The objectives of the present study were (1) to objectively assess the level of physical activity in daily life in adult smokers without airflow obstruction and compare it to non-smokers matched for potential factors influencing physical activity; and (2) to investigate determinants of physical activity level in smokers.

METHODS:

Study design and subjects:

This cross-sectional study included 116 subjects who were evaluated at the Laboratory of Research in Respiratory Physiotherapy from the State University of Londrina (Brazil). Sixty-five smokers without airflow obstruction ($FEV_1/FVC>0.7$)[15] were assessed before being included in an interventional program of physical activity promotion, previously described elsewhere[16]. The inclusion criteria for smokers were: to be a current smoker, aged over 18 years, without lung function impairments and pathological conditions that could impair daily physical activity. Individuals were excluded if they were unable to understand or cooperate during the assessments or if they reported not having worn the pedometer for a minimum of 12 hours per day, during 6 days. A group of 51 non-smokers were recruited and matched for gender, age, anthropometric characteristics, educational level, employment status and seasons of the year in which the assessment period was undertaken. They should have never been smokers or been exposed to passive smoking. The study was approved by the institution's Ethics in Research Committee and patients' data and information were kept confidential.

Assessments:

Physical activity in daily life was assessed using a pedometer Yamax Digiwalker SW-200 (Yamax Inc., Japan)[11-13]. All subjects were asked to wear it for 6 consecutive days, from Sunday to Friday. The average step count of the 6 days was calculated and for analysis purposes, the smokers' group was subdivided into physically active or inactive subgroups according to their

physical activity level (≥8000 or <8000 steps/day, respectively)[14,17]. Additionally, the profile of physical activity was expressed based on the five classifications proposed by Tudor-Locke[18] according to the number of steps/day: sedentary, low active, somewhat active, active and high active (Supporting Information).

A simple question about self-reported motivation and physical activity behavior (scale 1–5) was also applied. The question was an adaptation of a previously proposed 5-stage categorization[19-21] (Supporting Information). As for the results of this study, this question is from now on referred as motivation/behavior physical activity (Mot/Be.PA).

Besides the assessment of physical activity in daily life and self reported Mot/Be.PA, all participants underwent assessment of lung function (spirometry), exercise capacity (6-minute walk test, 6MWT), health related quality of life (36-Item Short Form Health Survey, SF-36), anxiety (State-Trait Anxiety Inventory, STAIT-T), depression (Beck Depression Inventory, BDI), self-reported comorbidities and medication use. For smokers, expired carbon monoxide level, smoking habits and nicotine dependence (Fagerström Tolerance Questionnaire) were also assessed. Specific details are provided in the Supporting Information.

Statistical Analysis:

The statistical software SPSS Statistics 17.0 was used. Normality in data distribution was checked with the Kolmogorov-Smirnov test. Data was expressed as mean (standard deviation) or median [interquartile range 25–75%]. For continuous variables, unpaired *t*-test or Mann-Whitney test were used to compare smokers and non-smokers or the subgroups of physically active or inactive smokers. For categorical variables, the Chi-square test was used to

compare groups and to compare the proportion of subjects classified according to physical activity level[18]. Pearson's or Spearman's coefficients were used to analyze correlations. Variables that were significantly related to the number of steps/day in the single correlation (continuous variables) or showed significant differences in the number of steps/day between categories (dichotomous variables) were selected to be included in the multivariate model. Multiple stepwise regression was performed to identify independent contributors to the variance in daily activity of smokers. A $p<0.05$ was set for statistical significance.

RESULTS:

Profile of physical activity in smokers and comparison with non smokers

Five smokers and one non-smoker were excluded from the study because they did not complete the physical activity assessment; therefore, 60 smokers and 50 non-smokers were included in the analysis. Smokers and non-smokers were matched for potential factors known to be possible contributors to level of physical activity in daily life. These factors were: gender, age, anthropometric characteristics, educational level, employment status and season of the year in which the assessment period was undertaken (Table 1). Besides presenting worse lung function, exercise capacity, quality of life and symptoms of anxiety and depression, smokers also walked less than non-smokers in daily life (Table 2 and Figure 1).

The pattern of physical activity in daily life of the smokers and non-smokers groups, based on the classification proposed by Tudor-Locke[18], is shown in Figure 2. When comparing physically inactive (n= 34) and active (n= 26) smokers (cutoff of 8000 steps/day), despite the fact that the average distance achieved in the 6MWT was not significantly different between the subgroups (565±74 *vs* 584±69 meters, respectively; p=0.39), there were statistical differences in fatigue both immediately after the test (BORG scores: 2.5 [0-3.25] *vs* 0.5 [0-2], respectively; *p*=0.03) and at 2 minutes of recovery after the end of the test (0.75 [0-2] vs 0 [0-0.13], respectively; *p* <0.008), i.e., physically inactive smokers reported a higher perceived exertion of fatigue than physically active smokers. No other inter-group differences were found.

Self-reported comorbidities and medication use

The proportion of smokers and non-smokers with self-reported comorbidities is presented in Table 3. In general, smokers reported more comorbidities than non-smokers, although with no statistically significant differences except for stable cardiac disease. Thirty smokers (50%) reported daily medication use against 21 non-smokers (42%) (p=0.44).

Determinants of physical activity behavior in smokers

Based on the results of single correlation analyses and comparisons between different levels of dichotomous variables, the following five parameters were included in the multivariate model: BMI (r=-0.29); distance achieved in the 6MWT (meters) (r=0.31); Borg fatigue scale's score 2 minutes after the end of the 6MWT (or extended fatigue)(r=0.32), self-reported Mot/Be.PA (r=0.31) and cardiac disease (r=-0.29). Gender, age, season of the year in which assessment period was undertaken, educational level, employment status, lung function, nicotine dependence, smoking habits, anxiety, depression and quality of life were not significantly related to number of steps/day in this sample and therefore were not included in the multivariate analysis. The model of stepwise multiple regression showed that distance achieved in the 6MWT, extended fatigue, self-reported Mot/Be.PA and cardiac disease emerged as significant determinants of daily number of steps. Altogether, these variables explained 38% of the variance in the number of steps/day achieved by smokers (adjusted R^2=0.378; p<0.001). Beta coefficients, 95% confidence interval, part correlation and statistical significance are shown in Table 4. Multiple regression analyses including the other factors that were hypothesized to be related to physical

activity were also performed (Supporting Information and Table S1); however, the same four variables remained as the significant ones in the regression model (adjusted R^2=0.377). Finally, the sample was pooled (smokers and non-smokers), and FEV_1 and smoking status (yes/no) were included in the regression model; as a result, steps/day was significantly explained only by being a smoker (*b*=-1730 steps; *p*=0.01; adjusted R^2=0.05).

DISCUSSION

To our best knowledge, this is the first study that has demonstrated a reduction in the objectively measured level of physical activity in daily life of adult smokers compared with matched non-smokers. It is also the first study to outline the profile and determinant factors of daily physical activity of smokers without spirometric diagnose of airflow obstruction. Several potential factors of participation in daily activity such as employment status[22], educational level[22, 23], seasonal variation throughout the year[24, 25] and anthropometric characteristics[26, 27] were controlled by having matched non-smoking participants.

The present study has clearly shown that smokers performed significantly less steps/day than non-smokers. Inactivity in smokers is not a surprising finding on itself. Others have used different tools to suggest that smokers are less active in daily life; however, conflicting results are found in the literature[9,28,29]. A Brazilian study[28] involving undergraduate students found that both smokers and non-smokers presented similar pattern of physical inactivity, and no association was found between smoking and physical inactivity. Nevertheless, physical activity level was self-reported and the subjects' age was considerably lower in comparison to the present study. Conversely, a study which assessed physical activity levels of adults with an accelerometer[29] demonstrated that smokers had significantly lower levels of physical activity than their nonsmoking counterparts. However, groups were not matched for the main factors that could influence daily physical activity level. The lack of a matched group of non-smokers might be a source of bias, since differences in potential determinants of physical activity could act as confounding factors.

Further interesting findings from the present study were the differences in exercise capacity, lung function, quality of life, anxiety and depression between the groups of smokers and non-smokers. These results confirmed different aspects of health impairment among smokers and contribute with previous literature findings. It is known that smoking leads to a lifelong reduction in spirometric values such as reduction in FEV_1, which has been associated with increased all-cause mortality in smokers[30]. Furthermore, previous research shows that smokers present peripheral muscle alterations[31], worse exercise tolerance[32], higher levels of anxiety[33] and depression[33] and consequently more impaired quality of life[34] than non-smokers. Pertaining to worse lung function, one could speculate that inactivity among smokers could be due to ventilatory limitation as observed in mild COPD during exercise[35], however, steps/day was not correlated with any spirometric variable and in the regression model with the pooled sample, FEV_1 did not significantly explain steps/day. All these differences between smokers and non-smokers, specifically the novel physical inactivity aspect brought by the present study corroborate previous studies, encouraging not only smoking cessation but also physical activity promotion programs for smokers[6-8,16,36]. Differences between physically active and inactive smokers are discussed in the Supporting Information.

This is potentially the first study which has investigated the determinants of objectively-assessed physical activity in smokers. Exercise capacity, extended fatigue, self-reported Mot/Be.PA and cardiac disease explained 38% of the variability in the number of steps/day performed by smokers. It has been suggested that causal effects of health behavior, such as social and physical environment, are determinants of physical activity while individual-level factors

such as age, sex, health status, self-efficacy, and previous physical activity are only associated with it. Further; although being infrequently assessed[26], the combination of favorable psychosocial and environmental variables should improve prediction of high physical activity level. It is unclear whether functional exercise capacity affects physical activity or the later affects the former. This is a tricky chicken-and-egg situation which deserves further investigation. Identifying exercise capacity as a determinant factor of physical activity in smokers is in line with previous findings in patients with COPD[3]. However, the predictive value of the 6MWT's distance in the regression model was lower in smokers than in patients with COPD (R^2=0.10 and R^2=0.56, respectively). This is likely to occur due to the much more pronounced variability of the number of steps/day in smokers when compared to patients with COPD[37]. As previously discussed, the presence of fatigue sensation assessed by the Borg scale also explained part of the physical activity variance, which might reflect muscle alterations in smokers[31]. Motivation is believed to help individuals to initiate and maintain healthy behavior[38]. Not surprisingly, adults who report higher enjoyment and preference for physical activity have been shown to report higher levels of activity[39]. This study demonstrated that Mot/Be.PA was another independent determinant of physical activity. However, our assessment of motivational and behavioral aspects was limited to a simple question based on the trans-theoretical model of readiness to change, developed to investigate change in health behavior[19, 20]. Finally, cardiac disfunction is also recognized as a determinant of physical inactivity in patients with COPD[40]; moreover, the association between cardiovascular disease, smoking and physical inactivity

may be present in adult smokers[41]. Therefore, the fact that cardiovascular comorbidity determines physical activity in smokers is not surprising.

Despite our efforts, some limitations are found in the study. Variables that could explain part of the variance in daily physical activity of smokers have not been assessed, such as ethnicity, food intake behavior and marital status. However, as the groups were recruited from the same region and matched by age and educational level, we do not believe that there are marked differences between the groups in these outcomes. Further, the addition of single-breath diffusing capacity for carbon monoxide (DLCO) could have provided useful information to the intergroup results' interpretation[42]. Finally, self-reporting of comorbidities could also be considered a limitation. However, this method of reporting comorbidities is largely used and was the same in the two present groups. Therefore, an eventual underreport would happen in both groups. Furthermore, comorbidities are related to physical activity even considering certain degree of misclassification, justifying their investigation as determinants of physical activity.

CONCLUSION

In summary, smokers with no spirometric diagnosis of airflow obstruction presented a reduced level of daily physical activity and worse exercise capacity, lung function, anxiety, depression and quality of life in comparison to matched non-smokers. Functional exercise capacity, extended fatigue sensation, aspects of motivation/physical activity behavior and self-reported cardiac disease are significant determinants of daily physical activity in smokers.

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TABLE 1: Characteristics of the subjects matched for potential factors known to be possible contributors to physical activity.

	Smokers (n=60)	**Non-smokers (n=50)**
Gender, M/F (%)	24/36 (40/60)	19/31 (38/62)
Age, years	50 [39-54]	48 [40-53]
BMI, $kg.m^2$	25 [22-29]	26 [24-29]
Educational level, CU/IU/CHS/IHS/CMS/IMS (%)	24/5/19/3/5/3 (40/8/32/5/8/5)	20/8/16/1/4/0 (40/16/32/2/8/0)
Employment status, FE/S/H/R (%)	41/2/13/4 (68/3/22/7)	34/1/10/5 (68/2/20/10)
Seasons of the year, SS/AW (%)	31/29 (52/48)	29/21 (58/42)
Initiation of smoking, years	16 [14-19]	-
Cigarettes/day	20 [11-24]	-
Pack-years	23 [15-43]	-
Nicotine dependence	5 [3-7]	-

The values of categorical variables were described as frequency (percentage) as well as the numeric variables were described as median [interquartile range 25-75%] according to the normality in data distribution. M/F: Male/Female; BMI: Body Mass Index; CU or IU: Complete or Incomplete University, CHS or IHS: Complete or Incomplete High School, CMS or IMS: Complete or Incomplete Middle School; FE: Formally Employed; S: Student; H: Housewife; R: Retired; SS: assessed on Summer or Spring; AW: assessed on Autumn or Winter. Nicotine dependence: Fagerström Tolerance Questionnaire to nicotine dependence level (score 0-10). There were no differences between the groups ($p > 0.05$ for all).

TABLE 2: Comparison between the groups concerning the measurements of physical activity, functional exercise capacity, expired carbon monoxide level, lung function, health-related quality of life, anxiety and depression.

	Smokers (n=60)	**Non-smokers (n=50)**
Steps/day	7923 ± 3558 *	9553 ± 3637
6MWT, meters	574 ± 72 *	631 ± 64
6MWT, %pred	84 ± 9 *	93 ± 8
COexh, level	3 [2-5] *	1 [1-1]
COexh, ppm	18[13-30] *	6 [6-6]
COexh, %COHb	3.6 [2.6-5.4] *	0.8 [0.8-0.8]
Spirometry		
FVC, liters	3.18 [2.7-4.1]	3.43 [2.9-4.2]
FVC, % pred	86 ± 13 *	95 ± 14
FEV_1, liters	2.6 [2.3-3.3] #	3 [2.5-3.6]
FEV_1, %pred	91 [78-97] *	99 [92-105]
FEV_1/FVC	83 ± 6 *	85 ± 5
FEF_{25-75}, l/s	3.1 ± 1.1 *	3.5 ± 0.9
FEF_{25-75}, %pred	104[116-143] *	116 [99-131]
MVV, l/min	114 ± 35 *	133 ± 41
MVV, % pred	91 ± 21 *	100 ± 21
PEF, l/s	6.5 [5.2-8.8] #	6.9 [5.9-9.9]
PEF, % pred	79 ± 15 *	91± 12
HRQoL Questionnaire		
Physical functioning	90 [75-95] *	95 [85-100]
Physical Role	100 [75-100] *	100 [100-100]
Bodily pain	72 [51-84] *	74 [62-100]
General health	72 [57-82] *	87 [77-92]
Vitality	65 [45-80] *	78 [70-85]
Social role functioning	87 [50-100] *	100 [88-100]
Emotional role functioning	100 [33-100] *	100 [92-100]
Mental Health	64 [44-84] *	84 [76-92]

Anxiety Questionnaire STAIT-T	39 [32-49] *	33 [30-40]
Depression Questionnaire BDI	10 [5-17] *	4 [2-8]

The values were described as mean ± standard deviation or median [interquartile range 25-75%] according to the normality in data distribution. 6MWT: Six minute walking test; COexh: Carbon Monoxide Level in the exhaled air; COHb: Carboxyhemoglobin; FVC: Forced Volume Capacity; FEV_1: Forced expiratory volume in the first second; FEF: Forced Expiratory Flow; MVV: Maximum Voluntary Ventilation; PEF: Peak Expiratory Flow; HRQoL: Health Related Quality of Life; STAIT-T: State-Trait Anxiety Inventory; BDI: Beck Depression Inventory. * $p < 0.05$ in comparison to non-smokers; $^{\#}$ $0.05 < p < 0.1$ in comparison to non-smokers.

TABLE 3: Self-reported comorbidities and comparison between smokers and non-smokers.

Comorbidities	**Smokers (n=60)**	**Non-smokers (n=50)**	***p*-value**
Systemic Hypertension	11 (19%)	5 (10%)	0.28
Arthritis	6 (10%)	4 (8%)	0.75
Peripheral Vascular Disease	8 (14%)	3 (6%)	0.34
Stable Cardiac Disease	8 (14%)	1 (2%)	0.04
Diabetes Mellitus	5 (8%)	3 (6%)	0.72
Osteoporosis	2 (3%)	1 (2%)	1.00
Thyroid Disorders	4 (7%)	2 (4%)	0.68
Allergy	25 (41%)	13 (27%)	0.16

The values were described as frequency (percentage). The total number of subjects reporting any comorbidities in each group were 41 (68%) of smokers and 25 (50%) of non-smokers. The median [interquartile range 25-75%] of the number of comorbidities for the subjects reporting comorbidities in each group were 1 [1-2] of smokers and 1 [1-2] of non-smokers ($p = 0.13$).

TABLE 4: Multiple regression analysis with the number of steps/day as the dependent variable.

	Unstandardized coefficients (B)	Std. Error	Standardized coefficients (Beta)	95% CI for B	*p*-value	Part correlation
Constant	5672.061	981.471		3704.331 to 7639.790		
Mot/Be PA[a]	1206.742	321.107	0.394	562.962 to 1850.523	0.001	0.389
Extended Fatigue[b]	-997.224	317.379	-0.334	-1633.530 to -360.919	0.003	-0.325
6MWT (m)[c]	15.293	5.264	0.309	4.704 to 25.845	0.005	0.301
Cardiac Disease[d]	-2329.705	1103.121	-0.226	-4541.329 to -118.082	0.039	-0.219

[a] Mot/Be PA = Answers about Motivation and Physical Activity Behavior (score 1 – 5). [b] Extended Fatigue: Borg scale of fatigue after 2 minutes of recovery of the 6MWT (score 0 – 10). [c] Walking distance in the six minute walking test (meters).[d] Self-reported cardiac disease (yes/no). Partial r^2=0.16, 0.12, 0.10 and 0.05, respectively. Overall fit of the model R^2=0.378; p<0.001. Based on the results of single correlation analyses (Pearson or Spearmam Coefficient) the following five parameters were entered into the multivariate model with r = BMI: -0.29; 6MWT (meters): 0.31; Borg fatigue scale 2 minutes after the end of the 6MWT: 0.32, self-reported Mot/Be.PA: 0.31; Cardiac Disease: -0.29. Continuous variables (BMI and 6MWT) were centered.

FIGURE LEGENDS:

FIGURE 1: Number of steps/day in smokers and non-smokers. Error bar with the mean score and 95% confidence interval (95% CI) for both groups. Smokers: 7923 (7004-8842); Non-smokers: 9553 (8520-10587) steps/day. *p = 0.02.

FIGURE 2: Profile of physical activity in daily life of smokers and non-smokers. Sed = Sedentary: <5000 steps/day; L. Act. = Low Active: between 5000 and 7499 steps/day; Sw-Act. = Somewhat Active: between 7500 and 9999 steps/day; Act = Active: between 10000 and 12499 steps/day; High Active: >12500 steps/day. *p<0.05 between the proportion of Low-Active subjects in the groups of smokers (32%) and non-smokers (14%).

FIGURE 1

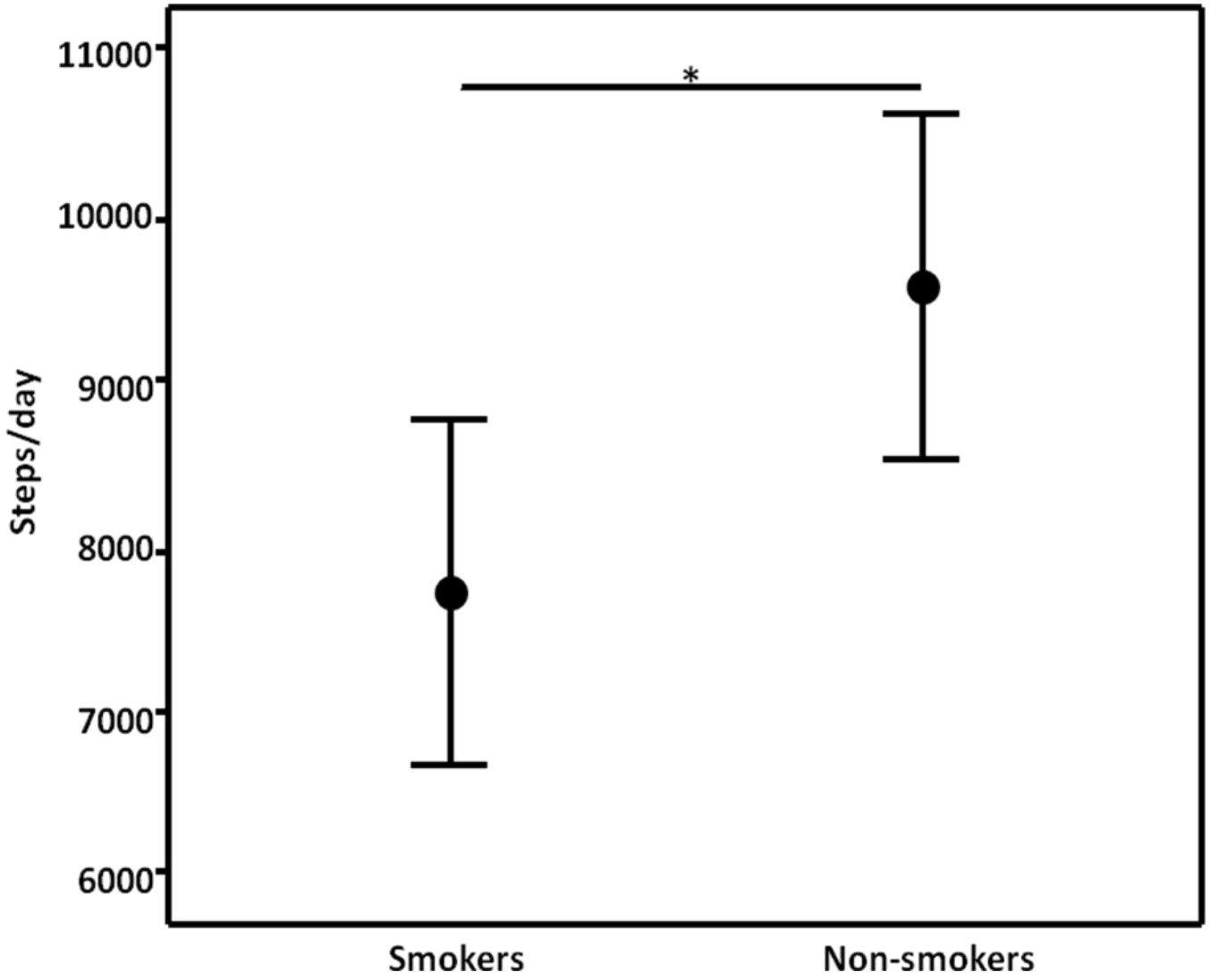
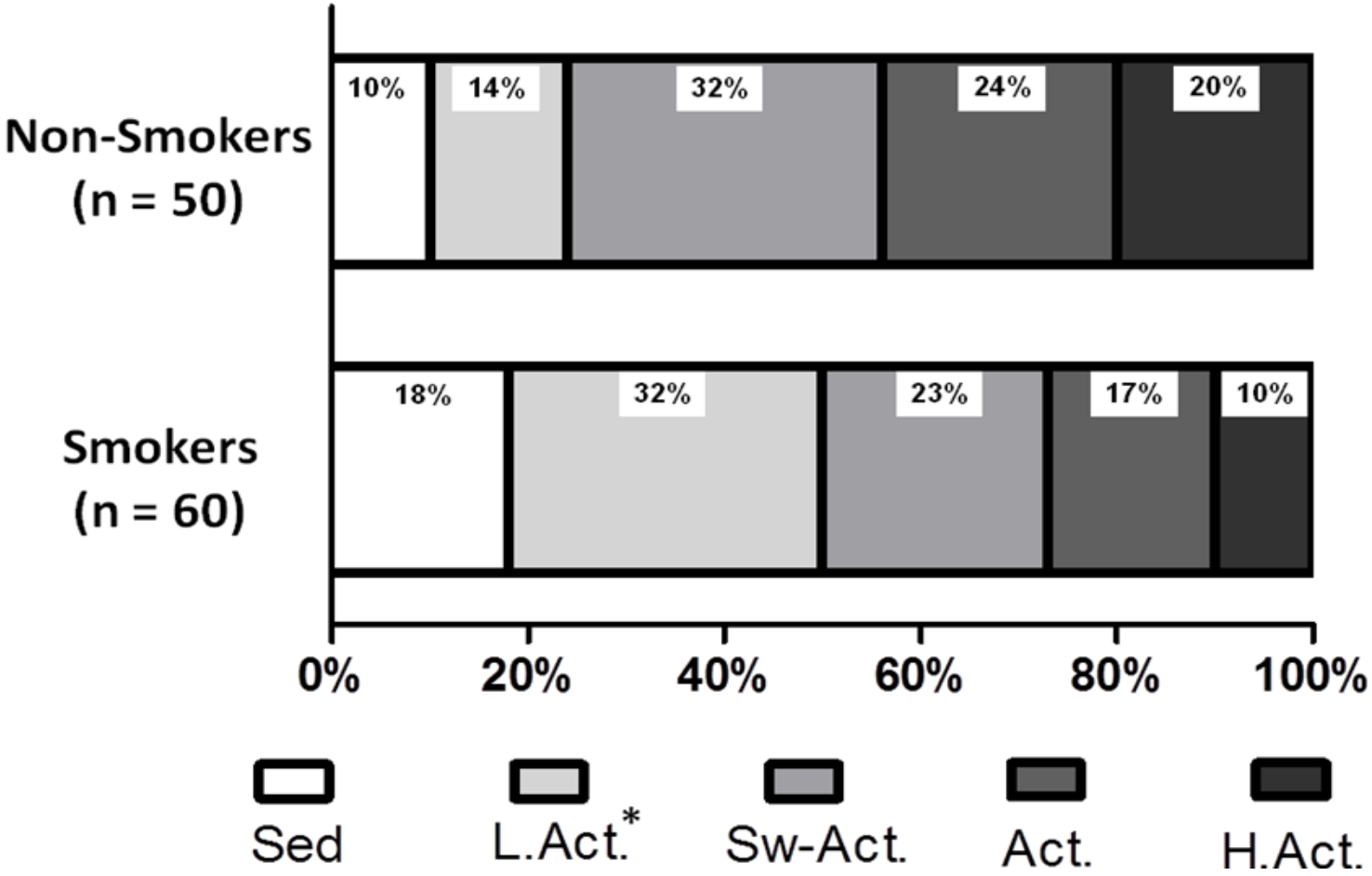

11000
10000
9000
8000
7000
6000
Steps/day
*
Smokers
Non-smokers

FIGURE 2


Non-Smokers
(n = 50)
10%
14%
32%
24%
20%
Smokers
(n = 60)
18%
32%
23%
17%
10%
0%
20%
40%
60%
80%
100%
Sed
L.Act.*
Sw-Act.
Act.
H.Act.

SUPPORTING INFORMATION

METHODS:

Study design and subjects:

In this cross-sectional study, 116 subjects who were evaluated at the Laboratory of Research in Respiratory Physiotherapy from the State University of Londrina (Brazil) were included. Sixty five smokers with normal lung function were assessed before their inclusion in an intervention program of physical activity promotion, which is an unrelated study previously described elsewhere[1]. The sample recruitment was performed by the announcement of a free evaluation of daily physical activity in our laboratory. Television, radio and magazine advertisements were aired, as well as pamphlets and notice boards were placed in various bus stations and health units in order to advertise this study for the population of Londrina. Fifty-one non-smokers with the same characteristics of the smokers were recruited for this study. They were relatives of employees or students of the hospital. The inclusion criteria for smokers were: to be a current smoker, aged over 18 years, without lung function impairments (normal spirometry) and without any pathological condition that could impair their physical activity in daily life. Individuals were excluded if they were unable to understand or cooperate during the assessments or if the subject reported not having worn the pedometer for the whole day during the 6 days. The sample of non-smokers followed the same criteria of the smokers group, however, they should have never been smokers or in a passive smoking condition, which was confirmed by the expired monoxide carbon assessment. The non-smokers sample was also a convenience sample, which was matched with the smokers group for gender, age, anthropometrics characteristics, educational level, employment status and seasons of the year' assessment

period. All subjects signed an informed consent and the study was approved by the institution's Committee of Ethics in Research (Universidade Estadual de Londrina/Brazil: 007/07).

Assessments:

All participants were assessed regarding physical activity in daily life, lung function, functional exercise capacity, health related quality of life, anxiety, depression, carbon monoxide level in the exhaled air, smoking habits (for smokers) and self-reported comorbidities and medication use. These assessments are described below.

Physical Activity in Daily Life: The pedometer Yamax Digiwalker SW-200 (Yamax Inc., Japan)[2, 3] was used to assess the level of physical activity in daily life for 6 consecutive days, from Sunday to Friday. All participants were instructed to place the device at the right side of the waist, reset it immediately after waking up and remove it when going to bed at night. Additionally, they were instructed to keep up with their usual activities and remove the device only when bathing, showering or swimming. The subjects received a diary with the pedometer where they reported the number of steps/day, the time they started using the device in the morning, the time they removed it at night and for how long and why the pedometer was eventually removed during the day (when this was the case).

Self-reported motivation and physical activity behavior: A simple question about self-reported motivation and physical activity behavior was also applied, in which the participants should choose among the options: 1) I do not practice physical activity and I do not intend to start it; 2) I do not practice physical

activity but I intend to start it; 3) I sometimes practice physical activity but not regularly; 4) I regularly practice physical activity but I have started it in the past 6 months; 5) I have regularly been practicing physical activity for more than 6 months. The current questions towards physical activity of this study were an adaptation of the stages categories proposed by Godin and Shephard[4] and Prochaska et.al. [5]. According to the trans-theoretical model (TTM) of change, a different health behavior can be developed over the time and to progress through the stages. The TTM was developed with the objective to be used in promoting or stopping a certain behavior[4]. Particularly in the present study, the model was used as indicator of smokers to become physically active, which means that it was used as measure of motivation and physical activity behavior. These five stages of change were categorized as pre-contemplation (I do not practice physical activity and I do not intend to start it), contemplation (I do not practice physical activity but I intend to start it), preparation (I sometimes practice physical activity but not regularly), action (I regularly practice physical activity but I have started it in the past 6 months) and maintenance (I have regularly been practicing physical activity for more than 6 months). As for the results of this study, this question is from now on referred as motivation/behavior physical activity (Mot/Be.PA)

Lung Function: Spirometry (SpirobankG, MIR, Italy) was performed in accordance with the American Thoracic Society (ATS)/European Respiratory Society (ERS) guidelines[6]. Reference values were those for the Brazilian population[7].

Functional exercise capacity: The 6-minute walking test (6MWT) was performed in accordance with international standards[8]. Participants were encouraged to

walk 6 minutes as fast as they could in a straight leveled 30-m corridor. Two tests were performed with each subject, and the longest distance was used for the analysis. Borg scale of perceived exertion (fatigue and dyspnea) was evaluated at rest, immediately at the end of the test and with 2 minutes of rest after the test. Normative values were those by Gibbons el at.[9].

Health related quality of life: The Portuguese validated version of the Medical Outcomes Study 36 - Item Short Form Health Survey (SF-36)[10], was used to evaluate different domains of health-related quality of life (HRQoL). The SF-36 questionnaire is a generic, multidimensional instrument, easily applied and understood, consisting of 36 items, divided in 8 domains: physical functioning, physical role functioning, bodily pain, general health perception, vitality, social role functioning, emotional role functioning and mental health[11]. The questionnaire presents a score of 0 to 100, where 0 represents the worst and 100 the best general health-related quality of life.

Anxiety: The State-Trait Anxiety Inventory (STAIT-T)[12, 13] was used to assess the level of anxiety. It consists of 20 items and the subject is instructed to answer each item according to a 4-point *Likert* scale: 1 (almost never); 2 (sometimes); 3 (often) and 4 (almost always). A score below 33 points indicates mild anxiety, between 33 and 49 points indicates moderate anxiety and a score over 49 points indicates severe anxiety.

Depression: The Beck Depression Inventory (BDI)[14] was used to assess the level of depression; it consists of 21 items, including symptoms and attitudes, ranging from 0 to 3. The items refer to sadness, pessimism, sense of failure, lack of satisfaction, feelings of guilt, sense of punishment, self-deprecation, self-accusations, suicidal ideas, crying spells, irritability, social withdrawal, lack of

decision, distortion of body image, work inhibition, sleep disturbance, fatigue, loss of appetite, weight loss, somatic preoccupation and decreased libido. Scores lower than 11 points indicates no depression, between 11 and 19 points, mild depression, between 20 and 25 points, moderate depression, and greater than 26 points, severe depression.

Carbon Monoxide Level in the exhaled air (COexh): The Compact Smokerlyzer (Bedfont Scientific LTD, Rochester, Kent, United Kingdom) was used to measure the COexh. It provides an immediate feed-back of smoking status through seven levels of reading. Each level represents a range of ppm and a result equal or above 2 (or 8-10 ppm) indicates that the individual have been exposed to smoke in recent hours[15]. Each participant underwent two assessments, with a 2 minutes interval, in the sitting position with their nostrils occluded. The subjects were instructed to exhale completely, inhale fully and hold the inspiration for 15 seconds. Then, they were instructed to exhale slowly and completely in the device. Smokers performed their assessment after a period of 10 hours of smoking abstinence[15].

Smoking Habits: Smoker subjects were questioned about their smoking habits, *i.e*., time since they initiated smoking and number of cigarettes/day. From these data the number of pack/years was calculated (multiplying the number of total years of smoking by the number of packs smoked per day). The degree of nicotine dependence was also assessed by the Fagerström Tolerance Questionnaire[16, 17]. It is an easily understood and quickly applied instrument which consists of six items. The test scores allows the classification of nicotine dependence into five levels: very low (0-2 points), low (3-4 points), moderate (5 points), high (6-7 points) and very high (8-10 points).

Self-reported comorbidities and medication use: All the participants were questioned about their comorbidities and medication use. Information on these topics was obtained through an interview in which the participants answered a specific questionnaire. The presence or not of systemic hypertension, arthritis, peripheral vascular disease, stable cardiac disease, diabetes mellitus, thyroid disorders, osteoporosis and allergy was assessed. Furthermore, the participants informed the use of any kind of continuous medications, and the dose.

Classification of physical activity in daily life:

The profile of physical activity was expressed based on the five classifications proposed by Tudor-Locke[18], according to the number of steps/day: a) Sedentary: <5000 steps/day; b) Low Active: 5.000-7.499 steps/day; c) Somewhat Active: 7.500-9.999 steps/day; d) Active: 10.000-12.499 steps/day; e) High Active: >12.500 steps/day.

RESULTS

Profile of physical activity in smokers

The comparison between smokers and non-smokers regarding the above described 5 classifications of physical activity showed that the smokers group has a more pronounced inactive profile. The largest portion of smokers (32%) walked between 5000 and 7500 steps/day in average, while the largest portion of the non-smokers (32%) walked between 7500 and 10000 steps/day in average. In addition, the proportion of “Low Active” subjects among smokers (32%) was significantly higher than among non-smokers (14%) (*p=0.04)*.

Determinant factors of physical activity in smokers

Regarding the determinants of physical activity in smokers, multiple regression was performed as described in the main text: taking into consideration the results of single correlation analyses or comparisons between different levels of dichotomous variables, the following variables were categorized (dichotomized) and there were also no significant associations to justify their inclusion in the regression model: gender (p=0.2), educational level (p=0.5), season of the year (p=0.7) and employment status (p=0.9).

Due to their correlation with steps/day, BMI (r=-0.29); distance achieved in the 6MWT (meters) (r=0.31); Borg fatigue scale score at 2 minutes after the end of the 6MWT (or extended fatigue) (r=0.32), self-reported Mot/Be.PA (r=0.31) and the presence of self-reported cardiac disease (r=-0.29) entered the model. The model of stepwise multiple regression showed that exercise capacity, extended fatigue, self-reported Mot/Be.PA and self-reported cardiac disease emerged as significant determinants of daily steps and explained 38.%

of the variance in the number of steps/day achieved by smokers (adjusted R^2 = 0.378; *p*<0.001). Beta coefficients, 95% confidence interval, part correlation and significance are shown in Table 4 of the main text.

We have also calculated the walkwork (m x kg) and included this variable in the regression model together with the other variables previously described; however, walkwork was not statistical significant (p=0.32) in the regression model and the overall fit of this new model was adjusted R^2=0.29, therefore weaker than the adjusted R^2 with those variables included in the main text of the article (BMI, distance achieved in the 6MWT, Borg Fatigue, Mot/Be.PA and cardiac disease, adjusted R^2=0.38).

As a last step, we also performed a multiple regression analyses with the 5 correlated variables previously mentioned and the others variables known to be possible factors correlated with physical activity according to previous studies [19-24], For this regression model, the following variables were entered: (1) BMI, (2) 6MWT (meters), (3) extended fatigue (4) self-reported Mot/Be.PA, (5) self-reported cardiac disease, (6) gender, (7) season of the year, (8) age, (9) educational level and (10) social-economical status. Once again, only 6MWT (meters), extended fatigue, self-reported Mot/Be.PA and self-reported cardiac disease explained the variance in steps/day in smokers (adjusted R^2 = 0.373). Beta coefficients, 95% confidence interval, part correlation and significance are shown in Table S1.

TABLE S1: Multiple regression analysis with the number of steps/day as the dependent variable and the following variables as independent variables: (1) BMI, (2) 6MWT (meters), (3) Borg fatigue scale 2 minutes after the end of the 6MWT (4) self-reported Mot/Be.PA, (5) self-reported cardiac disease, (6) gender, (7) season of the year, (8) age, (9) educational level and (10) social-economical status.

	Unstandardized coefficients (B)	**Std. Error**	**Standardized coefficients (Beta)**	**95% CI for B**	***p*-value**	**Part correlation**
Constant	5505.278	1006.209		3487.079 to 7523.477		
Mot/Be PA[a]	1244.782	326.389	0.408	590.130 to 1899.435	0.001	0.400
Extended Fatigue[b]	-960.724	321.868	-0.323	-1606.309 to -315.139	0.004	-0.313
6MWT (m)[c]	15.266	5.325	0.306	4.586 to 25.947	0.006	0.301
Cardiac disease [d]	-2482.227	1186.990	-0.228	-4863.028 to -101.426	0.041	-0.219

[a] Mot/Be PA = Answers about Motivation and Physical Activity Behavior (score 1 – 5). [b] Extended Fatigue: Borg scale 2 minutes after the end of the 6MWT (score 0 – 10). [c] Walking distance in the six minute walking test (meters). [d] Self-reported cardiac disease (yes/no). Partial r^2=0.17, 0.10, 0.09 and 0.05, respectively. Overall fit of the model R^2=0.373 p<0.001. Continuous variables (BMI, 6MWT and age) were centered.

DISCUSSION

Comparison between physically active and inactive smokers

It is known that physically active smokers do not walk significantly further in the 6MWT than physically inactive smokers[1] although walking distance is statistically higher among physically active patients with COPD than physically inactive patients[25]. It is also known that there is a potential ceiling effect in the 6MWT regarding healthy people, although this is not prominent for patients with moderate-severe COPD. Interestingly, the present study found that physically inactive smokers report a higher score of fatigue after the 6MWT when compared with physically active smokers. A growing body of evidence support the direct toxicity of cigarette smoke on peripheral muscles in smokers even without COPD[26]. Additionally, it has been suggested that quadriceps wasting was independently associated with physical inactivity in patients with COPD in GOLD 1 stage[27]. However, the relation between peripheral muscle dysfunction and physical inactivity in smokers without airway obstruction was not yet explored in depth and more studies are needed to understand this mechanism.

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CONCLUSÃO GERAL

Tabagistas sem diagnóstico espiromtétrico de obstrução ao fluxo aéreo apresentam nível de atividade física na vida diária reduzido, pior capacidade de exercício, função pulmonar, ansiedade, depressão e qualidade de vida em comparação a não-tabagistas pareados. Capacidade funcional de exercício, sensação prolongada de fadiga, aspectos de motivação e comportamento de atividade física e doenças cardíacas são fatores determinantes significantes da atividade física em tabagistas.

Os achados deste estudo, especificamente sobre o menor nível de atividade física na vida diária em tabagistas quando comparados com não-tabagistas contribuem solidamente com informações relevantes para propostas de intervenções destinadas a esse público.

O entendimento sobre uma eventual relação causa e efeito entre tabagismo e inatividade física na vida diária ainda não está elucidado. Estudos longitudinais precisam ser desenvolvidos para identificar o real impacto do tabagismo no nível de atividade física e suas repercussões na saúde geral dos indivíduos.

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APÊNDICE A

Diário de Controle do Uso do Pedômetro

	DIA 1 _____	DIA 2 _____	DIA 3 _____	DIA 4 _____	DIA 5 _____	DIA 6 _____
Horário de Colocada (h: min)						
Número no visor **(manhã)**						
Horário de Retirada (h: min)						
Número no visor **(noite)**						
Tempo que retirou (banho, piscina,etc						
Obs						

LEMBRE: NÃO MUDE SUA ROTINA!

Departamento de Fisioterapia
Laboratório de Pesquisa em Fisioterapia Pulmonar

MANUAL DE INFORMAÇÕES

SOBRE O USO DO PEDÔMETRO

(Yamax DigiWalker® modelo SW200)

DIÁRIO DE
ATIVIDADE FÍSICA BASAL

Nome: _____

Data de Entrega: _____

Data do Retorno: _____

INSTRUÇÕES PARA O USO DO PEDÔMETRO

Prezado participante,

Este manual contém informações sobre o uso do **pedômetro,** um equipamento utilizado para quantificar o número de passos realizados por um indivíduo ao executar suas atividades diárias. A quantificação do número de passos permite saber se o indivíduo é suficientemente ativo para manter um estilo de vida saudável.

Muito obrigado por sua participação nesse estudo. Para que o estudo tenha sucesso, por favor, leia com atenção as instruções a seguir:

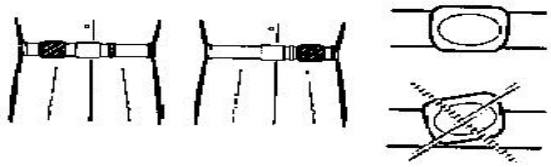
- O(a) senhor(a) irá usar o pedômetro por **6 dias consecutivos**;
- **Todas as manhãs** coloque o aparelho na cintura e **zere** o número no visor do pedômetro, utilizando o botão amarelo "reset" do aparelho;
- Retire o aparelho ao final do dia, quando for dormir, e **anote o número no visor;**
- **Somente** retire o pedômetro quando o(a) senhor(a) for tomar banho;
- **O pedômetro não pode ser molhado!**
- Não se esqueça de realizar as **anotações** no dia específico no diário;
- **Não mude seu padrão** normal diário de atividades e tente manter suas atividades o mais próximo do normal;
- Fique atento para a data de retorno.

Em caso de dúvida ou problema, favor entre em contato com:

Laboratório de Pesquisa: (43): 3371-2477

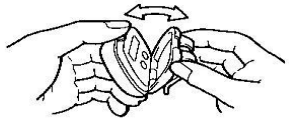
Como colocar o pedômetro?

Utilize o clipe para prender o pedômetro no cinto, calças ou saias, na altura da cintura. O pedômetro deve ficar do lado **direito** e alinhado com o joelho. Certifique-se que o pedômetro está bem preso. Preste atenção para que a palavra "Digiwalker" não esteja de ponta cabeça. Para ter certeza do posicionamento correto do aparelho, compare com o desenho abaixo.



Como abrir o pedômetro?

Abra o pedômetro apenas quando ele estiver posicionado na cintura, caso contrário, pode danificá-lo.



Anotações no diário:

Anote no diário o horário de colocação e o número que consta no visor do pedômetro **(que deverá ser zero)**. Faça o mesmo à noite, quando retirar o pedômetro. Anote também o tempo que o(a) senhor(a) teve que retirar o pedômetro ao longo do dia. No campo "Observações", anote alguma intercorrência ou atividade incomum que realizou naquele dia (por exemplo, exercício físico mais intenso).

Importante!

- ✓ Posicionar adequadamente o aparelho na cintura;
- ✓ Guardar o pedômetro em lugar seguro;
- ✓ Evitar choques ou peso em cima do aparelho;
- ✓ Evitar molhar o aparelho.

ANEXO A

Questionário de Tolerância de Fagerström

1. Quanto tempo após acordar você fuma seu primeiro cigarro?
a) Dentro de 5 minutos (3)
b) Entre 6 e 30 minutos (2)
c) Entre 31 e 60 minutos (1)
d) Após 60 minutos (0)

2. Você acha difícil não fumar em lugares proibidos como igrejas, bibliotecas, etc?
a) Sim (1) b) Não (0)

3. Qual o cigarro do dia que traz mais satisfação?
a) O primeiro da manhã (1) b) Outros (0)

4. Quantos cigarros você fuma por dia?
a) Menos de 10 (0) _____
b) De 11 a 20 (1) _____
c) De 21 a 30 (2) _____
d) Mais de 31 (3) _____

5. Você fuma mais freqüentemente pela manhã?
a) Sim (1) b) Não (0)

6. Você fuma, mesmo doente, quando precisa ficar de cama a maior parte do tempo?
a) Sim (1) b) Não (0)

Grau de Dependência:
0 - 2 pontos = muito baixo
3 - 4 pontos = baixo
5 pontos = médio
6 - 7 pontos = elevado
8 - 10 pontos = muito elevado

ANEXO B

QUESTIONÁRIO DE QUALIDADE DE VIDA – SF- 36

Instruções: Esta pesquisa questiona você sobre sua saúde. Estas informações nos manterão informados de como você se sente e quão bem você é capaz suas atividades de vida diária. Responda cada questão marcando a resposta como indicado. Caso você esteja inseguro de como responder, tente fazer melhor que puder.

1. **Em geral, você diria que sua saúde é:**
   excelente – 1 / muito boa –2 / boa-3 / ruim-4 / muito ruim-5

2. **Comparada a um ano atrás, como você classificaria sua saúde em geral, agora?**
- Muito melhor agora do que um ano atrás – 1
- Um pouco melhor agora do que um ano atrás – 2
- Quase a mesma de um ano atrás – 3
- Um pouco pior agora do que um ano atrás – 4
- Muito pior agora do que um ano atrás – 5

3. Os seguintes itens são sobre atividades que você poderia fazer atualmente durante um dia comum. Devido a sua saúde, você tem dificuldade para fazer estas atividades? Neste caso, quanto?

Atividades	Sim Dificulta muito	Sim, Dificulta pouco	Não, não Dificulta de modo algum.
A . atividades vigorosas, que exigem muito esforço, tais como correr, levantar objetos pesados, participar te esportes árduos...	1	2	3
B . atividades moderadas, tais como mover uma mesa, passar aspirador de pó, jogar bola, varrer a casa...	1	2	3
C .levantar ou carregar mantimentos	1	2	3
D .subir vários lances de escadas.	1	2	3
E .subir um lance de escada	1	2	3
F .curvar-se, ajoelhar-se ou dobrar-se	1	2	3
G .andar mais que um quilômetro	1	2	3
H .andar vários quarteirões	1	2	3
I . andar um quarteirão	1	2	3
J .tomar banho ou vestir-se	1	2	3

4. **Durante as últimas quatro semanas, você teve algum dos seguintes problemas com o seu trabalho ou com alguma atividade diária regular, como conseqüência de sua saúde física?**

	Sim	Não
A.Você diminuiu a quantidade de tempo que se dedicava ao seu trabalho ou a outras atividades?	1	2
B. Realizou menos tarefas do que gostaria?	1	2
C.Esteve limitado no seu tipo de trabalho ou em outras atividades?	1	2
D.Teve dificuldade de fazer seu trabalho ou outras atividades (p. ex. necessitou de um esforço extra)?	1	2

5. **Durante as últimas 4 semanas, você teve algum dos seguintes problemas com o seu trabalho ou outra atividade regular diária, como conseqüência de algum problema emocional (como sentir-se deprimido ou ansioso)?**

	Sim	Não
A.Você diminuiu a quantidade de tempo que se dedicava ao seu trabalho ou a ouras atividades?	1	2
B .Realizou menos do que você gostaria?	1	2
C. Não trabalhou ou não fez qualquer atividade com tanto cuidado como geralmente faz?	1	2

6. **Durante as últimas 4 semanas, de que maneira sua saúde física, ou problemas emocionais interferiram nas suas atividades sociais normais, em relação à família, vizinhos, amigos ou em grupo?**
   De forma nenhuma-1/ligeiramente-2/ moderadamente-3/ bastante-4 /extremamente-5

7. **Quanta dor no corpo você teve durante as últimas quatro semanas?**
   Nenhuma –1 / muito leve-2 / leve-3 / moderada-4 / grave-5 / muito grave-6

8. **Durante as últimas 4 semanas, quanto a dor interferiu em seu trabalho normal (incluindo tanto o trabalho fora como dentro de casa)?**
   De maneira alguma-1 /um pouco-2 / moderadamente-3 / bastante-4 /extremamente-5

9. **Estas questões são como você se sente, e como tudo tem acontecido com você durante as últimas 4 semanas. Para cada questão, de uma resposta que mais se aproxime da maneira como você se sente.**

	Todo Tempo	A maior parte do tempo	Um boa parte do tempo	Alguma Parte do tempo	Uma Pequena parte do tempo	Nunca
A . quanto tempo você tem se sentido cheio de vigor, cheio de vontade, cheio de força?	1	2	3	4	5	6
B .quanto tempo você tem se sentido uma pessoa muito nervosa?	1	2	3	4	5	6
C .Quanto tempo você tem se sentido tão deprimido que nada pode animá-lo?	1	2	3	4	5	6
D .Quanto tempo você tem se sentido calmo ou tranqüilo?	1	2	3	4	5	6
E .Quanto tempo você tem se sentido com muita energia?	1	2	3	4	5	6
F .Quanto tempo você tem se sentido desanimado e abatido?	1	2	3	4	5	6
G .Quanto tempo você tem se sentido esgotado?	1	2	3	4	5	6
H .Quanto tempo você tem se sentido uma pessoa feliz?	1	2	3	4	5	6
I .Quanto tempo você tem se sentido cansado?	1	2	3	4	5	6

10. Durante as últimas 4 semanas, quanto de seu tempo a sua saúde física ou problemas emocionais interferiram em suas atividades sociais (como visitar amigos, parentes, etc.)?
todo o tempo-1 / a maior parte do tempo-2 / alguma parte do tempo-3/ uma pequena parte do tempo-4 / nenhuma parte do tempo-5

11. O quanto verdadeiro ou falso é cada uma das afirmações para você?

	Definitivamente verdadeiro.	A maioria das vezes verdadeiro	Não sei	A maioria das vezes falsa	Definitivamente falsa
A .Eu costumo adoecer um pouco mais facilmente que as outras pessoas.	1	2	3	4	5
B .Eu sou tão saudável quanto qualquer pessoa que conheço.	1	2	3	4	5
C .Eu acho que a minha saúde vai piorar.	1	2	3	4	5
D .Minha saúde é excelente.	1	2	3	4	5

Pontuação do questionário SF-36.

Questão	Pontuação
01	1=>5.0 2=>4.4 3=>3.4 4=>2.0 5=>1.0
02	Soma normal
03	Soma normal
04	Soma normal
05	Soma normal
06	1=>5 2=>4 3=>3 4=>2 5=>1
07	1=>6 2=>5.4 3=>4.2 4=>3.1 5=.2.2 6=>1
08	Se 8=>1 e 7=>1 ====➔>>>>>6 Se 8=>1 e 7=> 2 a 6 ====➔>>>>>5 Se 8=>2 e 7=> 2 a 6 ====➔>>>>>4 Se 8=>3 e 7=> 2 a 6 ====➔>>>>>3 Se 8=>4 e 7=> 2 a 6 ====➔>>>>>2 Se 8=>5 e 7=>2 a 6 ====➔>>>>>1 Se a questão 7 não foi respondida, o escore da questão 8 passa a ser o seguinte: 1=>6.0 2=>4.75 3=>3.5 4=>2.25 5=>1.0
09	a,d,e,h, = valores contrários (1=6 2=5 3=4 4=3 5=2 6=1) vitalidade = a+e+g+i Saúde Mental = b+c+d+f+h
10	Soma normal
11	a, c = valores normais b,d = valores contrários (1=5 2=4 3=3 4=2 5=1)

Cálculo do raw scale (0 a 100).

	Questão	Limites	Score Range
Capacidade funcional	3 (a+b+c+d+e+f+g+h+ i+j)	10.30	20
Aspectos físicos	4 (a+b+c+d)	4.8	4
Dor	7+8	2.12	10
Estado geral da saúde	1+11	5.25	20
Vitalidade	9 (a+e+g+i)	4.24	20
Aspectos sociais	6+10	2.10	8
Aspectos emocionais	5 (a+b+c)	3.6	3
Saúde mental	9 (b+c+d+f+h)	5.30	25

Raw Scale:
Ex: Item = (valor obtido – valor mais baixo) x 100
Variação

Obs: a questão número 2 não entra no cálculo dos domínios. Dados perdidos: Se responder mais de 50% = substituir o valor pela média.

ANEXO C

Inventário Traço-Estado (IDATE-T) de *Spielberger*

IDATE – ESTADO

Abaixo encontram-se afirmações que as pessoas usam para descreverem a si mesmas. Leia cada uma e faça um círculo ao redor do número que melhor indicar como você geralmente tem se sentido nos últimos dois meses. Não há resposta certa ou errada. Não gaste muito tempo em uma única afirmação e não deixe de preencher nenhuma delas.

Muitíssimo.....4	Um pouco.....2
Bastante 3	Absolutamente não.....1

1. Sinto-me calmo (a).....	1	2	3	4
2. Sinto-me seguro (a)	1	2	3	4
3. Estou tenso (a)	1	2	3	4
4. Estou arrependido (a).....	1	2	3	4
5. Sinto-me à vontade	1	2	3	4
6. Sinto-me perturbado (a)	1	2	3	4
7. Estou preocupado (a) c/ possíveis infortúnios	1	2	3	4
8. Sinto-me descansado (a)	1	2	3	4
9. Sinto-me ansioso (a)	1	2	3	4
10. Sinto- me confortável	1	2	3	4
11. Sinto- me confiante	1	2	3	4
12. Sinto- me nervoso (a).....	1	2	3	4
13. Estou agitado (a)	1	2	3	4
14. Sinto- me uma pilha de nervos.....	1	2	3	4
15. Estou relaxado (a).....	1	2	3	4
16. Sinto-me satisfeito (a)	1	2	3	4
17. Estou preocupado (a).....	1	2	3	4
18. Sinto-me super excitado (a) e confuso (a).....	1	2	3	4
19. Sinto-me alegre.	1	2	3	4
20. Sinto-me bem....	1	2	3	4

ESTÁGIO ATUAL:

ESTÁGIO PRÉVIO:

_____

IDATE – TRAÇO

Leia cada pergunta e faça um círculo ao redor do número à direita que melhor indicar como você geralmente se sente. Não gaste muito tempo numa única afirmação, mas tente dar a resposta que mais se aproximar de como você se sente geralmente.

Quase sempre..... 4 Às vezes.....2
Freqüentemente .....3 Quase nunca.....1

1... Sinto-me bem.....1 2 3 4
2. Canso-me facilmente 1 2 3 4
3. Tenho vontade de chorar 1 2 3 4
4. Gostaria de poder ser tão feliz quanto os outros parecem ser 1 2 3 4
5. Perco oportunidades porque não consigo tomar decisões rapidamente.....1 2 3 4 .
6. Sinto-me descansado.....1 2 3 4
7. Sinto-me calmo (a), ponderado (a) e senhor (a) de mim mesmo (a) 1 2 3 4
8. Sinto que as dificuldades estão se acumulando de tal forma que não consigo resolver 1 2 3 4
9. Preocupo-me demais com coisas sem importância.....1 2 3 4
10. Sou feliz 1 2 3 4
11. Deixo-me afetar muito pelas coisas.....1 2 3 4
12. Não tenho muita confiança em mim mesmo (a) 1 2 3 4
13. Sinto-me seguro (a).....1 2 3 4
14. Evito ter que enfrentar crises ou problemas 1 2 3 4
15. Sinto-me deprimido (a).....1 2 3 4
16. Estou satisfeito (a).....1 2 3 4
17. Às vezes idéias sem importância me entram na cabeça e ficam me preocupando 1 2 3 4
18. Levo os desapontamentos tão a sério que não consigo tira-los da cabeça.....1 2 3 4
19. Sou um pessoa estável 1 2 3 4
20. Fico tenso (a) e perturbado (a) quando penso em meus problemas do momento.....1 2 3 4

ANEXO D

Inventário de Depressão de *Beck*

Este questionário consiste de 21 grupos de afirmações. Por favor, leia cada uma delas e faça um círculo em volta do número com afirmação que melhor descreve como você se sentiu na última semana, incluindo hoje. Se mais do que uma afirmação dentro de um grupo se aplicar, circule cada uma. Certifique-se de ter lido todas as afirmativas, antes de fazer sua escolha.

1.
0.Não me sinto triste
1.Sinto-me triste
2.Sinto-me triste o tempo todo e não consigo sair disto
3. Estou tão triste e infeliz que não posso agüentar

2.
0. Não estou particularmente desencorajado quanto ao futuro
1. Sinto-me desencorajando quanto ao futuro
2. Sinto que não tenho nada pelo que esperar
3. Sinto que o futuro é sem esperança e que as coisas não podem melhorar

3.
0. Não me sinto fracassado
1. Sinto que falhei mais que o indivíduo médio
2. Quando olho para trás em minha vida tudo o que vejo é uma série de fracassos
3. Sinto que sou um fracasso completo como pessoa

4.
0. Tenho tanta satisfação como costumava ter
1. Não consigo gostar das coisas da maneira como costumava gostar
2. Não consigo sentir mais satisfação com coisa alguma
3. Estou insatisfeito ou entediado com tudo

5.
0. Não me sinto particularmente culpado
1. Sinto-me culpado boa parte do tempo
2. Sinto-me culpado a maior parte do tempo
3. Sinto-me culpado o tempo todo

6.
0. Não sinto que esteja sendo punido
1. Sinto que posso estar sendo punido
2. Espero ser punido
3. Sinto estar sendo punido

7.
0. Não me sinto desapontado comigo mesmo
1. Sinto-me desapontado comigo mesmo
2. Sinto-me aborrecido comigo mesmo
3. Eu me odeio

8.
0. Não sinto que seja pior que qualquer pessoa
1. Critico minhas fraquezas ou erros
2. Culpo-me o tempo todo por minhas falhas
3. Culpo-me por todas as coisas ruins que acontecem

9.
0. Não penso em suicídio
1. Tenho pensamentos de me matar mas não os levaria adiante
2. Gostaria de me matar
3. Eu me mataria se tivesse oportunidade

10.
0. Não costumo chorar mais que o habitual
1. Choro mais agora do que costumava fazer
2. Atualmente choro o tempo todo
3. Eu costumava conseguir chorar, mas não consigo, mesmo que queira

11.
0. Não me irrito mais agora que em qualquer outra época
1. Fico molestado ou irritado mais facilmente do que costumava
2. Atualmente sinto-me irritado o tempo todo
3. Eu costumava conseguir chorar, mas não consigo, mesmo que queira

12.
0. Não perdi o interesse nas outras pessoas
1. Interesso-me menos do que eu costumava
2. Perdi a maior parte do meu interesse nas outras pessoas
3. Perdi todo o interesse nas outras pessoas

13.
0. Tomo decisões quase tão bem do que como em outra época
1. Adio minhas decisões mais do que costumava
2. Tenho maior dificuldade em tomar decisões
3. Não consigo mais tomar decisões

IDADE:_____
SEXO:_____
Subtotal parte 1_____

ANEXO VI- ESCALA DE DEPRESSÃO DE BECK (parte 2)

14. Não sinto que minha aparência seja pior do que costumava ser
0. Preocupo-me por estar parecendo velho ou sem atrativos
1. Sinto que há mudanças permanentes em minha aparência
2. Considero-me feio

15.
0. Consigo trabalhar tão bem quanto antes
1. Preciso de um esforço extra para começar qualquer coisa
2. Tenho que me esforçar muito até começar a fazer qualquer coisa
3. Não consigo fazer nenhum trabalho

16.

0. Durmo tão bem quanto de hábito
1. Não durmo tão bem quanto costumava
2. Acordo uma ou duas horas mais cedo do que de hábito e tenho dificuldades para voltar a dormir
3. Acordo várias horas mais cedo do que costumava e tenho dificuldade para voltar a dormir

17.

0. Não fico mais cansado do que de hábito
1. Fico cansado com mais facilidade do que costumava
2. Sinto-me cansado ao fazer quase qualquer coisa
3. Estou cansado demais para fazer qualquer coisa

18.

0. Meu apetite não está pior do que de hábito
1. Meu apetite não está tão bom quanto costumava ser
2. Meu apetite está muito pior agora
3. Não tenho mais nenhum apetite

19.

0. Não perdi muito peso se é que perdi algum ultimamente
1. Perdi mais de 2,5 Kg
2. Perdi mais de 5,0 Kg
3. Perdi mais de 7,5 Kg

Estou deliberadamente tentando perder peso, comendo menos:

SIM ( ) NÃO ( )

20.

0. Não me preocupo mais que o de hábito com minha saúde
1. Preocupo-me com problemas físicos como dores e aflições, ou pertubações no estômago ou prisão de ventre
2. Estou muito preocupado com problemas físicos e é difícil pensar em outra coisa
3. Estive tão preocupado com meus problemas físicos que não consegui pensar em outra coisa

21.

0. Não tenho observado qualquer mudança recente em meu interesse sexual
1. Estou menos interessado por sexo do que costumava
2. Estou bem menos interessado por sexo que costumava
3. Perdi completamente o interesse por sexo

Subtotal parte 1 _____

Subtotal parte 2 _____

Escore total _____

ANEXO E

TERMO DE CONSENTIMENTO ESCLARECIDO
INFORMAÇÕES SOBRE O ESTUDO

Título do estudo: Estudo sobre a Promoção de Atividade Física em Tabagistas (EPAFT) – um estudo randomizado e cruzado sobre os efeitos a curto e médio prazo de um programa utilizando pedômetros para aumento da atividade física diária em tabagistas.

Pesquisador responsável: Prof. Dr. Fábio Pitta

Prezados Senhores(as):

Este projeto de pesquisa visa proporcionar um modo de vida mais ativo para tabagistas, assim como mostrado em vários estudos em outras populações. Como conseqüência, aumentar a consciência de fumantes sobre a necessidade de um dia-a-dia mais ativo e saudável pode estimulá-los também a abandonar o tabagismo. Portanto, o presente trabalho é uma iniciativa que não se limita apenas a estudar os benefícios imediatos da atividade física em tabagistas, mas também traz uma proposta inédita de intervenção em tabagistas que, se bem-sucedida, pode se configurar como um importante fator de melhora na qualidade de vida e mesmo na sobrevida dessa população. Além disso, a longo prazo, iniciativas como apresentada nesse estudo podem vir a diminuir a prevalência de DPOC, acarretando um profundo impacto econômico pela redução de custos relativos ao tratamento da doença.

Objetivo: Avaliar a eficácia a curto e médio prazo de um programa que utiliza pedômetros para incentivar e monitorar o aumento de atividade física diária em tabagistas para o mínimo de 10.000 passos por dia.

Procedimentos: Os indivíduos incluídos no estudo passarão por uma série de avaliações: espirometria ou teste de função pulmonar, tolerância ao exercício (teste de caminhada) e qualidade de vida, além de permanecer durante 5 dias com um pequeno aparelho para monitorar o número basal de passos por dia (Pedômetro - usado na cintura) (Momento de avaliaçao 1 – AV1). A realização dos testes requer quatro visitas de aproximadamente 2 horas ao Hospital Universitário Regional Norte do Paraná, em Londrina, enquanto que nos cinco dias de monitoração da atividade física na vida diária o indivíduo tem que usar o pedômetro durante todo o dia, mas

não durante a noite. Após os testes iniciais os pacientes serão encaminhados através de sorteio para o grupo que receberá um pedômetro e um diário onde relatará o número de passos atingidos em cada dia nas próximas 4 semanas, e será orientado e incentivado a perfazer um mínimo de 10.000 passos por dia (G 1) OU grupo que receberá uma apostila com informações sobre os benefícios de se caminhar regularmente e serão estimulados a andar mais nas próximas 4 semanas (G 2). Após as quatro semanas iniciais, ambos os grupos se submeterão ao momento de avaliação 2 (AV2) com as mesmas avaliações constantes no AV1. Após o AV2, os grupos e as intervenções serão cruzados. Ou seja: os pedômetros dos indivíduos do G1 serão recolhidos, e os indivíduos desse grupo receberão a apostila com informações sobre os benefícios de caminhar, porém não terão nenhum controle escrito de sua atividade física nas 4 semanas seguintes. Os indivíduos do G2 receberão os pedômetros e o diário para relatar o número de passos atingidos em cada dia nas 4 semanas seguintes, e serão orientados e incentivados a perfazer um mínimo de 10.000 passos por dia. Ao final desse segundo período de 4 semanas ocorrerá o momento de avaliação 3 (AV3), com as mesmas avaliações constantes no AV1 e no AV2. Seis meses após o AV3, os pacientes serão novamente reavaliados com os mesmos procedimentos (AV4).

Custos: A pesquisa é gratuita e portanto não envolve qualquer custo por parte dos indivíduos. Não haverá qualquer gratificação financeira pela participação.

Riscos: Nenhum dos procedimentos a serem utilizados constitui risco direto para a integridade física ou moral dos participantes. Além disso, os participantes poderão abandonar o procedimento a qualquer momento que se achar conveniente, sem qualquer prejuízo ao seu acompanhamento / assistência / tratamento.

Sigilo: A identidade dos participantes será sempre preservada, embora os resultados da pesquisa possam ser divulgados em publicações e eventos científicos.

Colocamo-nos à disposição nos telefones (43) 3371-2288 ou 3371-2252 para qualquer esclarecimento que se fizer necessário para o estudo.

Atenciosamente,

Prof. Fábio Pitta

Coordenador do Projeto

CONSENTIMENTO PARA PARTICIPAÇÃO NO ESTUDO

Eu, _____, número de prontuário (RG HU) _____, abaixo assinado, concordo em participar do estudo: **"**Estudo sobre a Promoção de Atividade Física em Tabagistas (EPAFT) – um estudo randomizado e cruzado sobre os efeitos a curto e médio prazo de um programa utilizando pedômetros para aumento da atividade física diária em tabagistas."

Fui devidamente informado e esclarecido pelo pesquisador _____ **sobre a pesquisa, os procedimentos nela envolvidos, assim como os possíveis riscos e benefícios decorrentes de minha participação. Foi-me garantido que posso retirar meu consentimento a qualquer momento, sem que isto leve à qualquer penalidade ou interrupção de meu acompanhamento/ assistência / tratamento.**

Local e data : _____

Nome: _____

Assinatura do sujeito ou responsável:

_____

ANEXO F

Parecer do Comitê de Ética em Pesquisa

UNIVERSIDADE
ESTADUAL DE LONDRINA

COMITÊ DE ÉTICA EM PESQUISA ENVOLVENDO SERES HUMANOS

Parecer Nº 007/07 **CAAE Nº 0008.0.268.000-07** **FOLHA DE ROSTO Nº 121836**	**Londrina, 28 de fevereiro de 2007.**

PESQUISADOR(A): FABIO DE OLIVEIRA PITTA

Ilmo(a) Sr(a),

O Comitê de Ética em Pesquisa envolvendo Seres Humanos da Universidade Estadual de Londrina – CEP – UEL – de acordo com as orientações da Resolução 196/96 do Conselho Nacional de Saúde/MS , **APROVA** a realização do projeto: **"ESTUDO SOBRE A PROMOÇÃO DE ATIVIDADE FÍSICA EM TABAGISTAS (EPAFT) _ UM ESTUDO RANDOMIZADO E CRUZADO SOBRE OS EFEITOS A CURTO E MÉDIO PRAZO DE UM PROGRAMA UTILIZANDO PEDÔMETROS PARA AUMENTO DA ATIVIDADE FÍSICA DIÁRIA EM TABAGISTAS".**

Informamos que o(a) Sr.(a) deverá comunicar, por escrito, qualquer modificação que ocorra no desenvolvimento da pesquisa e deverá ser apresentado ao CEP/UEL relatório final da pesquisa.

Situação do Projeto: **APROVADO**

Atenciosamente,

Profª. Dra. Nilza Maria Diniz
Comitê de Ética em Pesquisa
Coordenadora

ANEXO G

Normas de formatação do periódico *Respirology*

Edited By: Peter Eastwood

Impact Factor: 2.781

ISI Journal Citation Reports © Ranking: 2012: 18/50 (Respiratory System)

Online ISSN: 1440-1843

1. Author Guidelines

Updated on 4 June 2013

Respirology is the official journal of the Asian Pacific Society of Respirology. It is the preferred English language journal of the Japanese Respiratory Society, the Thoracic Society of Australia and New Zealand and the Taiwanese Society of Pulmonary and Critical Care Medicine, and an official journal of the World Association of Bronchology and Interventional Pulmonology. The Journal publishes original papers of international interest on laboratory and clinical research that are pertinent to respiratory biology and disease. Manuscripts on any topic within the field of respiratory medicine, including allied health; cell and molecular biology; epidemiology; immunology; pathology; pharmacology; physiology; intensive and critical care; paediatric respiratory medicine; bronchoscopy; interventional pulmonology and thoracic surgery are welcomed.

SUBMISSION

Papers are published in *Respirology* in the approximate order of date of final acceptance under the following headings: Editorials,Invited Reviews, Reviews, Original Articles, Scientific Letters and Correspondences.

The Editor-in-Chief is:
Peter R. Eastwood
c/- School of Anatomy, Physiology and Human Biology (M309)
The University of Western Australia
35 Stirling Hwy
Crawley, Western Australia 6009,
AUSTRALIA
Tel: +61 8 6488 8694
Fax:+61 8 6488 1550
respirology-aphb@uwa.edu.au

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Contributions that do not comply with the Journal's requirements will be returned to the authors for correction prior to peer review.

ETHICS AND RESEARCH PRINCIPLES

Manuscripts concerning research supported in whole or in part by tobacco companies and associated institutes and organisations will not be considered for publication. Authors are expected to comply with strict ethical standards and for human research, conform to the provisions of the latest update of the WMA Declaration of Helsinki. Consent must be obtained from each patient after full explanation of the purpose, nature and risks of all procedures, and the research protocol must be approved by the Institutional Review Board or a suitably constituted Human Research Ethics Committee at the institution within which the work was undertaken. For retrospective studies using patient medical records, the Institutional Review Board or Ethics Committee must approve access to patient records and patient confidentiality must be maintained. For animal studies, approval from an appropriately constituted Animal Research Ethics Committee should be obtained. Statements regarding written informed consent and ethics approval, including the Ethics or Institutional Review Board approval number, must be included in the Methods section and proof of approval must be produced upon request. If ethics committee approval was not obtained or was not required, it should be stated in the Methods section of the manuscript.

PATIENT CONSENT AND CONFIDENTIALITY

Prior to submitting their manuscript, authors must ensure that the anonymity of every patient is respected by removing any detail that may lead to identification of a patient. If there is any possibility that a patient may be identified from the data presented in the submitted text, tables, figures or online supporting information, authors must obtain consent from the patient using the Journal's Patient Consent Form and submit the completed form with their manuscript. In the circumstance that the patient is unable to provide consent (i.e. under 18, deceased, those who are unable to provide verbal or written consent, etc), authors must obtain consent from the patient's next of kin or legal representative.

PUBLISHING PRINCIPLES

Manuscripts should conform to the revised guidelines of the International Committee of Medical Journal Editors (ICMJE), published as Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publication. These guidelines and the advice of the Editorial Board, Editorial Staff , Publisher and the Committee on Publication Ethics(COPE) will be used if matters of advice, dispute or contention arise in relation to publications and/or authors.

Respirology requires the author to submit exclusively to the journal and will not accept original contributions containing significant portions of material published or submitted for publication elsewhere except for abstracts of no more than 400 words. Any material available through PubMed, Institutional websites, Pre-Print websites or other electonically accessible sources are considered to have been published. The Editors of *Respirology* reserve the right to refuse such contributions. *Respirology* employs *iThenticate* software to detect plagiarism and, by submitting a manuscript to this journal, the authors accept that their manuscript will be screened for overlap with previously published works. We strongly advise authors to check their own work before submission to avoid rejection on those grounds.

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with the manuscript. In case of difficulty accesssing or uploading this form, please contact the Editorial Office (respirology-aphb@uwa.edu.au).

All persons listed as authors should qualify for authorship as defined by the ICMJE and all persons qualifying for these requirements should be listed as authors. No more than ten authors should be listed for any submission unless approved by the Editor in Chief. In exceptional circumstances, the Editor in Chief will accept equal first and last authorship and justification must be provided on the title page. There can only be one corresponding author and this person is solely responsible for (i) communicating with the journal and managing communication between co-authors; (ii) including all qualifying authors in the author list and getting their approval for submission of the manuscript and the order in which the authors are listed (iii) distributing the proofs to all co-authors and returning all proof corrections to the journal office; (iv) responding to any queries regarding the published paper.

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CLINICAL TRIALS

Clinical trials started after 1 July 2005 must be registered in an open-access trials database prior to the enrolment of the first participant for the manuscript to be considered for publication. The International Committee of Medical Journal Editors' definition states that a clinical trial is "any research study that prospectively assigns human participants or groups of humans to one or more health-related interventions to evaluate the effects on health outcomes." Authors should state in the Methods the site of registration and the reference number.

Respirology endorses the CONSORT (Consolidated Standards of Reporting Trials) statement for reporting of randomized controlled trials. Manuscripts presenting clinical trial results should conform to the CONSORT statement, comply with the CONSORT checklist and include aCONSORT flow diagram as the first figure of the

manuscript. Authors should also include a copy of the checklist as part of the submission and indicate which checklist items have been implemented in the manuscript.

ENGLISH EXPRESSION AND MANUSCRIPT STYLE

All contributions should be written in English and spelling should conform to the Concise Oxford English Dictionary. The Editors reserve the right to return manuscripts to the author for English language editing prior to external peer review. If necessary, *Respirology* may only consider the manuscript after it has been professionally edited at the author's expense. A list of editing services is available online at http://authorservices.wiley.com/bauthor/english_language.asp. In addition, the Editors and Publisher reserve the right to modify typescripts of accepted manuscripts to eliminate ambiguity and repetition and to improve communication between author and reader. In following this practice the scientific content and message will not be changed. In case of extensive alterations, the manuscript will be returned to the author for revision and/or approval before publication.

Respirology no longer accepts the use of the eponyms 'Clara cell', 'Clara cell secretory protein' and 'Wegener's granulomatosis' and will replace these terms with 'club cell', 'club cell secretory protein' and 'granulomatosis with polyangiitis' respectively. The old eponyms will be used in parentheses until the end of 2014. Further background information about this change in terminology can be found in the following publications:

*Winkelmann A, Noack T. The Clara cell: a "Third Reich eponym"? *Eur Resp J*. 2010;**36**: 722-7.

*Falk RJ, Gross WL, Guillevin L, Hoffman G, Jayne DR, Jennette JC, Kallenberg CG, Luqmani R, Mahr AD, Matteson EL, Merkel PA, Specks U, Watts R. Granulomatosis with polyangiitis (Wegener's): an alternative name for Wegener's granulomatosis. *Ann Rheum Dis*. 2011;**70**: 704.

ABBREVIATIONS

The use of abbreviations is discouraged except for standard abbreviations of units of measure. The author may abbreviate words in the text that are repeated more than five times, but these abbreviations should not be used in the title.The abbreviation must be defined in parentheses on first mention in the abstract and in the body of the manuscript and, if applicable, they must be re-defined in the figure legend or table caption. A list of used abbreviations including their definitions must be provided as part of the manuscript.

STATISTICAL METHODS AND HYPOTHESES

Where appropriate, all original articles should state the hypothesis that is being tested and detail the statistical method that was used.

For advice on statistical reporting, *Respirology* encourages authors to refer to the SAMPL guidelines: Lang T, Altman D. Basic statistical reporting for articles published in clinical medical journals: the SAMPL guidelines. In: Smart P, Maisonneuve H, Polderman A (eds.) *Science Editors' Handbook*, European Association of Science Editors, 2013.

Respirology uses the services of biostatisticians for the assessment of statistical methodology of selected manuscripts.

COLOUR FIGURES

A total payment of ¥64,000, US$530 or A$1,100 (Goods and Services Tax (GST) included) by the authors is required for up to three colour figures and an additional payment of ¥32,000, US$265 or A$550 (GST included) for each extra colour figure thereafter. The authors must agree to cover the cost of reproduction of all colour figures. Authors who do not wish to pay the colour charges must submit figures in grey scale. If colour is important to the understanding of the figure, the Editor in Chief may require agreement to pay colour charges as a condition of acceptance. Payment must be received prior to the paper being published.

ARTICLE TYPES

Original Articles

Respirology encourages the submission of manuscripts focusing on clinical or laboratory research in areas relevant to the practice of respiratory medicine. Original articles must not be longer than 2500 words, excluding the abstract (maximum 250 words), references (maximum 50), table and figure legends. Longer manuscripts, unless justified in the covering letter, may be returned to the authors for reduction before being considered for peer review.

Editorials and Invited Reviews

Editorials and invited reviews are generally commissioned by the Editor-in-Chief. Author guidelines, including word counts, for editorials and invited reviews will be provided by the Editorial Office at the time of invitation. Invited papers are subject to the same review process as unsolicited submissions.

Unsolicited Reviews

Unsolicited review articles may occasionally be considered if they cover a relevant and timely topic of strong interest to readers of *Respirology*. Before submitting an unsolicited review, authors must contact the Editorial Office (respirology-aphb@uwa.edu.au) and provide the following information for the Editor's consideration: an abstract; outline of the manuscript with subheadings and topics; need for the review; relevance to the readership of *Respirology* and authors' track record on the topic. Reviews submitted online without the pre-approval from the Editor-in-Chief will be returned to the author. Author guidelines, including word counts, for unsolicited reviews will be provided by the Editorial Office at the time of pre-approval.

Systematic Reviews and Meta-Analyses

Systematic reviews may or may not use statistical methods (meta-analysis) to analyze and summarize the results of the included studies. *Respirology* has endorsed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) Statement, as described in thePRISMA Explanatory and Elaboration document. It recommends the use of its checklist and flow diagram as a guide to a systematic review with or without a meta-analysis approach (www.prisma-statement.org). *Respirology* requires authors to include a similar flow chart as part of the manuscript, and a copy of the checklist as part of the submission. Authors must indicate in the copy of the checklist which items have been implemented in the manuscript. Taking the time to ensure the review meets these basic reporting needs will improve the manuscript and potentially enhance its chances for eventual publication.

Authors of meta-analyses of observational studies must follow the Meta-analysis of Observational Studies in Epidemiology (MOOSE) reporting guidelines and checklist, and include as part of their submission a copy of the checklist indicating the items that have been implemented.

Scientific Letters

Authors wishing to see rapid publication of early but significant data may wish to submit a Scientific Letter of no more than 500 words, one figure or table, and five references. An unstructured abstract of maximum 75 words should be included.

Clinical Notes / Case Report

Respirology no longer accepts the submission of case reports and clinical notes. Instead, case reports can be submitted to *Respirology Case Reports*, the official Open Access case reports journal of the Asian Pacific Society of Respirology:http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2051-3380

Correspondences

These are usually letters regarding articles published in *Respirology*. Letters must be fewer than 500 words. Author(s) of the article commented on may be invited to respond. *Respirology*reserves the right to accept or reject letters for publication, and may amend or extract text without misrepresenting the writer's views.

MANUSCRIPT STRUCTURE AND FORMATTING

Manuscripts are to be typed double-spaced (including references, tables, figure legends and footnotes), in 12-point type, on A4 size paper with 3-cm margins at the top and the left-hand side of the pages and must be in Word (doc or docx) format only (pdf cannot be accepted and will be returned to the author for conversion). All pages should be numbered consecutively beginning with the title page. Manuscripts should contain, in this order, a title page, summary at a glance (original articles only), abstract (see requirements below for each article type), key words, short title, text of the manuscript, acknowledgements, references, tables,and figure legends. Please note that in addition to including this in the manuscript, the title, abstract, names of the authors and their affiliations, short title and key words will have to be entered upon submission of the manuscript in ScholarOne Manuscripts.

Title Page

The title page should include the title and all authors' full names, degrees and affiliations. The contact address, fax number and email for the corresponding author must also be provided, as well as each author's role in the study. The word count for the abstract and text (without references, tables or figure legends) should also be provided on the title page.

Summary at a Glance

For Original Articles only, authors should provide a 'Summary at a Glance' that briefly states, in less than 50 words, what is being tested and what the presented study adds to the literature.

Abstract

Original Articles: Concise abstract of no more than 250 words which is structured as follows:*Background and objective*, *Methods, Results* and *Conclusions*. The abstract should not contain references or footnotes.

Reviews: An unstructured and concise abstract of no more than 250 words should be included. The abstract should not contain references or footnotes.

Scientific Letters: A concise abstract of no more than 75 words should be included.

Editorials and Correspondences: No abstract is required, please type N/A in the abstract box upon submission in ScholarOne Manuscripts.

Key Words

Five key words, in alphabetical order below the abstract, must be supplied for indexing purposes, and should be selected from the Medical Subject Headings (MeSH) list provided by the US National Library of Medicine

Short Title

A short title of fewer than 40 characters (including spaces) must be provided.

Text

Original Articles should be arranged under the usual headings of Introduction, Methods, Results and Discussion.

Methods (including statistical methods used, study design, participant recruitment and sample collection) should be described in sufficient detail to make clear how the results were derived. The location (city, state, country) of manufacturers specified in the text should be provided. Generic names of drugs should be used. SI units should be used throughout, with few exceptions, e.g. blood pressure (mmHg). If monetary values are mentioned in the manuscript, the equivalence in US dollars should also be presented. When applicable, statements regarding Ethics Committee and Institutional Review Board approval, written informed consent and clinical trial registration must be included in this section. Authors are encouraged to submit descriptions of non-critical or previously published methods as online supporting information.

Acknowledgements

Acknowledgements of persons (including their affiliation) who made a significant contribution and who endorse the data and conclusions should be included. Acknowledgement of funding sources is required. Submissions containing research supported by NIH grants must include the grant number in their acknowledgements.

References

References should be cited in the text, tables and legends, using superscript Arabic numerals (after punctuation marks where appropriate) in the order in which they first appear in the text. References should be limited to 50, typed doubled-spaced and numbered consecutively. All authors should be listed. Titles of journals should be abbreviated in the reference list according to the style used in *Index Medicus*. Journal issue numbers should not be quoted.

Reference formatting and punctuation should conform to the Journal style which is based on the Vancouver system.
Examples follow:

Standard journal article

1 Lahita R, Kluger J, Drayer DE, Koffler D, Reidenberg MM. Antibodies to nuclear antigens in patients treated with procainamide or acetylprocainamide. *N. Engl. J. Med.* 1979; **301**: 1382–5.

Books and other monographs

2 Cade JF, Pain MCF. *Essentials of Respiratory Medicine.* Blackwell Science, Oxford, 1988.

Book Chapter

3 Colby VT, Carrington CB. Infiltrative lung disease. In: Thurlbeck WM (ed.) *Pathology of the Lung.*Thieme Medical Publishers, New York, 1988; 198–213.

Electronic material

4 World Health Organisation, 3 July 2003. Update 94: Preparing for the Next Influenza Season in a World Altered by SARS. http://www.who.International/csr/disease/ influenza/sars. Accessed: 15 September 2003.

Online Article not yet published in an issue

An online article that has not yet been published in an issue (therefore has no volume, issue or page numbers) can be cited by its Digital Object Identifier (DOI). The DOI will remain valid and allow an article to be tracked even after its allocation to an issue.

5 Walker J, Kelly PT, Beckert L. Airline policy for passengers requiring supplemental in-flight oxygen. *Respirology* 2009 doi 10.1111/j.1440-1843.2009.01521.x

Unpublished observations and personal communications should not be listed as references, but may be incorporated in the text and stated as such in parentheses. References to articles in a language other than English that do not have an English abstract should not be used.

Tables

Tables should be supplied at the end of the manuscript file, on separate pages with one table per page, and each table accompanied by a descriptive caption at the top. Each table should be referred to in the text and numbered in the order of mention. Explanatory material should be placed in footnotes below the Table and not included in the heading. All non-standard abbreviations should be defined in the footnotes. Footnotes should be indicated by *, †, ‡, §. Statistical terms such as SD or SEM should be identified in headings. Use of the word-processing 'Table' function for creating tables is encouraged; otherwise, use only one Tab (not spaces) to separate each column in a table.

The number of tables should be kept to a minimum and tables presenting large collections of data should be avoided. We encourage authors to make use of online supporting information where possible.

Figure Legends

Legends should be supplied on a separate page in the manuscript file and should not appear as part of the figure files.

Each figure should be referred to in the text and numbered in the order of mention. Symbols, arrows and numbers or letters used to identify parts of illustrations should be identified and explained in the legend. The description in the legend should be sufficient for the reader to interpret the figure without reference to the text.

Figures and Electronic Art

Manuscript submissions containing figures that do not adhere to the requirements and specifications outlined in this section will be returned to the authors for corrections prior to peer review.

Each figure must be submitted as a separate file and should not be embedded in the manuscript text file. All figures must be saved in EPS or TIFF format with a minimum resolution of 300 dpi. Figures should be presented at actual size to fit a single column (81 mm width), double column (169 mm width) or intermediate column (118 mm width). Each figure and figure file is to be identified clearly with the figure number.

Figures should be sharp and authors should refer tohttp://authorservices.wiley.com/bauthor/illustration.asp for further details. Letters, numbers and symbols must be clear and legible and their size should be in scale with the figure. Use a sans serif font (preferably Arial), avoid using bold type, and use a consistent font type and size throughout all figures in the manuscript. Titles, keys and detailed explanations should be confined to legends and not included in the figures. All photomicrographs must have internal scale markers and legends must include the magnification and stain used. Photographs of persons must be retouched to make the subject unidentifiable, or be accompanied by written permission from the subject to use the photograph (see 'Patient Consent and Confidentiality' section for more information and Patient Consent Form).

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