UNIVERSIDADE ESTADUAL PAULISTA
"JÚLIO DE MESQUITA FILHO"

MONIQUE YNDAWE CASTANHO ARAUJO

ADIPOSIDADE CORPORAL COMO AGENTE MEDIADOR NA RELAÇÃO ENTRE PRÁTICA ESPORTIVA E GASTOS COM SAÚDE NA ADOLESCÊNCIA: ABCD GROWTH STUDY

Relatório de Pós-doutorado realizado na Universidade Estadual Paulista (UNESP), Faculdade de Ciências e Tecnologia de Presidente Prudente/FCT. Departamento de educação Física.

Supervisor(a): Prof. Dr. Prof° Dr° Rômulo Araújo Fernandes

Fundação de Amparo à Pesquisa do Estado de São Paulo - FAPESP - N° 2021/05730-3

Presidente Prudente

2025

UNIVERSIDADE ESTADUAL PAULISTA
"JÚLIO DE MESQUITA FILHO"

ADIPOSIDADE CORPORAL COMO AGENTE MEDIADOR NA RELAÇÃO ENTRE PRÁTICA ESPORTIVA E GASTOS COM SAÚDE NA ADOLESCÊNCIA: ABCD GROWTH STUDY

RELATÓRIO FINAL FAPESP

(PROCESSO: 2021/05730-3)

Beneficiário: Monique Yndawe Castanho Araújo

Pesquisador Responsável: Prof. Dr. Rômulo Araújo Fernandes

Instituição sede: Universidade Estadual Paulista – UNESP. Faculdade de Ciências e Tecnologia de Presidente Prudente/FCT. Departamento de Educação Física.

Monique Yndawe Castanho Araújo

Beneficiário

Romulo Araújo Fernandes

Pesquisador responsável

Presidente Prudente, julho de 2024

RESUMO DA PROPOSTA INICIAL (PROCESSO 2021/05730-3)

A proposta inicial objetivou analisar a relação da prática esportiva sobre custos com saúde acumulados ao longo de 11 meses entre adolescentes de ambos os sexos, bem como, identificar o papel mediador da adiposidade corporal sobre esta possível relação. O estudo propôs recrutar uma amostra estimada de 248 jovens no qual o trabalho de campo ocorreria ao longo de 11 meses, sendo que o contato com os participantes para coleta das informações sobre utilização de serviços de saúde seria mensal. Por meio de entrevista seriam coletados dados pessoais e antropométricos e as informações sobre o uso de serviços de cuidado com a saúde seriam reportadas pelos pais/responsáveis dos adolescentes e, em seguida, seriam calculados valores de custos desses serviços. A gordura corporal seria mensurada pela densitometria óssea (DEXA). Parâmetros da atividade física oriunda da prática esportiva seriam fornecidos por acelerometria. Seriam tratadas como variáveis de confusão: parâmetros sanguíneos (perfil lipídico, resistência a insulina e proteína C-reativa), hábitos alimentares (recordatório alimentar), tempo de sono (acelererômetro), pressão arterial e maturação somática. A Figura 1 exemplifica os momentos e as variáveis propostas na coleta (coleta no momento inicial, acompanhamento durante 11 meses e coleta no momento final). Como resultados, esperava-se estimar o peso da prática esportiva sobre gastos com saúde de adolescentes, bem como o papel da adiposidade corporal nesta relação.

RESUMO DO PROJETO

Objetivo: Analisar a relação da prática esportiva sobre custos com saúde acumulados ao longo de 11 meses entre adolescentes de ambos os sexos, bem como, identificar o papel mediador da adiposidade corporal sobre esta possível relação. **Métodos:** Estudo longitudinal com uma amostra estimada de 248 jovens no qual o trabalho de campo ocorreu ao longo de 11 meses. O contato com os participantes para coleta das informações sobre utilização de serviços de saúde foi realizado mensalmente. Por meio de uma entrevista foram coletados dados pessoais e antropométricos e as informações sobre o uso de serviços de cuidado com a saúde foram reportadas pelos pais/responsáveis dos adolescentes e, em seguida, foram calculados valores de custos desses serviços. A gordura corporal foi mensurada pela densitometria óssea (DEXA). Parâmetros da atividade física oriunda da prática esportiva foram fornecidos por acelerometria. Foram tratadas como variáveis de confusão: parâmetros sanguíneos (perfil lipídico, resistência a insulina e proteína C-reativa), hábitos alimentares (recordatório alimentar), tempo de sono (acelererômetro), pressão arterial e maturação somática. Para a análise estatística foi utilizado o software Stata (versão 13.0). **Resultados:** Nos modelos criados, a gordura corporal não afetou os gastos com saúde, bem como não apresentou papel mediador na relação entre prática esportiva e custos com saúde entre adolescentes. Por outro lado, a prática esportiva mostrou-se elemento com significativo impacto nos custos com saúde. **Conclusões:** Com base nos resultados deste estudo, pode-se concluir: i) Não foram observadas relações entre gordura corporal e custos com saúde entre adolescentes. Em nenhum dos modelos testados a gordura corporal apresentou papel mediador na relação entre prática esportiva e custos com saúde entre adolescentes; ii) O tempo gasto em atividades físicas moderadas e vigorosas (especialmente aquele envolvendo participação esportiva) foi inversamente relacionado aos custos com medicamentos acumulados ao longo de um período de 28 semanas, enquanto o tempo sedentário parece neutralizar esses benefícios (von Ah Morano A et al., 2025 [em anexo]); iii)

O volume de treinamento apresentou relação com menores custos com medicamentos, mesmo na presença de variáveis de confusão (em anexo - artigo 1 em fase final de elaboração) e ainda, a iniciação esportiva precoce aumentou a dor musculoesquelética entre adolescentes, afetando os custos com saúde (em anexo - artigo submetido).

EXECUÇÃO DAS ATIVIDADES PROPOSTAS NO PLANO DE TRABALHO E CRONOGRAMA DA PROPOSTA INICIAL

Na proposta inicial, constavam no plano de trabalho e cronograma das atividades a serem desenvolvidas ao longo dos 24 meses (01 de maio de 2023 a 30 de abril de 2025) de bolsa de pós-doutorado: i) coleta de dados (momento inicial, acompanhamento durante 11 meses e coleta no momento final); ii) participação em 4 congressos nacionais ou interacionais; iii) confecção de 6 artigos e iv) realização de estágio no exterior (BEPE).

No que se refere ao andamento efetivo do projeto, todos os prazos para o recrutamento da amostra e trabalho de campo foram respeitados. As coletas do momento inicial foram realizadas no segundo semestre de 2023, desde então os adolescentes foram acompanhados para obtenção de informações sobre atividade física habitual, prática esportiva, hábitos alimentares (recordatório alimentar), tempo de sono e utilização de serviços de saúde. As coletas do momento final da pesquisa foram realizadas no segundo semestre de 2024.

Durante a vigência do apoio financeiro, atividades acadêmicas foram desenvolvidas pela beneficiária, as quais concernem em: i) aulas ministradas na Pós-graduação em Ciências do Movimento Interunidades da UNESP; ii) participação em congressos nacionais e internacionais; iii) confecção de capítulos de livros; iv) publicação/aceite e confecção de artigos científicos. Cabe mencionar que, em paralelo as atividades relacionadas a proposta inicial, outras atividades oriundas de parcerias e trabalhos com outros pesquisadores, foram desenvolvidas pela beneficiária ao longo da vigência da bolsa de pós-doutorado, sendo elas: publicação de resumos, publicação de capítulos de livros e publicação/aceite de artigos científicos, sendo assim, os comprovantes de todas as atividades desenvolvidas na vigência do financiamento seguem anexos ao final do relatório e estão numerados na ordem que aparecem descritos acima (i, ii e iii).

JUSTIFICATIVA PARA NÃO REALIZAÇÃO DE ESTÁGIO NO EXTERIOR

Devido ao andamento das coletas de dados da proposta inicial (momento inicial [segundo semestre de 2023], acompanhamento durante 11 meses e coleta no momento final [segundo semestre de 2024]), contextualizado nos itens anteriores, a beneficiária não teve a oportunidade de sair do país para um estágio BEPE, uma vez que assumiu a responsabilidade de acompanhar e organizar o andamento das coletas de dados (coletas mensais sobre utilização de serviços com saúde e trimestrais sobre atividade física habitual, prática esportiva, hábitos alimentares e tempo de sono). O trabalho de campo mostrou-se mais desafiador do que inicialmente dimensionado pela equipe.

Ademais, durante a vigência da bolsa surgiram oportunidades para a beneficiária concorrer em três concursos públicos para cargo de Professor de Ensino Superior (Universidade Estadual de Maringá [Edital Nº 252/2024-PRH], Universidade Estadual Paulista- Júlio de Mesquita Filho [Edital Nº 222/2023], Faculdades de Dracena [Edital Nº 06/2024]) e considerando imprevisibilidade dos editais na divulgação das datas para realização das provas, a beneficiária priorizou a participação nos certames e se manteve no país, obtendo êxito em um deles (Faculdades de Dracena [Edital Nº 06/2024]).

ATIVIDADES PROFISSIONAIS CONCOMITANTES ÀS ATIVIDADES COMO BOLSISTA FAPESP

Dentre os processos seletivos para cargo de Professor de Ensino Superior, mencionados acima, a beneficiária foi selecionada e admitida em 27 de janeiro de 2025, por meio do processo seletivo 06/2024, com contrato temporário com data fim prevista para 31/12/2025, em regime de trabalho CLT, para exercer a função de Professor de Ensino Superior, na Faculdades de Dracena, mantida pela Fundação Dracenense de Educação e Cultura, Instituição de ensino, Com inscrição no CNPJ nº 49.845.878/0001-17. No primeiro semestre de 2025, a beneficiária tem ministrado aulas na disciplina Trabalho de Conclusão de Curso, contabilizando um total de 4 horas/aulas semanais. Vale destacar que a FAPESP foi comunicada e autorizou as atividades de ensino. A declaração da instituição e holerite da beneficiária seguem em anexo.

COMPROVANTES DAS ATIVIDADES DESENVOLVIDAS

i) AULAS MINISTRADAS NA PÓS-GRADUAÇÃO

UNIVERSIDADE ESTADUAL PAULISTA

Câmpus de Presidente Prudente

ATESTADO

ATESTAMOS que a Profa. Dra. Monique Yndawe Castanho Araujo Santana, RG [redacted] SSP, ministrou/ministra aulas aos discentes do Programa de Pós-graduação desta Unidade Universitária, conforme abaixo descrito:

Programa: Ciências do Movimento

Disciplina	Ano	Dt.Início	Dt.Término	Curso	Discentes	Hr/Aula
Tools for assessment of health care costs	2023	28/08/2023	01/09/2023	MD	12	12
Physical activity, sports participation and health care costs among adolescents	2024	16/01/2024	18/01/2024	MD	5	15

Presidente Prudente, 30 de janeiro de 2024

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Supervisora Técnica de Seção Substituta
Seção Técnica de Pós-Graduação

ii) PARTICIPAÇÃO EM CONGRESSO NACIONAL E INTERNACIONAIS

Congresso Brasileiro de Atividade Física e Saúde

Garopaba-SC | 25 a 28 de outubro de 2023

Garopaba - SC

25 a 28 de Outubro de 2023

CERTIFICADO

Certificamos que **Monique Yndawe Castanho Araujo**, participou como **ouvinte** do **XIV Congresso Brasileiro de Atividade Física e Saúde**, realizado de 25 a 28 de Outubro de 2023, na cidade de Garopaba - SC, contabilizando carga horária total de **40 horas**.

Prof. Dr. Adroaldo Gaya
Presidente do CBAFS 2023

Profa. Dra. Anelise Reis Gaya
Presidente do CBAFS 2023

Profa. Dra. Maria Cecília Tenório
Presidente da SBAFS

Trabalho apresentado como primeira autora

Trabalho como coautora

Centro Universitário
Antônio Eufrásio de Toledo
de Presidente Prudente

CERTIFICADO

Certificamos que **Andréa Wigna Pereira de Jesus**, RG nº 532860482, participou do **XIX Encontro Toledo de Iniciação Científica "Prof. Dr. Sebastião Jorge Chammé"**, no Centro Universitário Antonio Eufrásio de Toledo de Presidente Prudente-SP, nos dias 26 e 27 de setembro de 2023, com carga horária de 4,00 horas, na condição de **Ouvinte**, e na condição de **Expositor(a)** do(s) trabalhos(s) abaixo relacionado(s) e que se encontram PUBLICADOS nos anais eletrônicos "ETIC - ENCONTRO DE INICIAÇÃO CIENTÍFICA", Vol. 19, N. 19, ISSN 21-76-8498.

Título	Tipo	Apresentação	Autor(es)
DOENÇAS CRÔNICAS NÃO TRANSMISSÍVEIS, FATORES E COMPORTAMENTOS DE RISCO À SAÚDE RELACIONADOS À PERDA DE PRODUTIVIDADE LABORAL: REVISÃO SISTEMÁTICA	Resumo Expandido	Oral	ANDRÉA WIGNA PEREIRA DE JESUS JAMILE SANCHES CODOGNO MONIQUE YNDAWE CASTANHO ARAUJO

Presidente Prudente, 27 de setembro de 2023.

Carla Roberta Ferreira Destro
Coordenadora de Pesquisa e Extensão

Verificação Digital: 0001220232000003278 emitido em: 07/11/2023 10:06:24

Trabalho como orientadora

Trabalho como orientadora

TOLEDO PRUDENTE CENTRO UNIVERSITÁRIO

Centro Universitário
Antônio Eufrásio de Toledo
de Presidente Prudente

Certificamos que **Amanda Nunes Correia** participou do XIX Encontro Toledo de Iniciação Científica "Prof. Dr. Sebastião Jorge Chammé" realizado nos dias 26 e 27 de setembro de 2023, na condição de **AUTOR(A) DO(S) TRABALHO(S)** abaixo relacionado(s) e que se encontram **PUBLICADOS** nos anais eletrônicos "ETIC - ENCONTRO DE INICIAÇÃO CIENTÍFICA".

Título	Autores	Tipo
ANÁLISE DE DOCUMENTOS OFICIAIS PROCESSOS DE PRESCRIÇÃO, DISPENSAÇÃO E ADAPTAÇÃO ÀS ÓRTESES, PRÓTESES E MEIOS DE LOCOMOÇÃO NO CENÁRIO BRASILEIRO	Alessandra Madia Mantovani Fabri Amanda Nunes Correia Fernanda Diekmann Mantovani Gabriel Luiz B	Resumo
CUSTOS COM SERVIÇOS DA ATENÇÃO PRIMÁRIA À SÁUDE DO SUS ENTRE ADULTOS COM DOENÇAS CARDIOVASCULARES E DIABETES MELLITUS: COORTE DE 12 MESES DE SEGUIMENTO	Alessandra Madia Mantovani Fabri Amanda Nunes Correia jamile sanches Codogno Monique Yndawe Casta	Resumo Expandido
INTERNAÇÕES POR DOENÇAS CARDIOVASCULARES DE ACORDO COM SEXO E IDADE ENTRE JUNHO DE 2021 A JUNHO DE 2023 SEGUNDO DATASUS: ESTUDO EPIDEMIOLÓGICO DESCRITIVO	Amanda Nunes Correia Anne Kastelianne França da Silva Fernanda Diekmann Mantovani Mariana Olive	Resumo

Presidente Prudente, 7 de dezembro de 2.023

Carla Roberta Ferreira Destro
Coordenadora do Núcleo de Estudos e Pesquisa - NEPE

Trabalho como coautora

CERTIFICADO

Certificamos, para os fins que se fizerem necessários, que o trabalho intitulado: CUSTO COM SÍNDROME METABÓLICA SEGUNDO NÍVEL DE ATIVIDADE FÍSICA EM PACIENTES ATENDIDOS NA ATENÇÃO PRIMÁRIA DE SAÚDE. de autoria de GLORIA DE LIMA RODRIGUES, MONIQUE YNDAWE CASTANHO ARAUJO, SUELEN JANE RICARDO, LIONAI LIMA DOS SANTOS, JAMILE SANCHES CODOGNO, foi apresentado na modalidade Tema Livre (TL) no XIII CONGRESSO INTERNACIONAL DE EDUCAÇÃO FÍSICA E MOTRICIDADE HUMANA e XIX SIMPÓSIO PAULISTA DE EDUCAÇÃO FÍSICA, evento realizado na UNESP - Instituto de Biociências, Campus de Rio Claro - Rio Claro - SP, no período de 07 a 10 de junho de 2023.

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Prof. Dr. José Angelo Barela
Presidente do XIII CIEFMH e XIX SPEF
Depto de Educação Física
Instituto de Biociências - UNESP – Rio Claro

Prof. Dr. Adalgiso Coscrato Cardozo
Chefe do Depto de Educação Física
Instituto de Biociências - UNESP – Rio Claro

Trabalho como coautora

CERTIFICADO

Certificamos, para os fins que se fizerem necessários, que o trabalho intitulado: PERDA DE PRODUTIVIDADE LABORAL E INDICADORES DE RISCO À SAÚDE ENTRE PACIENTES DO SISTEMA ÚNICO DE SAÚDE de autoria de EDUARDO DUARTE DE LIMA MESQUITA, MONIQUE YNDAWE CASTANHO ARAUJO, LIONAI LIMA DOS SANTOS, GLORIA DE LIMA RODRIGUES, JAMILE SANCHES CODOGNO, foi apresentado na modalidade Tema Livre (TL) no XIII CONGRESSO INTERNACIONAL DE EDUCAÇÃO FÍSICA E MOTRICIDADE HUMANA e XIX SIMPÓSIO PAULISTA DE EDUCAÇÃO FÍSICA, evento realizado na UNESP - Instituto de Biociências, Campus de Rio Claro - Rio Claro - SP, no período de 07 a 10 de junho de 2023.

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Prof. Dr. José Angelo Barela
Presidente do XIII CIEFMH e XIX SPEF
Depto de Educação Física
Instituto de Biociências - UNESP – Rio Claro

Prof. Dr. Adalgiso Coscrato Cardozo
Chefe do Depto de Educação Física
Instituto de Biociências - UNESP – Rio Claro

Trabalho como coautora

CERTIFICADO

Certificamos, para os fins que se fizerem necessários, que o trabalho intitulado: PAPEL MEDIADOR DA RADIAÇÃO ULTRAVIOLETA B NA RELAÇÃO ENTRE CALCIDIOL E MARCADORES DE REMODELAMENTO ÓSSEO EM ADOLESCENTES NADADORES: ABCD GROWTH STUDY de autoria de EDUARDO DUARTE DE LIMA MESQUITA, MONIQUE YNDAWE CASTANHO ARAUJO, AMANDA BARBOSA DOS SANTOS, GUSTAVO DOS SANTOS DRUZIAN, RÔMULO ARAÚJO FERNANDES, foi apresentado na modalidade Tema Livre (TL) no XIII CONGRESSO INTERNACIONAL DE EDUCAÇÃO FÍSICA E MOTRICIDADE HUMANA e XIX SIMPÓSIO PAULISTA DE EDUCAÇÃO FÍSICA, evento realizado na UNESP - Instituto de Biociências, Campus de Rio Claro - Rio Claro - SP, no período de 07 a 10 de junho de 2023.

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Prof. Dr. José Angelo Barela
Presidente do XIII CIEFMH e XIX SPEF
Depto de Educação Física
Instituto de Biociências - UNESP – Rio Claro

Prof. Dr. Adalgiso Coscrato Cardozo
Chefe do Depto de Educação Física
Instituto de Biociências - UNESP – Rio Claro

I Congresso Brasileiro On-line de
ATENÇÃO BÁSICA À SAÚDE

CERTIFICADO

Certificamos que o trabalho intitulado **SÍNDROME METABÓLICA, ATIVIDADE FÍSICA E CUSTOS COM SAÚDE ENTRE USUÁRIOS DO SUS** do tipo **RESUMO EXPANDIDO** de autoria de **MONIQUE YNDAWE CASTANHO ARAUJO, SUELEN JANE RICARDO, GLÓRIA DE LIMA RODRIGUES, ALESSANDRA MADIA MANTOVANI FABRI E JAMILE SANCHES CODOGNO** foi aprovado e publicado nos anais do I Congresso Brasileiro On-line de Atenção Básica à Saúde, através da Revista Multidisciplinar em Saúde (ISSN: 2675-8008) no seu Volume X, número X, com código DOI **10.51161/CONABS2024/31058.**

Fortaleza/CE, 22 de fevereiro de 2024.

Prof. Dr. Vandbergue Santos Pereira
Coordenador do evento
Instituto Multiprofissional de Ensino - IME
CNPJ: 36.773.074/0001-08

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Trabalho como primeira autora

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XXXVI CIC

"Ciência em tempos de crise climática e social"

FCT

Faculdade de Ciências e Tecnologia

CERTIFICADO

1ª FASE

Certificamos que o trabalho intitulado **GORDURA CORPORAL DE ADOLESCENTES SEGUNDO PRÁTICA ESPORTIVA** de autoria de Pedro Bertacine Neto, Monique Yndawe Castanho Araujo, Lucas Rios Cordeiro, Tiago Galbiatti Nunes, Rômulo Araújo Fernandes e Jamile Sanches Codogno, foi submetido no evento **XXXVI Congresso de Iniciação Científica da Unesp - FCT/Presidente Prudente**, realizado nos dias 10 e 11 de outubro de 2024, na cidade de Presidente Prudente.

Presidente Prudente, 11 de outubro de 2024.

Edson Cocchieri Botelho
Pró-Reitor de Pesquisa
Presidente do CIC

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1ª FASE

Certificamos que o trabalho intitulado **GASTOS COM SAÚDE DE ADOLESCENTES, SEGUNDO PRÁTICA ESPORTIVA** de autoria de Antonio Vinícius Ribeiro de Oliveira, Monique Yndawe Castanho Araujo, Santiago Maillane Vanegas, Pedro Henrique Narciso Picchi, Pedro Bertacine Neto, Tiago Galbiatti Nunes, Lucas Rios Cordeiro, Rômulo Araújo Fernandes e Jamile Sanches Codogno, foi submetido no evento **XXXVI Congresso de Iniciação Científica da Unesp - FCT/Presidente Prudente**, realizado nos dias 10 e 11 de outubro de 2024, na cidade de Presidente Prudente.

Presidente Prudente, 11 de outubro de 2024.

Edson Cocchieri Botelho
Pró-Reitor de Pesquisa
Presidente do CIC

Avaliador de trabalho na área Ciências da Saúde do Congresso de Iniciação Científica da Unesp

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1ª FASE

Certificamos que **Monique Yndawe Castanho Araujo** participou da 1ª fase do **XXXVI Congresso de Iniciação Científica da Unesp - FCT/Presidente Prudente**, realizada nos dias 10 e 11 de outubro de 2024, na cidade de Presidente Prudente, na qualidade de **AVALIADOR** da(s) área(s) Ciências da Saúde.

Presidente Prudente, 11 de outubro de 2024.

Edson Cocchieri Botelho
Pró-Reitor de Pesquisa
Presidente do CIC

IV SIMPÓSIO INTERNACIONAL DE PESQUISA EM ESTILOS DE VIDA & SAÚDE SIPES

Recife - PE

27 a 29 de Novembro de 2024

Certificado

Conferimos o presente certificado a

Monique Yndawe Castanho Araujo

pela participação no **IV Simpósio Internacional de Pesquisa em Estilos de Vida e Saúde (SIPES)**, realizado de **27 a 29 de novembro de 2024**, no Centro de Eventos Recife, na cidade de Recife - PE.

Carga horária: **24 horas**

Prof. Dr. Marcos André Moura dos Santos
Presidente da Comissão Científica - IV SIPES

Prof. Dr. Mauro Virgilio Gomes de Barros
Presidente do IV SIPES

Trabalho como primeira autora

Avaliador de trabalho na área Prática de Esporte Relacionada à Saúde em Crianças e Adolescentes, do I Simpósio de Atividade Física e Exercício em Populações Pediátricas (SAFE-PED)

UNIVERSIDADE ESTADUAL DE LONDRINA

CERTIFICADO

Certificamos que **Profª. Drª. Monique Yndawe Castanho Araujo** participou como **coordenadora** da Sessão de Temas Livres IV: *Prática de Esporte Relacionada à Saúde em Crianças e Adolescentes*, do I Simpósio de Atividade Física e Exercício em Populações Pediátricas (SAFE-PED), realizado de 12 a 14 de dezembro de 2024 em Londrina - PR, promovido Pelo Grupo de Estudo e Pesquisa em Atividade Física e Exercício (GEPAFE) da Universidade Estadual de Londrina.

Prof. Dr. Ênio Ricardo Vaz Ronque

Presidente I SAFE-PED

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for attending

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Dr. Karen Milton

President

International Society for Physical Activity and Health (ISPAH)

Apresentação de trabalhos como coautora e orientadora

FRENCH SOCIETY OF PUBLIC HEALTH

CERTIFICATE OF ATTENDANCE

This is to certify that Monique Yndawe Castanho Araujo has participated in the 10th International Society for Physical Activity and Health (ISPAH) Congress hosted by the French Society of Public Health, held from 28 October to 31 October 2024 at the Palais des Congrès de Paris, France.

During the congress, Monique Yndawe Castanho Araujo presented the following works:
• "THE BURDEN OF PHYSICAL INACTIVITY AND DIABETES ON PRIMARY CARE COSTS IN BRAZIL" Presented as a Poster on 31 October 2024 at 13:15. Co-authors: Jamile Sanches Codogno, Monique Yndawe Castanho Araujo, Bruna Camilo Turi-Lynch, Henrique Luis Monteiro, Rômulo Araújo Fernandes

• "BURDEN OF CYCLING ON PRIMARY CARE COSTS IN BRAZIL" Presented as a Poster on 30 October 2024 at 11:45. Co-authors: Rayana Loch Gomes, Jamile Sanches Codogno, Rafael Orbolato, Rômulo Araújo Fernandes, Monique Yndawe Castanho Araujo

Their presence and engagement have contributed to the exchange of knowledge and the advancement of research, policies, and practices in the field of physical activity and public health.

Anne Vuillemin
President
French Society of Public Health (SFSP)

iii) CAPÍTULOS DE LIVRO PUBLICADOS

CAPÍTULO 1

AGREGAÇÃO DE EXCESSO DE PESO CORPORAL E PRÁTICA INSUFICIENTE DE ATIVIDADE FÍSICA AUMENTAM PERDA DE PRODUTIVIDADE LABORAL ENTRE OS PACIENTES DO SISTEMA ÚNICO DE SAÚDE

Data de aceite: 21/12/2023

Monique Yndawe Castanho Araujo

Alessandra Madia Mantovani

Lionai Lima dos Santos

Glória de Lima Rodrigues

Jamile Sanches Codogno

Resultados parciais desse trabalho foram publicados na forma de resumo simples no XIII Congresso Internacional de Educação Física e Motricidade Humana com título **"Perda de produtividade laboral e agregação de indicadores de risco a saúde entre os pacientes do Sistema Único de Saúde"**

INTRODUÇÃO

A expectativa de vida global aumentou nas duas últimas décadas, em média, seis anos[1], e no Brasil, o crescimento acelerado da população idosa vem acompanhado de consequências sociais, especialmente na área da saúde, como por exemplo, maior prevalência de doenças crônicas não transmissíveis[2], incapacidade funcional[3], perda na produtividade laboral[4] e, consequentemente, maior utilização dos serviços de saúde pública[5].

Neste contexto, a prática insuficiente de atividade física[6] e a obesidade,[7] associadas a demais fatores de risco a saúde, podem potencializar o surgimento de doenças crônicas, a procura por serviços de saúde e consequentemente a incapacidade funcional[8].

Sabe-se que agregação desses fatores interfere na saúde[9], porém ainda não está claro se a agregação destes fatores de risco poderiam desencadear aumento na perda de produtividade laboral, atrelado a aposentadoria por invalidez, que seria a total incapacidade de realizar as atividades de trabalho, bem como do absenteísmo[10].

Ademais são limitados os estudos que investigaram a associação desses indicadores de risco na produtividade laboral, sendo estas inferências primordiais para a Saúde Pública, decorrente da aplicabilidade na atenção primária. Assim, o objetivo do presente estudo foi analisar

CAPÍTULO 7

CUSTOS COM SERVIÇOS DA ATENÇÃO PRIMÁRIA À SÁUDE DO SUS ENTRE ADULTOS COM DOENÇAS CARDIOVASCULARES E DIABETES MELLITUS: COORTE DE 12 MESES DE SEGUIMENTO

Data de aceite: 26/01/2024

Monique Yndawe Castanho Araujo

Amanda Nunes Correia

Jamile Sanches Codogno

Alessandra Madia Mantovani Fabri

Trabalho publicados nos anais eletrônicos do XIX Encontro Toledo de Iniciação Científica – ETIC, realizado pelo Centro Universitário Antônio Eufrásio de Toledo de Presidente Prudente- SP, com menção honrosa pelo 1º lugar entre os trabalhos da área "Educação, Saúde e Bem-Estar".

RESUMO: A incidência das doenças crônicas não transmissíveis e do diabetes estão relacionadas a ocorrência de morbidades, mortalidade e custos com saúde. Sendo assim, o objetivo do trabalho foi analisar os custos diretos com saúde provenientes do atendimento de pessoas com DM e DCV atendidos pela atenção primária à saúde do sistema único de saúde (SUS) numa coorte de 12 meses. Diagnóstico de doenças cardiovasculares foram verificados por meio de prontuário médico. Diagnóstico de diabetes foi autorrelatado. Custos diretos com saúde foram verificados por meio de prontuário eletrônico. Os testes estatísticos foram realizados por meio do software Stata (versão 16.0). Participaram do estudo 46 diabéticos com alguma doença cardiovascular. Houve aumento com custos na atenção básica ao longo de um ano, como um aumento de 17% com exames, 38% com medicamentos e 25% nos custos totais. Conclui-se que indivíduos diabéticos, com diagnóstico de doença cardiovascular, apresentaram aumento em custos com saúde de serviços oferecidos pela atenção primária à saúde do SUS, ao longo de 12 meses de seguimento. Palavras-chave: Sistema único de Saúde. Doenças Cardiovasculares. Diabetes Mellitus

INTRODUÇÃO

As doenças cardiovasculares (DCV) são responsáveis por aproximadamente 30% da mortalidade precoce e diagnóstico de morbidades (BANSILAL, CASTELLANO e FUSTER, 2015; GBD, 2013). No Brasil, a prevalência é de 35% entre indivíduos com idade acima de 40 anos (BHATNAGAR et al., 2015, RIBEIRO, COTTA e RIBEIRO,

iv) PUBLICAÇÃO/ACEITE E CONFECÇÃO DE ARTIGOS CIENTÍFICOS

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International Journal of Sports Medicine

The impact of sports participation on medication costs among adolescents: ABCD-Growth Study

Ana Elisa von Ah Morano, Jéssica Malek da Silva, Lara J Montezori Costa, Karla Minacca Osco, Beatriz Dalarme Tanganini, Ariane Pereira Ramirez, Jamile Sanches Codogno, Rómulo Fernandes, Monique Y Castanho Araujo.

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Conflict of Interest: The authors declare that they have no conflict of interest.

This study was supported by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (http://dx.doi.org/10.13039/501100002322), 001, Fundação de Amparo à Pesquisa do Estado de São Paulo (http://dx.doi.org/10.13039/501100001807), 2021/05730-3; 2022/09796-1

Trial registration: RBR-43vbh6b, Brazilian Clinical Trials Registry (http://www.ensaiosclinicos.gov.br/), pragmatic trial

Abstract:
The economic impact of physical activity (PA) has been extensively investigated among adults, but few studies have analyzed this issue in pediatric populations. To analyze the relationship of costs attributed to medicine use with the time spent in different intensities of PA and sports participation among adolescents. A sample of 92 adolescents were tracked for 28 weeks. The main outcome was the overall cost attributed to medicine use (assessed weekly [US$]). Independent variables were moderate-to-vigorous PA (MVPA) outside sports and sportive MVPA, assessed in three time points (baseline, 14 weeks and 28 weeks) by accelerometers (min/day). A total of 53 boys and 39 girls, with a mean age of 14.54 (1.96) years, were evaluated. Sedentary time (rho= 0.217 [95%CI: 0.006 to 0.420]) and MVPA + Sportive MVPA (-0.250 [95%CI: -0.447 to -0.130]) were related to costs attributed to medicine use. When the multivariate model considered sedentary time as a covariate, the relationship between MVPA + Sportive MVPA and costs attributed to medicine use became non-significant (beta= -0.007 [95%CI: -0.017 to 0.004]; p-value= 0.206). The time spent in MVPA was inversely related to the medication costs accumulated through the follow-up period, while sedentary time appears to counteract these benefits.

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ARTIGOS CIENTÍFICOS PUBLICADOS

Brazilian Journal of Physical Therapy 27 (2023) 100551

Brazilian Journal of Physical Therapy

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ORIGINAL RESEARCH

Habitual physical activity minimizes healthcare costs resulting from comorbidities among adults with cardiovascular diseases

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KEYWORDS
Brazilian national health system;
Exercise;
Obesity;
Primary health care

Abstract
Background: Habitual physical activity (HPA) can be used as a non-pharmacological strategy to prevent and control chronic diseases, as well as playing a role in minimizing healthcare costs.
Objective: To verify the impact of HPA on healthcare costs at different levels of care, over 24 months, in an adult population with cardiovascular diseases (CVD), including individuals with or without comorbidities.
Methods: Two-hundred and seventy-eight adults with CVD, aged between 30 and 65 years, participated in the study. Information on healthcare costs was obtained from medical records and included primary, secondary, and tertiary levels. Comorbidities such as diabetes, dyslipidemia, arterial hypertension, and obesity were registered. HPA was measured using the Baecke questionnaire. Comparisons between groups were performed using Student's t ($<$P75 HPA and $\geq$P75HPA) and Mann-Whitney (YES and NO for presence of comorbidities) tests. Quantile regression was used to measure the impact of diseases and confounding variables on healthcare costs. Statistical significance was set at <0.05.
Results: The presence of comorbidities increased healthcare costs ($p<0.05$). HPA provided savings ranging from US$ 22.5/24 months to US$ 63.9/24 months with primary healthcare services, regardless of the presence of comorbidities.

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ORIGINAL SCIENTIFIC ARTICLE

Comorbidities do not mitigate the effect of habitual physical activity on the reduction of healthcare costs among adults with cardiovascular diseases: A mediation analysis

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ARTICLE INFO

Keywords:
Healthcare costs
Obesity
Hypertension
Dyslipidemia
Diabetes

ABSTRACT

Background: Habitual Physical activity (HPA) is a non-pharmacological strategy to prevent and control chronic diseases, and it plays an important role in minimizing healthcare costs.
Objectives: This study aimed to investigate the relationship between HPA and healthcare costs from the perspective of the Brazilian National Healthcare System, and to establish the mediating role of comorbidities in this relationship among patients with cardiovascular diseases (CVD).
Design and setting: This longitudinal study was conducted in a medium-sized Brazilian city and included 278 participants assisted by the Brazilian National Healthcare System.
Methods: Information on healthcare costs were obtained from medical records and included primary, secondary, and tertiary levels. Comorbidities (diabetes, dyslipidemia, and arterial hypertension) were self-reported, and obesity was confirmed with the percentage of body fat. HPA was measured using a questionnaire (Baecke questionnaire). Face-to-face interviews provided information on sex, age, and education level. Statistical analysis included linear regression and Structural Equation Modeling, significance was set at 5 % and the Stata software (version 16.0) was used to perform the analysis.
Results: The sample included 278 adults with a mean age of 54.49 (8.32) years. For each score of HPA, there was a reduction in healthcare costs of US$ 83.99/$_{24\ months}$ (95 % CI: − 159.15; − 8.84), and the sum of comorbidities did not mediate this relationship.
Conclusion: It is concluded that healthcare costs seem to be affected by HPA among patients with CVD, while this phenomenon seems not to be mediated by the sum of comorbidities.

1. Introduction

Cardiovascular diseases (CVD) are composed of a group of diseases related to the heart and blood vessels and are responsible for 31 % of all deaths worldwide [1]. With global prevalence ranging from 3.5 % to 12.5 % [2], CVD have a costly impact on the need and use of healthcare

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BMC Primary Care

RESEARCH Open Access

Interrelationship between arterial hypertension, health service costs, therapeutic treatment and physical activity

Lionai Lima dos Santos[1], Jamile Sanches Codogno[1], Bruna Camilo Turi-Lynch[2], Monique Yndawe Castanho Araujo[1], Romulo Araujo Fernandes[1], Grace Angelica de Oliveira Gomes[3], Shirley Crankson[4] and Nana Anokye[4*]

Abstract

Background Arterial hypertension is a high prevalence disease that increase healthcare costs and affects physical activity level. This study aimed to analyse the interrelationship between arterial hypertension, health service costs, therapeutic treatment, and physical activity in patients with cardiovascular diseases.

Method Cross-sectional study that evaluated 306 patients from a hospital in Presidente Prudente-Brazil. Based on their medical diagnosis, they were classified into multiple groups to access primary care and hospital-related costs variations. Then, using data from medical records and face to face interviews, they were examined on their treatment adherence and physical activity practice. Healthcare costs were accessed using medical records. Finally, the generalised linear model was used to analyse the interrelationship between treatment adherence, physical activity, health care costs and arterial hypertension. The data were analysed with Stata/MP4 16, and a p-value of less than 5% was used to determine statistical significance.

Results The group that adhered to the arterial hypertension treatments but were physically inactive presented higher costs with consultation (US$=24.1, 95%CI = 1.90;46,3) medication (US$=56.60, 95%CI = 1.65; 111.5) and total primary health care costs (US$=71.60, 95%CI = 19.2; 123.9) even after adjusting for confounding variables, meanwhile those participants that adhered to the treatments and were physical active did not present difference in healthcare cost when compared to normotensive and physical active participants.

Conclusion To be adherent to hypertension treatment were related to higher health care costs meanwhile been physical activity were related to lower health care costs and the combination of both showed that be adherent and physical activity represent the same cost with health than those normotensive and active emphasizing the importance of adherence and physical activity in the hypertensive treatment.

Keywords Cardiovascular disease, Health expenditures, Physical exercise, Treatment adherence

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CSP CADERNOS DE SAÚDE PÚBLICA
REPORTS IN PUBLIC HEALTH

ARTICLE

Impact of cycling and walking on adiposity and healthcare costs among adults: longitudinal study

Impacto do ciclismo e da caminhada na adiposidade e nos custos de saúde em adultos: estudo longitudinal

Impacto de andar en bicicleta y caminar sobre la adiposidad y los costos de salud en adultos: estudio longitudinal

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Abstract

Leisure-time physical activity seems relevant to prevent the development of chronic diseases and obesity. However, not much is known about the economic burden of these healthy behaviors, mainly in longitudinal designs. This study aimed to analyze the impact of walking and cycling on leisure-time on adiposity and healthcare costs among adults. This longitudinal study was conducted at a medium-size Brazilian city and included 198 participants with no missing data attended in the Brazilian Unified National Health System. Cycling and walking were assessed by a questionnaire with a face-to-face interview at four time-points (baseline, 6-month, 12-month, and 18-month). Healthcare costs were assessed using medical records. Adiposity markers included waist circumference and body fatness. Over the follow-up period, participants who were more engaged in cycling presented lower body fatness (p-value = 0.028) and healthcare costs (p-value = 0.038). However, in the multivariate model, the impact of cycling on costs was not significant (p-value = 0.507) due to the impact of number of chronic diseases (p-value = 0.001). Cycling on leisure-time is inversely related to adiposity in adults, whereas its role on preventing chronic diseases seems the main pathway linking it to cost mitigation.

Exercise; Body Mass Index; Health Care Costs

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https://doi.org/10.1590/1516-3180.2023.0029.140823 ORIGINAL ARTICLE

Sedentary behavior, abdominal obesity and healthcare costs in Brazilian adults with cardiovascular diseases: a cross-sectional study

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KEY WORDS (MeSH terms):
Sedentary behavior.
Public health.
Health care costs.
Fat body.
Waist circumference.
Brazil.

AUTHORS' KEY WORDS:
Chronic disease.
Medicines.
Adult patients.

ABSTRACT

BACKGROUND: Research on the economic burden of sedentary behavior and abdominal obesity on health expenses associated with cardiovascular diseases is scarce.

OBJECTIVE: The objective of this study was to verify whether sedentary behavior, isolated and combined with abdominal obesity, influences the medication expenditure among adults with cardiovascular diseases.

DESIGN AND SETTING: This cross-sectional study was conducted in the city of President Prudente, State of São Paulo, Brazil in 2018.

METHODS: The study included adults with cardiovascular diseases, aged 30-65 years, who were treated by the Brazilian National Health Services. Sedentary behavior was assessed using a questionnaire. Abdominal obesity was defined by waist circumference. Medication expenditures were verified using the medical records of each patient.

RESULTS: The study included a total of 307 adults. Individuals classified in the group with risk factor obesity combined (median [IQ] USD$ 29.39 [45.77]) or isolated (median [IQ] USD$ 27.17 [59.76]) to sedentary behavior had higher medication expenditures than those belonging to the non-obese with low sedentary behavior group (median [IQ] USD$ 13.51 [31.42]) (P = 0.01). The group with combined obesity and sedentary behavior was 2.4 (95%CI = 1.00; 5.79) times more likely to be hypertensive.

CONCLUSION: Abdominal obesity was a determining factor for medication expenses, regardless of sedentary behavior, among adults with cardiovascular diseases.

INTRODUCTION

The use of medicines has been the basis of many clinical interventions to treat a large variety of diseases and represents one of the most relevant components of overall healthcare costs. Healthcare costs related to medicine use increases with age[1,2] and represents a relevant challenge for the management of any national health service.

The prevalence of sedentary behavior and abdominal obesity has increased worldwide, and these phenomenon seems to have been boosted by the coronavirus pandemic.[3] Even before the pandemic, the relevant burden of both abdominal obesity and sedentary behavior on the development of cardiovascular and metabolic diseases has been reported by several authors.[4,5,6,7] Part of this attention directed to abdominal obesity and sedentary behavior is because the diseases associated with these factors put relevant pressure on national health services worldwide.

One hour of sedentary behavior can add up to approximately USD $37 in personal health expenditures.[8] It has been defined as activities that do not increase energy expenditure substantially above the resting level and involves energy expenditure of 1.0 to 1.5 metabolic equivalent units (METs).[9] Sedentary behavior, over the last decade, has been associated with numerous chronic non-communicable diseases (NCDs).[10-12]

An epidemiological study conducted over a span of 12 years on individuals aged 18-90 years in Canada showed that spending excessive time on sedentary behaviors can have a negative impact on various health outcomes, regardless of the individual's physical activity level. Those who reported spending approximately three-quarters of their time, or almost all of their time throughout the day, sitting (hazard ratio, HR = 1.47 [95% confidence interval (CI) = 1.09–1.96]; HR = 1.54

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ORIGINAL ARTICLE

American Journal of Human Biology WILEY

The impact of early sports participation on body fatness in adulthood is not mediated by current physical activity

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Funding information
Conselho Nacional de Desenvolvimento Científico e Tecnológico; Coordenação de Aperfeiçoamento de Pessoal de Nível Superior—Brazil (CAPES); Fundacion Araucaria; Sao Paulo Research Foundation

Abstract

Objective: The aim was to analyze the relationship between early sports participation (ESP) and body fatness (BF) in adults, as well as to identify whether this possible relationship is directly influenced by the current physical activity (PA) level.

Methods: This cross-sectional study combined baseline data of two cohort. The BF estimated by DXA. The ESP, the subjects reported the engagement in sports during childhood (7–10 years) and adolescence (11–17 years) through two yes/no questions and current PA (described as steps) was device—measured using pedometers. Were identified as potential covariates and therefore adjusted the multivariate models: age, ethnicity, alcohol consumption, smoking, and sleep quality. Statistical analysis consisted of the chi-square test, analysis of variance/covariance, and structural equation modeling (software BioEstat version 5.0; p-value < .05).

Results: Adults engaged in ESP had lower BF; among women, the variance in BF explained by ESP was 25.5%; among men, it was 9.2%. Sports participation in early life ($r = -.436$ [95% CI: −0.527 to −0.346]) and current PA ($r = -.431$ [95% CI: −0.522 to −0.340]) were inversely related to BF, as well as positively related to each other ($r = .328$ [95% CI: 0.226 to 0.430]). In the mediation model, current PA partially mediated (18.5%) the impact of ESP on BF, while current PA and ESP remained relevant determinants of BF.

Conclusion: Early sports participation and current PA have a significant impact on BF in adulthood, which is of similar magnitude and independent of each other.

1 | INTRODUCTION

Obesity is the origin of many health problems in different age groups, including cardiovascular and metabolic diseases (Aune et al., 2018; Cayres et al., 2017; Drozdz et al., 2021). The obesity prevalence raised over the last decades in developed and developing nations, as well as in pediatric and adult groups (NCD, 2017). In terms of its development, components of human behavior have been pointed out as relevant determinants of obesity, such as physical activity level (Datta Banik et al., 2014; Tanisawa et al., 2014).

https://doi.org/10.1590/1516-3180.2023.0215.R1.13052024 ORIGINAL ARTICLE

Burden of metabolic syndrome on primary healthcare costs among older adults: A cross-sectional study

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KEYWORDS (MeSH terms):
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ABSTRACT

BACKGROUND: The impact of metabolic syndrome (MetS) on healthcare costs remains unclear in the literature.

OBJECTIVES: To determine the impact of MetS on primary healthcare costs of adults, as well as to identify the impact of physical activity and other covariates on this phenomenon.

DESIGN AND SETTING: This cross-sectional study was conducted in the city of Presidente Prudente, State of São Paulo/Brazil, in 2016.

METHODS: The sample comprised 159 older adults (> 50 years) of both sexes (110 women) who were identified from their medical records in the Brazilian National Health Service. Healthcare costs (US$) were assessed through medical records and divided into medical consultations, medications, laboratory tests, and total costs. MetS was assessed using medical records.

RESULTS: The Brazilian National Health Service spent more on consultations (US$ 22.75 versus US$ 19.39; + 17.3%) and medication (US$ 19.65 versus US$ 8.32; + 136.1%) among adults with MetS than among those without MetS, but the costs for laboratory tests were similar (P = 0.343). Total costs were 53.9% higher in adults with MetS than in those without the diagnosis of the disease (P = 0.001). Regarding total costs, there was an increase of US$ 38.97 when five components of MetS were present (P = 0.015), representing an increase of approximately 700%, even after adjusting for sex, age, and physical activity.

CONCLUSION: In conclusion, the presence of the MetS is responsible for increasing primary care costs among older adults, especially in those related to medicines.

INTRODUCTION

Metabolic syndrome (MetS) is a complex disorder characterized by a set of cardiovascular risk factors.[1-4] According to the National Cholesterol Education Program's Adult Treatment Panel III,[1] the diagnosis of MetS is made by altering at least three of these components: abdominal obesity, high triglycerides (TG), low high-density lipoprotein (HDL), high blood pressure (BP), and high fasting blood glucose levels.[1]

Diabetes mellitus (DM), arterial hypertension (AH), and cardiovascular diseases (CVDs), in isolation, are known as public health problems responsible for high mortality rates worldwide.[1-5] There are indications that MetS, in most cases, foreshadows some CVDs,[6-8] which are responsible for the highest mortality rate (31% worldwide) according to the World Health Organization.[4] People with MetS are more likely to have CVD than those without MetS (45.6% versus 8.6%, P < 0.0001) and show increased mortality risk of CVD.[7] Another concern related to MetS is its increasing prevalence worldwide,[9-11] which is a concerning phenomenon observed in both developed (Korea and United States)[9,10] and developing nations (Brazil and India).[3,11]

In fact, the components of MetS contribute negatively to the economy.[11,12] In the United States, patients with hypertension have generated an annual expenditure of approximately US$ 2,000 higher than people without the disease.[13] In Brazil, a follow-up study identified that patients with DM spend approximately 41% more on health services when compared with individuals without DM.[12] In contrast, the economic burden of MetS has been less investigated, mainly in developing nations.

Moreover, the literature confirms the positive impact of physical activity on the control of the different components of MetS[14] and the mitigation of healthcare costs attributed to the treatment of diseases related to MetS,[15] but its impact on the relationship between MetS and healthcare costs is not clear.

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ESTUDOS

Exergames como recursos de tecnologia assistiva a estudantes com paralisia cerebral: análise do desempenho e das adaptações de estratégias de ensino

Elaine de Oliveira Santos[I,II]
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Resumo

Os *exergames* fazem parte de uma categoria de jogos digitais que utiliza o movimento como forma de interação entre o usuário e o jogo. Os usuários, em especial quando acometidos por paralisia cerebral (PC), apresentam dificuldades na interação com esses jogos, em virtude das alterações motoras. O objetivo deste estudo foi analisar o desempenho de estudantes com PC e as adaptações de estratégias de ensino em intervenções com *exergames*. Participaram do estudo seis estudantes diagnosticados com PC. As sessões de intervenções totalizaram 75 registros. O desempenho foi analisado mediante um roteiro de observação com cinco itens de análise: independência, atenção/concentração, amplitude de movimento, tempo de reação e frequência de apoio, associados a uma correlação entre as variáveis "número de sessões" e "pontuação".

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Acute and Chronic Effects of Exercise

Cost-effectiveness analysis of physical exercise program among hypertensive patients in the Brazilian National Healthcare System: real-life data

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Abstract - Objective The study aimed to perform a cost-effectiveness analysis comparing the treatment based on traditional drug therapy (TDT), in relation to alternative treatment based on combined TDT and exercise program (TDT +E) in real-life condition. **Methods:** The health outcomes monitored during the investigation were metabolic (glucose, cholesterol, and triglycerides) and body composition (weight, body mass index [BMI] and body fat percentage [%BF]) parameters of individuals within each group. Healthcare expenditures from each participant were estimated including information registered in medical records during 12 months of follow-up. **Results:** The intervention group showed economic advantages in comparison to control group for triglycerides, cholesterol, weight, BMI and body fat percentage and corresponding to savings of US$7.63/mg/dL, US$5.20/mg/dL, US$31.21/kg, US$69.38/kg/m^2 and US$19.32/%BF. Results were maintained even after sensitivity analyzes. **Conclusions:** Exercise programs might be cost-effectiveness to public health interventions among hypertensive patients in primary health care facilities, due to reduced metabolic and body composition variables, which are risk factors for chronic diseases.

Keywords: cost-effectiveness, exercise, dyslipidemias, healthcare costs.

Introduction

The increase in life expectancy has been accompanied by an increase in the prevalence of non-communicable chronic diseases[1], a matter of especial concern in low and middle-income countries[2] due to the occurrence of double burden of disease[3]. Non-communicable chronic diseases were responsible for 72% of all deaths in Brazil in 2013, cardiovascular diseases were the main causes. In 2019, the cardiovascular diseases were responsible for 28.2% of the deaths in the country[5].

Physical inactivity is an aggravating factor in the upsurge of non-communicable chronic diseases, being directly related to the development of several health problems, including hypertension, type 2 diabetes and obesity[6], which in turn represent significant expenditures to the public health system[7-11].

On the other hand, the practice of regular physical activity minimizes the physiological effects and progression of non-communicable chronic diseases, being considered an important strategy for health promotion, non-drug control of diseases and protection from risk factors[6,12,13]. In primary care settings, the National Institute for Health and Care Excellence (NICE) provides specific guidelines for promotion of physical activity to countries belonging to the United Kingdom[14]. In fact, a study recently conducted in London showed that programs encouraging the practice of physical activities would result in resource savings by reducing the significant number of cases of non-communicable chronic diseases and their aggravating factors[15].

In Brazil, the National Health Promotion Policy (PNPS) was instituted in 2006, which incorporates physical activities practice promoting quality of life[16]. Regarding primary health care, the physical education professional could be included in a multidisciplinary team called Family Health Support Center (NASF)[17]. Research-

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Relationship Between Physical Activity Level and Primary Care Costs in Older Diabetic Patients From a Middle-Size Brazilian City: An Eight-Year Follow-Up Study

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Objectives: Physical activity and costs have been consistently related each other, but mostly in cross-sectional investigations. This study aims to investigate the relationship between changes in physical activity level and changes in healthcare costs among older diabetic adults in an 8-year follow-up study.

Methods: The study followed 151 diabetic adults ≥50 years of age, for a period of 8 years, who were patients of Basic Health Care Units in the city of Bauru (Brazil). Medical records were consulted to obtain information on healthcare costs. Physical activity level was assessed through an interview. Data analysis included descriptive statistics, analysis of variance, and linear regression.

Results: Participants who increased leisure-time physical activity from 2010 to 2018 accumulated less healthcare costs from 2020 to 2018. The magnitude of the relationship was small (r = −0.233 [95% CI: −0.379 to −0.076]).

Conclusion: In summary, among diabetic patients, to increase leisure-time physical activity from 2010 to 2018 was inversely related to the amount of healthcare costs spent over the same period of 8 years.

Keywords: diabetes mellitus, physical activity, primary care, health care costs, epidemiology

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INTRODUCTION

Diabetes mellitus (DM) is a clinical condition characterized by a deficiency in the action/secretion of insulin, leading to abnormal alterations in blood glucose levels [1]. Over the last decades, concerns about the social and economic impact of DM have grown due to the relevant number of people living with DM worldwide (536.6 million), and figures show an increasing trend in both its prevalence [1] and related comorbidities [1–3]. In terms of economic burden, DM is a clinical condition related to

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Musculoskeletal and economic repercussions of early sports initiation: ABCD Growth Study

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Abstract

Objective: To evaluate the association of early sports initiation with pain and healthcare costs in adolescents.

Study design: This is a 28-week cohort study with adolescents (11-17 years-old) carried out in 2022. The primary outcomes were self-reported pain (weekly reported) and health care costs (weekly monitored [medical consultations, laboratory/clinical tests and medication consumption]). Outcomes were compared according to early sports initiation: Control (adolescents not engaged in [n= 32]), Early (adolescents who initiated before the recommended age [n= 17]) and Ontime (adolescents who initiated in the recommended age [n= 46]).

Results: Of 95 adolescents, 26.9% (95%CI: 16.1% to 37.9%) of the adolescents engaged in sports started sports participation before the recommended age. The self-report of low back pain was significantly associated with early sports initiation when compared to adolescents not engaged in sports (HR= 4.5 [95%CI: 1.2 to 16.6]). Intensity (β= 0.158 [95%CI: 0.018 to 0.298]) and volume (β= 0.016 [95%CI: 0.002 to 0.029]) of sports participation were positively related to the number of pain events reported by adolescents who started before recommended age. Among these adolescents, every pain event reported during the follow-up period increased the costs by US$0.09 (95%CI: 0.02 to 0.16).

Conclusions: Early sports initiation increased musculoskeletal pain among adolescents, affecting health care costs.

ARTIGOS EM FASE FINAL DE ELABORAÇÃO

ARTIGO 1

Relationship between training volume and costs with medication among adolescents: ABCD – Growth Study

Monique Yndawe Castanho Araujo[1], Jamile Sanches Codogno[2], Santiago Maillane-Vanegas[3], Pedro Henrique Narciso[4], Ana Elisa von Ah Morano[5], Rômulo Araujo Fernandes[6].

Abstract

Objective: to analyze the relationship between medication costs, sports participation and habitual physical activity among adolescents regularly engaged in organized sports. **Methods:** This cross-sectional study was carried out at Sao Paulo State University - UNESP through the Laboratory of Investigation in Exercise (LIVE) and followed 63 adolescents for 28 weeks through 2022. The training volume was self-reported (number of weekly sessions multiplied by the duration). The medication consumption was reported by the adolescents' parents/guardians, it was considered that all the medication used were paid for out of pocket. Body fat (%) was measured by a single full-body scan on dual-energy X-ray absorptiometry. Pain was verified through a questionnaire. Habitual physical activity was monitored in three data collections (baseline, after 12 weeks, and 28 weeks) using a accelerometer. The average daily time spent in each intensity level (resting, sitting position, low intensity, moderate intensity, and vigorous intensity) was calculated to determine the time spent in the sitting position and in moderate-to-vigorous physical activities (MVPA), which is the sum of moderate and vigorous intensities.Peak height velocity was calculated based on anthropometric measurements. **Results:** A total of 63 adolescents (36 boys and 27 girls) with a mean age of 14.81 (2.16) years were evaluated. A significant relationship was found between the occurrence of pain, training volume (rho= 0.295) and the cost of medications (rho= 0.315) used by the adolescents. Training volume was negatively related to medication costs (p-value <0.05), independently of confounder in model. However, MVPA proves to be an influential covariate in medication costs (p-value= 0.036). **Conclusion:** Our findings suggest that training volume and MVPA seems to be related with lower medication costs among adolescent athletes.

RESULTS

A total of 63 adolescents (36 boys and 27 girls) with a mean age of 14.81 (2.16) years were evaluated. The adolescents had mean values of body mass of 64.69 (17.97) kg, height 167.75 (13.28) cm, body fatness 23.12 (8.32) %, PHV 1.77 (1.76) years, training volume 553.87 (267.50) min/week, MVPA 42.64 (23.22) min/day and Sitting position 493.73 (98.57) min/day.

Table 1 describes the characteristics according to the sports modality. Judo athletes had higher body fatness (p-value= 0.003) when compared to track and field, basketball and swimming athletes. Swimming and basketball athletes had higher weekly training volume values compared to judo and gymnastics athletes (p-value < 0.001). However, robust differences for MVPA (p-value= 0.572) and Sitting position (p-value= 0.080) between modalities were not observed.

Table 1. General characteristics of the sample according to sports modality (ABCD – Growth Study; n = 63).

	Sports Modality				
	Judo (n=14)	**Gymnastics (n=7)**	**Track and field (n=13)**	**Basketball (n=11)**	**Swimming (n=18)**
General characteristics	Mean (95% IC)	Mean (95% IC)	Mean (95% IC)	Mean (95% IC)	Mean (95% IC)
Sex (boys/girls)	10/4	0/7	6/7	11/0	9/9
Age (Years)	14.64 (12.67 to 16.61)	13.57 (10.65 to 16.49)	15.38 (14.71 to 16.06)	14.82 (14.31 to 15.32)	15.00 (14.21 to 15.36)
Body mass (kg)	66.52 (54.86 to 78.17)	47.72 (41.22 to 54.22)	61.17 (53.90 to 68.44)	78.61[b] (63.15 to 94.07)	63.89 (57.26 to 70.53)
Height (cm)	162.45 (155.99 to 168.90	149.64 (138.45 to 160.82)	167.90[b] (163.76 to 172.05)	182.90[a,b,c] (177.07 to 188.72)	169.55[b,d] (164.35 to (174.74)
PHV(Years)	1.14 (-0.33 to 2.61)	0.99 (-1.37 to 3.35)	2.34 (1.50 to 3.19)	1.79 (1.31 to 2.27)	2.15 (1.56 to 2.73)
Body fat (%)	30.27 (26.21 to 34.33)	24.37 (20.98 to 27.76)	19.35[a] (15.11 to 23.59)	20.50[a] (15.01 to 25.98)	21.40[a] (17.08 to 25.71)
Training Volume (min/week)	265.96 (180.68 to 351.24)	396.54 (240.93 to 552.15)	430.96[a,b] (389.85 to 472.08)	700.64[a,b,c] (610.19 to 791.09)	838.07 [a,b,c] (750.65 to 925.49)
MVPA (min/day)	43.14 (25.19 to 61.09)	31.14 (21.84 to 40.44)	50.40 (31.92 to 68.87)	40.20 (28.41 to 51.98)	43.93 (32.45 to 55.42)
Sitting position (min/day)	497.07 (426.22 to 567.91)	585.71 (511.39 to 660.03)	496.00 (455.87 to 536.12)	462.80 (375.21 to 550.38)	468.50 (432.80 to 504.19)

Nota: 95%IC= 95% confidence interval; PHV= peak of height velocity (somatic maturation); MVPA= moderate to vigorous physical activity; [a]= different from Judo; [b]= different from gymnastics; [c]= different from track and field; [d]= different from basketball.

The total amount spent on medications during the 28 weeks of follow up was US$ 1,488.67. The swimming athletes (Midian= 0.0, min-max= 0.0 – 43.64) had lower values than those who practiced gymnastics (Midian= 17.16, min-max= 0.0 – 62.44), track and field (Midian= 11.25, min-max= 0.0 – 93.79) and basketball (Midian= 14.31, min-max= 0.0 – 224.78), however, no different from judo (Midian= 0.0, min-max= 0.0 – 173.77) (**Figure 2)**.

Finally, a significant relationship was found between the occurrence of pain, training volume and the cost of medications used by the adolescents (**Figure 3)**.

In GLM-Gamma model, training volume was negatively related to medication costs (p-value <0.05), independently of confounder in model 1, 2, 3 and 4 (sex, body fat, PHV, pain, MVPA and Sitting Position). However, in the model 4, MVPA proves to be an influential covariate in medication costs (p-value= 0.036) (**Table 2)**.

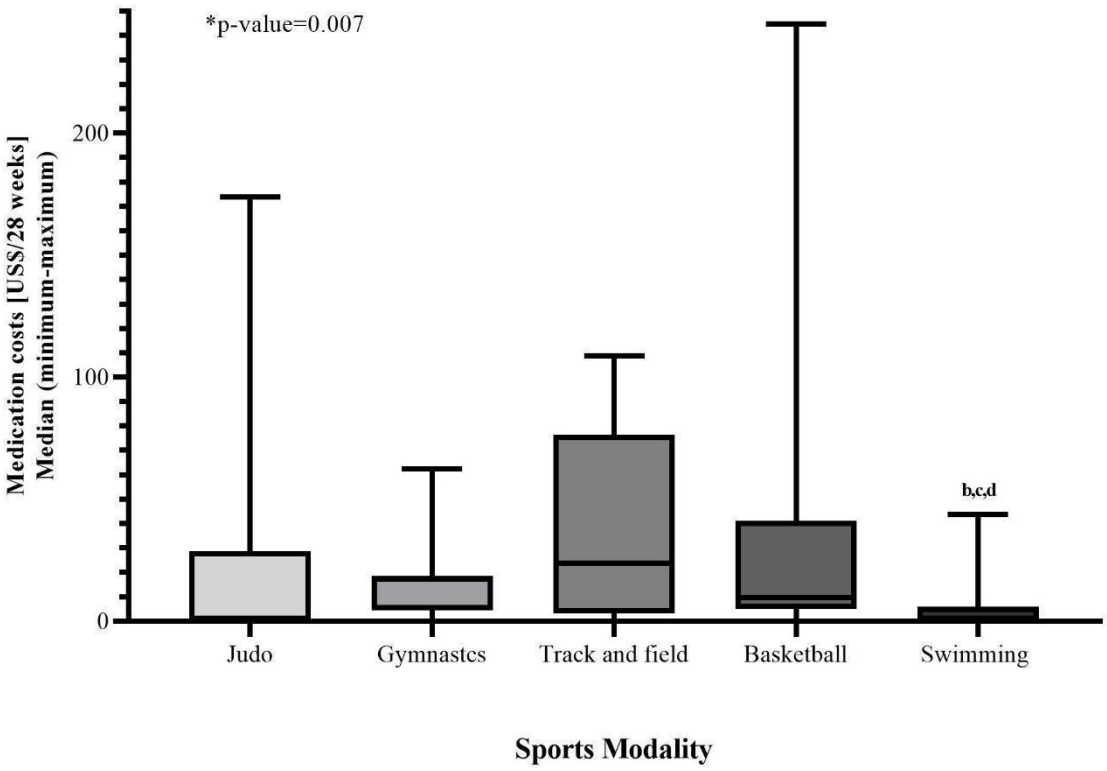

Figure 2: Medication costs according to sports modality (ABCD – Growth Study; n = 63)

Nota: *= p-value for Kruskal-Wallis test; [a]= different from Judo; [b]= different from gymnastics; [c]= different from track and field; [d]= different from basketball.

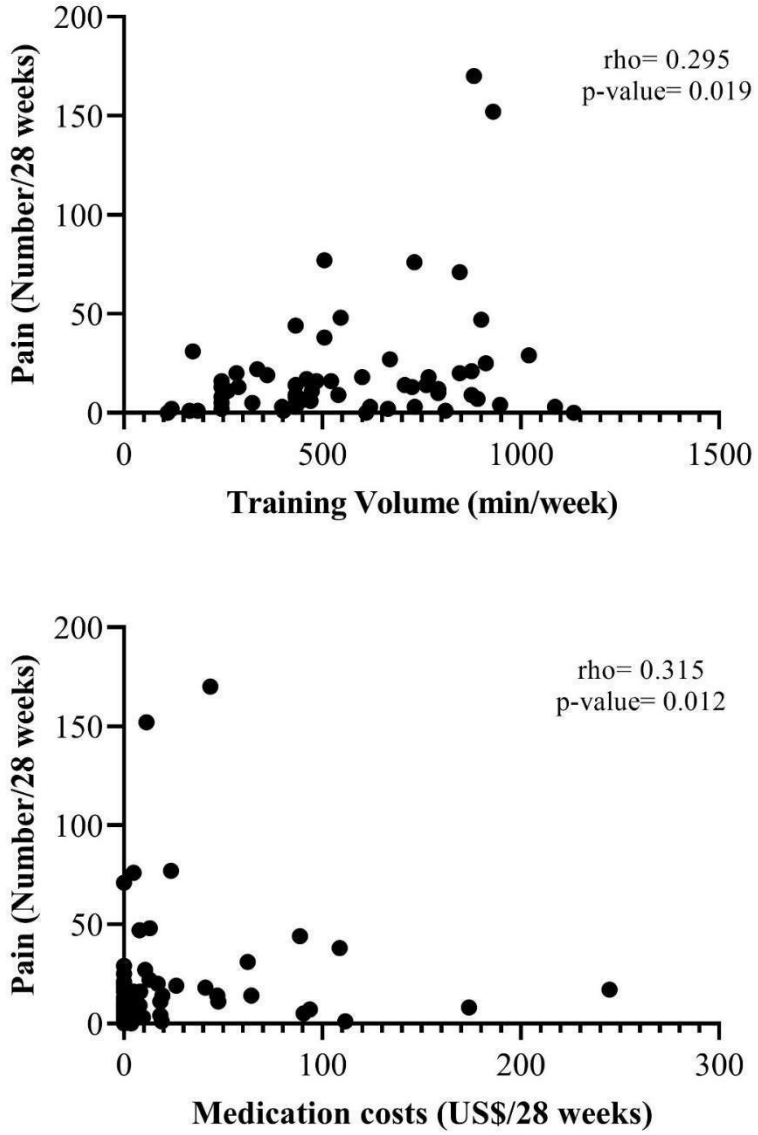

Figure 3: Correlations between pain, training volume and medication costs (ABCD – Growth Study; n = 63)

Nota: rho= Spearman correlation.

Table 2: Multivariate relationship between medication costs and training volume among adolescents (ABCD – Growth Study; n = 63).

	GLM—Gamma (Dependent variable: Medication costs [US$]- 28weeks)			
	Model 1	**Model 2**	**Model 3**	**Model 4**
Independent Variables	(β 95%IC)	(β 95%IC)	(β 95%IC)	(β 95%IC)
Training Volume (min/week)	-0.002 (-0.004 to -0.001)*	-0.002 (-0.004 to -0.001)*	-0.003 (-0.004 to -0.001)*	-0.003 (-0.005 to -0.001)*
Confunders				
Sex (1=boys; 2=girls)		-0.543 (-1.470 to 0.385)	-0.741 (-1.708 to 0.225)	-0.739 (-1.840 to 0.361)
Body fat (%)		0.031 (-0.027 to 0.088)	0.015 (-0.047 to 0.077)	0.011 (-0.054 to 0.076)
Pain (number/28weeks)			0.007 (-0.003 to 0.017)	0.011 (0.001 to 0.022)*
PHV(Years)			0.156 (-0.056 to 0.368)	0.229 (-.037 to 0.495)
MVPA (min/day)				-0.026 (-0.051 to -0.002)*
Sitting position (min/day)				-0.001 (-0.006 to 0.004)

Nota: GLM= generalized linear model; 95%CI= 95% confidence interval; PHV= peak of height velocity (somatic maturation); MVPA= moderate to vigorous physical activity. Model-1 (crude); Model-2 (adjusted by general information [sex and body fat]); Model-3 (Model-2 + pain + PHV); Model-4 (Model-3 + MVPA and sitting position)

ARTIGO 2

Restful sleep, physical activity and cardiovascular outcomes among adolescents: ABCD – Growth Study

Ana Elisa von Ah Morano, Monique Yndawe Castanho Araujo, Rafael Luiz de Marco, Wesley Torres, Alan Barker, Rômulo Araujo Fernandes

Abstract

Objective: to identify the correlates of restful sleep time among adolescents, to analyze the relationship of restful sleep time with cardiovascular outcomes and if confirmed any significant relationship with cardiovascular parameters, to identify if such relationship is affected by the physical activity level of the adolescents. **Methods:** Cross-sectional study, carried out at Sao Paulo State University - UNESP through the Laboratory of Investigation in Exercise (LIVE). The cross-sectional datasets used in this manuscript were collected between 2017 and 2023, totaling 212 adolescents between 11 and 18 years old. Physical activity level and sleep were collected using an accelerometer (Polar V800; Polar, Kempele, Finland). Participants wore accelerometers throughout the day, except during sports. For each day analyzed, the device discriminated: I) sleeping time (in minutes), II) sitting time, III) light, IV) moderate and V) vigorous intensity activities. Body fat (BF) was estimated using the whole-body dual-energy radiological absorptiometry technique (General Electrics brand, Lunar DPX-NT) and analyzed using the GE Medical System Lunar software, version 4.7. Carotid and femoral intima-media thicknesses (CIMT and FIMT, respectively) were evaluated on the same day using an ultrasound device (Figlabs, model FP 102, Brazil) equipped with a high-resolution multifrequency linear transducer, adjusted to 12 MHz. blood samples were collected (high-density lipoprotein [HDL-c], low-density lipoprotein [LDL-c], total cholesterol [TC], triacylglycerol [TG], insulin, glucose, and C-reactive protein [CRP]). **Results:** There was negative correlation of CIMT (r=-0.176 [95%CI: -0.304 to -0.042]) and FIMT (r=-0.138 [95%CI: -0.268 to -0.003]) with restful sleep, but not with SBP and DBP. The adjusted relationship of restful sleep time with cardiovascular outcomes identified that the time of restful sleep remained significantly related to CIMT (explaining 11.4% of the variance on CIMT) and FIMT (explaining 10.4% of the variance on CIMT). On the other hand, this relationship happened in a significant way only among insufficiently active adolescents. Among insufficiently active adolescents, restful sleep time was inversely related to both CIMT (r= -0.210; p-value= 0.012) and FIMT (r= -0.168; p-value= 0.043), while the models explained 14.9% and 13.4% of the variance on CIMT and FIMT, respectfully. **Conclusion:** Among adolescents, restful sleep is linked to better IMT parameters in adolescents, while this beneficial relationship has been observed only among those who are insufficiently active.

Keywords: adolescent, sleep time, physical activity; sedentary behavior.

Results

Boys were slightly younger (p-value= 0.045), taller (p-value= <0.001) and heavier (p-value= 0.001) than girls, but they presented lower body fatness (p-value= <0.001). Physical activity, cardiovascular and inflammatory outcomes were similar between boys and girls, while fasting glucose was 5.2% higher in girls than boys (p-value= 0.004) (**Table 1**). The relationship between restful sleep time and its correlates are presented in **Table 2**. There was a significant and negative relationship between sleep and age (standardized coefficient r= -0.190 [effect-size of small magnitude]; p-value= 0.019), while the model explained poorly the variance on restful sleep time (3.8%).

The Relationship of restful sleep time with cardiovascular outcomes among adolescents is shown in **Table 3**. There was negative correlation of CIMT (*r*=-0.176 [95%CI: -0.304 to -0.042]) and FIMT (*r*=-0.138 [95%CI: -0.268 to -0.003]) with restful sleep, but not with SBP and DBP. The adjusted relationship of restful sleep time with cardiovascular outcomes identified that the time of restful sleep remained significantly related to CIMT (explaining 11.4% of the variance on CIMT) and FIMT (explaining 10.4% of the variance on CIMT).

On the other hand, this relationship happened in a significant way only among insufficiently active adolescents (**Table 4**). Among insufficiently active adolescents, restful sleep time was inversely related to both CIMT (r= -0.210; p-value= 0.012) and FIMT (r= -0.168; p-value= 0.043), while the models explained 14.9% and 13.4% of the variance on CIMT and FIMT, respectfully.

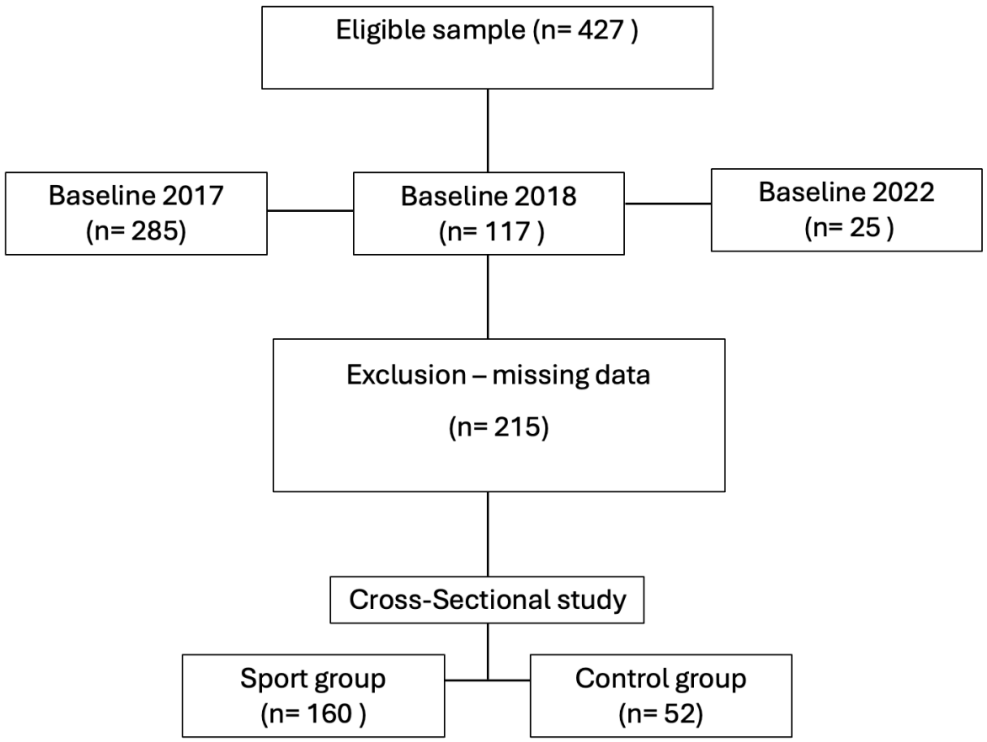

Figure 1- Flow diagram (ABCD – Growth Study, 2017 – 2022)

Table 1. Characteristics of adolescents according to sex (n= 212; ABCD – Growth Study).

	Boys (n= 134) Mean (SD)	Girls (n= 78) Mean (SD)	*p*-value
Age (years)	14.1 (2.3)	14.8 (2.4)	0.045
Body weight (kg)	62.8 (17.9)	55.4 (10.8)	<0.001
Height (cm)	168.5 (12.6)	159.1 (8.8)	<0.001
BF (%)	21.2 (11.2)	30.6 (10.6)	<0.001
Cardiovascular			
SBP (mmHg)	116.3 (11.9)	110.7 (10.9)	<0.001
DBP (mmHg)	62.7 (7.6)	63.1 (7.1)	0.735
CIMT (mm)	0.405 (0.212)	0.341 (0.214)	0.037
FIMT (mm)	0.366 (0.191)	0.346 (0.222)	0.502
Metabolic			
Glucose (mg/dL)	88.1 (11.6)	83.7 (6.9)	0.004
CRP (mg/L)*	2.6 [3.1]	2.1 [4.1]	0.198
HOMA-IR*	1.8 [1.3]	2.1 [1.3]	0.158
Physical activity			
MVPA (min)	59.1 (42.8)	50.5 (35.1)	0.137
Sleep			
Sleep time (min)	431.5 (87.4)	441.0 (73.6)	0.205
Restful sleep (min)	345.1 (70.6)	355.2 (55.6)	0.111

*= expressed as median and interquartile range and compared using Mann-Whitney's test; SD= standard-deviation; BF= body fatness; SBP= systolic blood pressure; DBP= diastolic blood pressure; CIMT= carotid intima-media thickness; FIMT= femoral intima-media thickness; CRP= C-reactive protein.

Table 2. Restful sleep and its correlates among adolescents (n= 212; ABCD – Growth Study).

	Outcome: Restful sleep (min)		
	Pearson Correlation		Linear regression*
Independent variables	*r*	p-value	β (95%CI)
Sex (0= boys / 1= girls)	-0.075	0.278	-9.38 (-29.78 to 11.01)
Age (years)	-0.195	0.004	-5.23 (-9.61 to -0.86)
Sports participation (0= no/ 1= yes)	0.127	0.065	6.53 (-17.94 to 31.01)
Resistance training (0= no/ 1= yes)	0.030	0.664	5.35 (-15.79 to 26.51)
MVPA (min/day)	-0.122	0.076	-0.16 (-0.38 to 0.06)
Body fatness (%)	0.092	0.183	0.26 (-0.56 to 1.09)
Model (*r*)			0.255
Model (r^2 $_{adjusted}$)			0.038
Collinearity (VIF)			From 1.049 to 1.462

*= adjusted by sex, age, sports participation, resistance training, MVPA, and obesity; 95%CI= 95% confidence interval; MVPA= moderate-to-vigorous physical activity; VIF= variance inflation factor.

Table 3. Relationship of sleep time with cardiovascular outcomes among adolescents (n= 212; ABCD – Growth Study).

	SBP (mmHg)	DBP (mmHg)	CIMIT (mm)	FIMT (mm)
	Correlation (*r*)	Correlation (*r*)	Correlation (*r*)	Correlation (*r*)
Pearson Correlation				
Restful sleep (min)	-0.080	0.014	**-0.176***	**-0.138***
Linear regression				
	β (95%CI)***	β (95%CI)***	β (95%CI)***	β (95%CI)***
Restful sleep (min)	---	---	**-0.606^{-3} (-1.039^{-3} to -0.173^{-3})**	**-0.460^{-3} (-0.871^{-3} to -0.049^{-3})**
Model (*r*)			0.374	0.360
Model (r^2 $_{adjusted}$)			0.114	0.104
Collinearity (VIF)			From 1.058 to 1.453	From 1.058 to 1.445

SBP= systolic blood pressure; DBP= diastolic blood pressure; CIMT= carotid intima-media thickness; FIMT= femoral intima-media thickness; *= p-value < 0.05; **= p-value < 0.01; ***= linear regression adjusted by sex, age, body fatness, C-reactive protein and HOMA-IR

Table 4. Relationship of restful sleep time and cardiovascular outcomes according to the level of physical activity among adolescents (n= 212; ABCD – Growth Study).

	CIMIT (mm)	FIMT (mm)
Physical activity level	β (95%CI)*	β (95%CI)*
MVPA <60min/day (n= 133)		
Restful sleep (min)	**-0.670^{-3} (-1.189^{-3} to -0.150^{-3})**	**-0.502^{-3} (-0.989^{-3} to -0.015^{-3})**
Model (*r*)	0.433	0.415
Model (r^2 adjusted)	0.149	0.134
Collinearity (VIF)	From 1.049 to 1.543	From 1.049 to 1.531
MVPA ≥60min/day (n= 79)	β (95%CI)*	β (95%CI)*
Restful sleep (min)	-0.408^{-3} (-1.275^{-3} to 0.459^{-3})	-0.444^{-3} (-1.266^{-3} to 0.378^{-3})

MVPA= moderate-to-vigorous physical activity; CIMT= carotid intima-media thickness; FIMT= femoral intima-media thickness; *= linear regression adjusted by sex, age, body fatness, C-reactive protein and HOMA-IR.

v) ATIVIDADES PROFISSIONAIS CONCOMITANTES ÀS ATIVIDADES COMO BOLSISTA FAPESP

DECLARAÇÃO

O Departamento de Gestão de Pessoas da **FUNDAÇÃO DRACENENSE DE EDUCAÇÃO E CULTURA**, Instituição de Ensino, com inscrição no CNPJ nº. 49.845.878/0001-17, estabelecida na Avenida Alcides Chacon Couto, nº. 395, nesta cidade de Dracena, Estado de São Paulo, **D E C L A R A** para os devidos fins que a Sra. **Monique Yndawe Castanho Araujo Santana**, portadora do CPF [redacted], foi admitida em 27 de janeiro de 2025, por meio do Processo Seletivo 06/2024, com contrato temporário com data fim prevista para 31/12/2025, para exercer a função de Professor Ensino Superior, na Faculdades de Dracena, mantida por esta Instituição. O Regime de trabalho é CLT (Consolidação das Leis do Trabalho). Informo que no 1º semestre de 2025, a professora ministra aulas na disciplina Trabalho de Conclusão de Curso, às quintas-feiras das 21h00 às 22h00 e às sextas-feiras das 18h50 às 22h00. Contabilizando um total de 4 horas/aulas semanais.

Por ser verdade, firmo a presente.

Dracena-SP, 09 de abril de 2025.

CLÁUDIA BINOTO LUIS SCALABRINI
Diretora de Gestão de Pessoas