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Implementacja interwencji dotyczących aktywności fizycznej i diety

Rozprawa doktorska przygotowana pod kierunkiem:

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Wrocław 2024

Spis treści

Abstrakt

Prezentowana rozprawa doktorska stanowi cykl publikacji oparty na trzech badaniach, w skład których wchodzą dwa przeglądy systematyczne systematycznych przeglądów (ang. *meta-review; umbrella review*) oraz jedno badanie oryginalne. Wspólnym przedmiotem badań jest identyfikacja kluczowych aspektów implementacji interwencji psychospołecznych dotyczących zmiany zachowań zdrowotnych, takich jak aktywność fizyczna oraz zdrowa dieta. W szczególności badania są poświęcone: (1) analizie charakterystyk modeli teoretycznych wyjaśniających implementację, (2) identyfikacji kluczowych barier i czynników ułatwiających implementację interwencji w istniejących badaniach oraz (3) zależności między: (a) spostrzeganiem adekwatności procesu implementacji w zakresie zaadresowania barier i czynników ułatwiających procesy implementacji przez osoby wdrażające interwencję a (b) zmianami aktywności fizycznej wśród uczestników interwencji dotyczącej planowania aktywności fizycznej.

W szczególności, celem Badania 1 była identyfikacja kluczowych aspektów procesów implementacji interwencji w analizowanych modelach teoretycznych. Celem Badania 2 było określenie jakie determinanty implementacji interwencji (bariery oraz czynniki ułatwiające implementację interwencji, zaproponowane w modelu the *Consolidated Framework for Implementation Research [CFIR*/ są najczęściej identyfikowane jako kluczowe w systematycznych przeglądach badań oraz dokumentach interesariuszy). W Badaniu 3, w oparciu o model *CFIR* weryfikowano czy istnieją zależności pomiędzy barierami oraz czynnikami ułatwiającymi implementację interwencji spostrzeganymi przez osoby implementujące przeprowadzoną interwencję a wskaźnikami efektywności interwencji, takimi jak zmiana w poziomie umiarkowanej i intensywnej aktywności fizycznej uczestników interwencji. Analizowano interwencje prowadzone z udziałem instytucji administracji

publicznej (tzw. polityki; Badania 1 i 2) oraz prowadzone bez udziału takich instytucji (Badanie 3).

W Badaniu 1 przeprowadzono systematyczny przegląd badań (k =25) oraz dokumentów interesariuszy (k=17). Badanie prowadzono zgodnie z wytycznymi PRISMA. Protokół badawczy zarejestrowano w bazie PROSPERO (nr CRD42019133341). Spośród 38 zidentyfikowanych modeli implementacji, niespełna połowa dotyczyła takich aspektów implementacji, jak: proces, determinanty oraz ewaluacja implementacji. Większość modeli teoretycznych (68,5%) koncentrowała się na trzech poziomach implementacji: indywidualnym, organizacji oraz systemowym, ponad połowa modeli teoretycznych nie uwzględniała w procesie implementacji interwencji aspektów równościowych, takich jak: status społeczno-ekonomiczny czy kontekst kulturowy.

Do Badania 2 (systematyczny przegląd systematycznych przeglądów), przeprowadzonego zgodnie ze standardami PRISMA, na podstawie przeszukania 18 baz danych, włączono 25 przeglądów systematycznych oraz 17 dokumentów interesariuszy. Wśród 26 determinantów implementacji interwencji opartych na CFIR, 7 wskazano jako znaczące (66,7-76,2% analizowanych przeglądów oraz dokumentów interesariuszy). Były to: koszt implementacji, nawiązywanie kontaktów z innymi organizacjami/ społecznościami, polityki zewnętrzne, cechy strukturalne otoczenia, atmosfera sprzyjająca implementacji, gotowość do implementacji oraz wiedza/przekonania.

W Badaniu 3 uwzględniono dane zebrane od 372 uczestników interwencji (dotyczącej promocji aktywności fizycznej i zdrowej diety) oraz 21 implementatorów interwencji. Aktywność fizyczna była oceniana na przestrzeni 14 miesięcy za pomocą akcelerometrów ActiGraph model wGT3X-BT. Wyniki uzyskane w Badaniu 3 wskazują na istotne różnice w zakresie aktywności fizycznej o umiarkowanej i wysokiej intensywności wśród uczestników interwencji, zależne od oceny adekwatność procesu implementacji w zakresie zaadresowania

barier i czynników ułatwiających implementację, zawartych w 2 domenach modelu CFIR: cechy otoczenia zewnętrznego oraz cechy otoczenia wewnętrznego.

Słowa kluczowe: implementacja; interwencja; polityka; aktywność fizyczna; dieta; determinanty implementacji; przegląd systematyczny.

Abstract

This doctoral dissertation is comprised of a series of 3 publications, including two systematic reviews of systematic reviews (meta-review; umbrella review) and one original study. The common objective of the studies is to identify key aspects of the implementation of psychosocial interventions for health behavior change, such as physical activity and healthy diet. In particular, the research is being dedicated to (1) analyzing the characteristics of the theoretical models explaining implementation, (2) identifying key barriers and facilitators to intervention implementation in existing studies, and (3) the relationship between perceptions of barriers and facilitators of implementation processes by intervention implementers (and the related evaluation of the implementation process), as well as changes in physical activity among participants of a physical activity planning intervention.

In particular, the objective of Study 1 was to identify key aspects of intervention implementation processes in the theoretical models analyzed. The objective of Study 2 was to identify which determinants of intervention implementation (barriers and facilitators of intervention implementation, as proposed by the Consolidated Framework for Implementation Research [CFIR) model] are most frequently identified as crucial in systematic reviews and documents of major international stakeholders). In Study 3, the CFIR model was applied to verify whether there are any relationships between the implementers perceptions of adequacy of addressing barriers and facilitators of implementation perceived and indicators of intervention effectiveness, such as levels of moderate-to-vigorous physical activity of intervention participants. Interventions conducted with the participation of public administration institutions (referred to as policies; Studies 1 and 2) and those conducted without the participation of such institutions (Study 3) were analyzed.

In Study 1, a meta-review of published systematic reviews (k =25) and stakeholder documents (k=17) was conducted, in accordance with PRISMA guidelines. The research

protocol was registered in the PROSPERO database (No. CRD42019133341). Of the 38 implementation frameworks identified, less than half addressed implementation aspects such as process, determinants, and implementation evaluation; the majority of theoretical models (68.5%) focused on three levels of implementation: individual, organizational, and system; over half of the theoretical models did not include equality aspects such as socioeconomic status or cultural context.

A total of 25 systematic reviews and 17 stakeholder documents were included in Study 2 (systematic review of systematic reviews), conducted according to PRISMA guidelines, and based on a search of 18 databases. Among the 26 determinants of CFIR-based intervention implementation, 7 were endorsed as significant (66.7-76.2% of the reviews and stakeholder documents analyzed). These were: cost of implementation, networking with other organizations/communities, external policies, structural characteristics of the environment, climate of implementation, readiness for implementation, and knowledge/confidence of the individuals involved.

Study 3 included data collected from 372 participants of interventions (physical activity promotion and healthy diet) and 21 implementers. Physical activity was evaluated over 14 months using ActiGraph model wGT3X-BT accelerometers. The results obtained in Study 3 indicate a significant difference in moderate to vigorous-intensity physical activity between participants supported by those implementers, who evaluated the implementation process as more adequately addressing barriers facilitators from two domains of the CFIR model: characteristics of the outer setting and characteristics of the inner setting.

Keywords: implementation; intervention; policy; physical activity; diet; determinants of implementation; systematic review

Wprowadzenie

Nieprawidłowa dieta oraz niski poziom aktywności fizycznej są kluczowymi czynnikami ryzyka chorób niezakaźnych, takich jak choroby układu krążenia, nowotwory, cukrzyca typu 2 i otyłość (Stanaway i in., 2018). Zmiana zachowań zdrowotnych (np. zwiększenie aktywności fizycznej, redukcja zachowań siedzących) jest kluczowym elementem warunkującym zarówno poprawę zdrowia na poziomie jednostki, jak i wzrost efektywności opieki zdrowotnej na poziomie populacji (Cane i in., 2012). Do osiągnięcia zmiany zachowań niezbędne jest wdrożenie (implementacja) praktyk oraz interwencji, przy czym nie tylko zawartość interwencji, ale i sama implementacja powinna być oparta na dowodach naukowych (Cane i in., 2012). Interwencje implementowane w oparciu o dowody naukowe są bardziej skuteczne niż interwencje, których proces wdrażania nie odwołuje się do modeli teoretycznych (Michie i in., 2010).

W psychologii jako dyscyplinie naukowej coraz większa liczba badań dotycząca zmiany zachowań koncentruje się na opracowywaniu i zastosowaniu modeli teoretycznych, w tym modeli implementacji interwencji, które proponują determinanty implementacji typu indywidualnego (poznawcze, behawioralne), organizacyjnego (Michie i in., 2010, Davies i in., 2010; Eccles i in., 2008) oraz systemowego (Nilsen, 2015).

Implementacja interwencji

W pracy zdefiniowano, *interwencje* jako działania projektowane oraz wdrażane w celu bezpośredniego lub pośredniego zrealizowania określonych celów danej społeczności, na przykład: zdrowe odżywianie, zwiększenie aktywności fizycznej oraz redukcja zachowań siedzących (Lakerveld i in., 2020).

Polityki stanowią szczególny rodzaj interwencji, w których proces decyzyjny, przygotowanie, wdrożenie lub inne działania zaangażowani są interesariusze rządowi, w tym

administracja rządowa, lokalna lub regionalna (Lakerveld et al., 2020). Polityki są efektem złożonych procesów decyzyjnych prowadzonych w określonym kontekście oraz otoczeniu, sprecyzowanych na mocy konsensusu różnorodnych wartości i aspektów (Greer i in., 2018), podczas gdy inne interwencje nie muszą być przygotowane przy udziale takich procesów i w mniejszym stopniu uwzględniają kontekst. Zawarte w pracy badania dotyczą obu działań.

Implementacja interwencji może być zdefiniowana jako proces wprowadzania w życie, wykorzystywania, lub integracji interwencji/polityki z określonym otoczeniem lub systemem, lub proces utrzymywania użyteczności i potencjału interwencji/polityk (Moullin i in., 2015). Implementacja jest dwukierunkowym procesem społecznym, w ramach którego interwencja/polityka jest operacjonalizowana w ramach organizacji/społeczności lub systemu. To także proces, w którym praktyki implementacji są operacjonalizowane w ramach interwencji/polityk (Pfadenhauer i in., 2017). Proces ten obejmuje podmioty odpowiedzialne za implementację, środowisko implementacji, strategie implementacji, populację docelową i cechy interwencji (np. jej zakres) wchodzące w interakcje z charakterystykami szerszego kontekstu kulturowego, społecznego, gospodarczego i politycznego (Pfadenhauer i in., Leeman i in., 2017). Charakterystyki kontekstu implementacji, otoczenia, podmiotów odpowiedzialnych za implementację oraz populacji docelowych mogą stanowić determinanty implementacji (lub warunki implementacji), które występują podczas jej procesu (Nilsen, 2015). Bariery i czynniki sprzyjające implementacji interwencji mogą również odnosić się do strategii stosowanych w celu oddziaływania na implementację (Nilsen, 2015).

Badania dotyczące zmiany zachowań zdrowotnych zwykle koncentrują się na ocenie efektywności interwencji, nie jest ona jednak warunkiem wystarczającym do wprowadzenia danej interwencji do powszechnego użytku. Jednym z kluczowych aspektów interwencji, współdeterminującym jej efektywność, jest implementacja (Bauer i Kirchner, 2020).

Efektywność interwencji prozdrowotnych należy rozumieć jako wpływ działań interwencyjnych na kluczową mierzoną zmienną dotyczącą zdrowia, którą może być na przykład redukcja masy ciała czy też wzrost poziomu aktywności fizycznej (Ramly i Brown, 2023). Proces implementacji to wszelkie działania i strategie, które należy podjąć i/lub wziąć pod uwagę, abv interwencja mogła zostać wdrożona, natomiast efektywność procesu implementacji określa, jak dobrze strategie implementacji oddziałują na wdrożenie interwencji (Ramly i Brown, 2023). Na przykład, charakter i jakość sieci organizacji współpracujących w procesie implementacji oraz rodzaj i jakość formalnej i nieformalnej komunikacji w organizacji implementującej interwencję mogą być czynnikami ułatwiającymi proces implementacji (i tym samym przyczyniać się do wzrostu efektywności zarówno interwencji, jak i implementacji interwencji) (Damschoder i in., 2009). Efekty te mogą wystąpić na poziomie organizacji, implementatorów lub grup docelowych (np. pacjentów) (Ramly i Brown, 2023).

Niniejsza praca dotyczy procesu implementacji, w szczególności analizy modeli implementacji oraz identyfikacji kluczowych barier i czynników ułatwiających implementację interwencji promujących zdrową dietę i aktywność fizyczną.

Charakterystyki i rodzaje modeli teoretycznych implementacji interwencji

Modele teoretyczne implementacji interwencji i polityk (ang. implementation frameworks) stanowią podtyp modeli teoretycznych interwencji/polityk. Modele te koncentrują się na sposobach wprowadzania polityki w życie (Heikkila i in., 2018). Definiuje się je jako „graficzną lub narracyjną reprezentację kluczowych czynników, pojęć lub zmiennych w celu wyjaśnienia zjawiska implementacji” (Moullin i in., 2015). W szczególności modele implementacji mogą obejmować etapy implementacji, determinanty implementacji lub strategie (Moullin i in., 2015). Mogą określać relacje między

uwzględnionymi konstruktami (por. Rycroft-Malone i Bucknall, 2010). W procesie rozwoju modelu teoretycznego poprzez integrowanie nowych dowodów, konstrukty mogą ewoluować, od stosunkowo szerokich lub niejasnych do bardziej szczegółowych i dobrze zdefiniowanych (Dubois i Gadde, 2014). Modele teoretyczne implementacji podlegają klasyfikacji ze względu na specyfikę (np. ogólne działania dotyczące zdrowia vs te mające na celu realizację określonych efektów zdrowotnych, do których odnoszą się modele), ich treść lub cele (np. wyjaśnienie procesów implementacji, identyfikacja czynników determinujących implementację lub opis ewaluacji implementacji), poziom, na którym konstrukty operują (np. poziom indywidualny, organizacyjny lub systemowy), relacje między konstruktami (np. brak powiązań, powiązania jedno- lub dwukierunkowe), jak również uwzględnienie szerszego kontekstu socjodemograficznego i ekonomicznego (Heikkila i in., 2018).

Modele teoretyczne implementacji odnoszące się do obszaru zdrowia można klasyfikować ze względu na zakres, jaki obejmują oraz kontekst do którego się odnoszą (Nilsen, 2015; Nilsen i in., 2019): (1) modele skoncentrowane na procesie implementacji opisujące kroki i praktyczne wskazówki w planowaniu i realizacji przedsięwzięć implementacyjnych; (2) modele charakteryzujące determinanty implementacji koncentrujące się na barierach i czynnikach ułatwiających (sprzyjających) implementację, mających wpływ na efekty implementacji interwencji; (3) modele odnoszące się do ewaluacji implementacji informujące o tym, w jaki sposób prowadzić system ocen zarówno procesu, jak i efektów implementacji.

Modele teoretyczne implementacji interwencji można zaklasyfikować do czterech kategorii ze względu na rodzaj asocjacji występujący pomiędzy konstruktami (Bowen, Zwi, 2005; Rubenstein-Montano i in., 2001): (1) modele opisowe (ang. descriptive frameworks) informują o kluczowych konstruktach modelu, ich właściwościach i cechach, nie uwzględniając jakichkolwiek relacji między konstruktami; (2) modele preskryptywne (ang.

prescriptive) wyznaczają ogólny kierunek działań, wyjaśniając je w szeregu kroków, które należy podjąć; (3) modele wyjaśniające (ang. explanatory) obejmują bardziej szczegółowe jedno- lub dwukierunkowe powiązania między domenami (lub pojęciami w domenach) danego modelu; (4) modele predykcyjne (ang. predictive) obejmują szczegółowe jedno- lub dwukierunkowe zależności między domenami (lub pojęciami w domenach) danego modelu. Modele predykcyjne zakładają kierunkowe relacje między wszystkimi konstruktami modelu (Bowen, Zwi, 2005; Rubenstein-Montano i in., 2001).

Dodatkowo, poza podejściami koncentrującymi się na liniowych powiązaniach między konstruktami zawartymi w modelach implementacji, istnieją modele systemowe, odnoszące się do kompleksowych nieliniowych, wielokierunkowych powiązań pomiędzy konstruktami w modelach (Rohwer i in., 2017; Rutter i in., 2017). Podejścia systemowe (ang. complex system approaches) do relacji zakładają, że system relacji jest czymś więcej niż sumą domen i konstruktów w danym modelu teoretycznym, np. pomiędzy konstruktami modelu mogą tworzyć się pętle sprzężenia zwrotnego (ang. feedback loops), charakteryzujące się tym, że zmiana w pętli pomiędzy dwoma konstruktami może skutkować zmianą całego systemu relacji (Rutter i in., 2017).

Nadrzędnym celem interwencji i polityk zdrowotnych jest egalitaryzm, a więc dostęp do zdrowia dla każdego (OECD, 2019), w związku z tym obecność konstruktów równościowych może stanowić kolejny istotny element kategoryzacji modeli teoretycznych implementacji interwencji ukierunkowanych na promocję zachowań zdrowotnych. Do kluczowych aspektów równości w dostępie do interwencji zdrowotnych zaliczyć należy: status ekonomiczny, wykształcenie, płeć, wiek, narodowość (grupy etniczne, mniejszościowe), izolację geograficzną, normy kulturowe (OECD, 2019; Bleich i in., 2012).

Przykład modelu implementacji: Ujednolicony Model Badań nad Implementacją (the Consolidated Framework for Implementation Research; CFIR*).* Wśród modeli teoretycznych poświęconych implementacji interwencji, opisujących determinanty interwencji, Consolidated Framework for Implementation Research (CFIR; Damschroder i in., 2009), jest jednym z najczęściej wykorzystywanych, zarówno w badaniach nad implementacją, jak i przez praktyków implementujących interwencje (Birken i.in., 2017). Jego nadrzędnym celem jest opisywać, wyjaśniać i przewidywać determinanty implementacji interwencji, takie jak bariery i czynniki ułatwiające implementację (Damschroder i in., 2022). Ponadto model CFIR dostarcza kompleksowej, zoperacjonalizowanej i dobrze zdefiniowanej taksonomii, co umożliwia jego multidyscyplinarne zastosowanie, np. w psychologii i socjologii, w celu implementacji kompleksowych programów i interwencji (Damschroder i Lowery, 2013).

CFIR jest modelem opisowym, który wskazuje na 26 determinantów implementacji interwencji (Damschroder i in., 2009), ujętych w pięciu głównych kategoriach (domenach): (1) Charakterystyki interwencji (ang. Intervention characteristics), które mogą determinować implementację, np. kompleksowość, koszt; (2) cechy otoczenia zewnętrznego (ang. Outer setting), np. umiejętność współpracy z innymi organizacjami; (3) cechy otoczenia wewnętrznego (ang. Inner setting), np. atmosfera panująca w organizacji; (4) determinanty na poziomie indywidualnym (ang. Characteristics of induviduals), np. wiedza i przekonania osób implementujących interwencję; (5) charakterystyka procesu implementacji (ang. Process), np. planowanie i ewaluacja (Damschroder i in., 2009). Model został zaktualizowany w odniesieniu do „theory-buiding science", na mocy której teoria jest udoskonalana przy każdym zastosowaniu, a teoretyzowanie staje się „powtarzalnym i cyklicznym procesem" (Damschroder i in., 2022), co oznacza, że teoria nie powinna być postrzegana jako byt

niezmienny, ale taki, który należy doskonalić w odniesieniu do empirii (Damschroder i in., 2022).

Istnieją nieliczne badania wskazujące na zależność pomiędzy posiadającymi oparcie w teorii barierami i czynnikami wspierającymi interwencję a efektywnością interwencji (Wolfenden i in., 2020), a także badania wskazujące na zależność pomiędzy barierami i czynnikami wspierającymi implementację interwencji a wskaźnikami procesu udanej implementacji interwencji (Weatherson i in., 2017). Istnieją nieliczne badania, identyfikujące charakterystyki implementacji, które są związane ze wskaźnikami procesu udanej implementacji (np. trwałość implementacji czy tzw. adoptowalność implementacji – gotowość implementatorów do podjęcia się wprowadzania danej interwencji w życie). Na przykład, w badaniu opartym na modelu CFIR zidentyfikowano szereg barier i czynników wspierających odnoszących się do domeny otoczenia zewnętrznego i wewnętrznego, które przyczyniły się do zwiększenia adaptowalności (adoption) interwencji ukierunkowanych na promocję aktywności fizycznej w szkołach (Wendt i in., 2023). Niestety, w nurcie badań nad implementacją interwencji niewiele jest prac, które koncentrują się zarówno na pomiarze efektywności interwencji, jak i procesu implementacji interwencji oraz ich wzajemnych zależnościach.

Cele badań własnych oraz ich uzasadnienie

Prezentowana rozprawa doktorska stanowi cykl publikacji oparty na trzech badaniach. Wspólnym przedmiotem badań jest identyfikacja kluczowych aspektów procesów implementacji interwencji. Badania są poświęcone (1) analizie charakterystyk modeli teoretycznych wyjaśniających implementację, (2) identyfikacji kluczowych barier i czynników ułatwiających implementację interwencji w istniejących badaniach oraz (3) identyfikacji barier i czynników ułatwiających procesy implementacji w przykładowym badaniu własnym (interwencja dotycząca promocji aktywności fizycznej i zdrowej diety).W szczególności, sformułowano następujące cele:

Cel Badania 1:

- analiza charakterystyk modeli implementacji (wykorzystywanych do implementacji interwencji/polityk mających na celu promocję zdrowej diety i aktywności fizycznej), a zwłaszcza ustalenie: (1) jak można scharakteryzować te modele ze względu na ich specyfikę (np. ogólne działania dotyczące zdrowia vs te mające na celu realizację określonych efektów zdrowotnych, do których odnoszą się modele); (2) treść lub cele (np. koncentracja na procesach implementacji, identyfikacja barier/czynników ułatwiających implementację lub opis ewaluacji implementacji); (3) poziomy, na którym konstrukty operują (np. poziom indywidualny, organizacyjny lub systemowy); (4) relacje między konstruktami (np. brak powiązań, powiązania jedno- lub dwukierunkowe), uwzględnienie w modelach szerszego kontekstu socjodemograficznego i ekonomicznego.

Cel Badania 2:

- ustalenie, które bariery i czynniki ułatwiające implementację interwencji (spośród uwzględnionych w modelu CFIR) są najczęściej wskazywane jako kluczowe przez

implementatorów i innych interesariuszy procesu implementacji interwencji mających na celu promocję zdrowej diety i aktywności fizycznej.

Cel Badania 3:

- analiza zależności między: (1) percepcją implementatorów, dotyczącą tego czy proces implementacji był skonstruowany w taki sposób, że bariery i czynniki ułatwiające implementację były adekwatnie zaadresowane, a w konsekwencji proces implementacji był wysokiej jakości a (2) poziomem zmian w aktywności fizycznej uczestników interwencji dotyczącej promocji aktywności fizycznej, zdrowego stylu odżywiania oraz redukcji zachowań siedzących.

Badanie 1

(por. Lobczowska, Banik, Romaniuk i in., 2022)

Cele Badania

Celem przeglądu jest analiza charakterystyk modeli teoretycznych implementacji interwencji ukierunkowanych na promocję zdrowego odżywiania i aktywnego trybu życia, zdefiniowanego jako promocja aktywności fizycznej oraz redukcja zachowań siedzących.

Przeprowadzona analiza koncentrowała się na uzyskaniu odpowiedzi na następujące pytania badawcze**:** (1) czy modele i teorie implementacji interwencji/polityk odnoszące się do procesów implementacji, dotyczą: (a) determinantów implementacji, takich jak: bariery i czynniki ułatwiające implementację polityk; (b) ewaluacji procesów implementacji; (c) efektów implementacji (Nilsen, 2015); (2) które modele i teorie dotyczące implementacji interwencji/polityk uwzględniają takie aspekty, jak: (a) czynniki lub procesy na poziomie indywidualnym, (b) czynniki lub procesy na poziomie organizacji lub na poziomie społeczności, oraz (c) czynniki lub procesy na poziomie systemu (np. polityczne, społeczne, ekonomiczne, kulturowe) (Bowen i Zwi, 2005); (3) które modele mają charakter opisowy (informujący jedynie o cechach modelu); preskryptywny (wyznaczający kierunek działań i kolejne kroki procesu implementacji); wyjaśniający (informujący o szczegółowych jedno- lub dwukierunkowych powiązaniach między domenami); predykcyjny (zakładają kierunkowe relacje między wszystkimi konstruktami modelu) (Rubenstein-Montano i in., 2001); (4) czy w zidentyfikowanych modelach uwzględniono aspekty równościowe (status ekonomiczny i wykształcenie, wiek, płeć, pochodzenie etniczne, różnice kulturowe i izolację geograficzną)?

W Badaniu 1 skoncentrowano się na interwencjach typu polityki (interwencje z udziałem instytucji rządowych lub samorządowych).

Metoda Badania 1

Przeprowadzono przegląd systematyczny artykułów recenzowanych (k = 31) oraz dokumentów interesariuszy (k = 7). Badanie prowadzono zgodnie z wytycznymi Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher i in., 2009; Moher i in., 2015), z dbałością o przestrzeganie zaleceń dotyczących najlepszych praktyk odnoszących się do meta-recenzji (Hennessey i in., 2019). Protokół badawczy zarejestrowano w bazie PROSPERO (nr CRD42019133251). Systematycznie przeszukano 9 baz bibliograficznych (np. Medline) oraz dokumenty w 8 bazach głównych interesariuszy (np. WHO, FAO, the European Commission, the National Institute for Health and Care Excellence (Wielka Brytania), Centers for Disease Control and Prevention). Wstępna analiza danych pozwoliła wyłonić 1740 artykułów recenzowanych oraz 147 888 dokumentów interesariuszy (organizacji światowych zajmujących się promocją zdrowia). Do przeglądu włączono 7 dokumentów następujących interesariuszy: Światowa Organizacja Zdrowia (WHO; 6 dokumentów); Food and Agriculture Organization of United Nations (FAO; 1 dokument);

W procesie wyszukiwania danych zastosowano kombinację czterech grup słów kluczowych (zarówno dla czasopism recenzowanych, jak i baz danych interesariuszy) odnoszących się do: (1) procesu, determinantów i ewaluacji implementacji (np. implement*); (2) modeli (np. framework*); (3) rodzaju działania (np. law OR strateg*); (4) zachowania (np. diet *). Pełna lista słów kluczowych zastosowanych w procesie wyszukiwania danych znajduje się w materiałach dodatkowych do artykułu.

Zastosowane następujące kryteria włączenia: (1) oryginalne artykuły i dokumenty omawiające modele implementacji polityk (lub ich znacząco zmienione wersje); (2) artykuły omawiające implementację polityk w kontekście diety i/lub aktywności fizycznej oraz zachowań siedzących; (3) oficjalne dokumenty interesariuszy zatwierdzone przez

odpowiednią organizację; (4) tylko anglojęzyczne dokumenty interesariuszy i artykuły recenzowane.

Wyniki Badania 1

Zidentyfikowano 31 modeli teoretycznych w przeglądach naukowych (np. Consolidated Framework for Implementation Research, CFIR; the Advocacy Coalition Framework, ACF; A Conceptual Framework for Organizational Readiness to Implement Nutrition and Physical Activity Programs) oraz 7 modeli teorytycznych zidentyfikowanych w dokumentach interesariuszy (np.. School Policy Framework; Steps to health: a European framework to promote physical activity for health; Global Strategy on Diet, Physical Activity and Health). Szczegółowe zestawienie modeli przedstawiono w tabeli 1.

Spośród 38 zidentyfikowanych modeli implementacji, poza jednym, wszystkie uwzględniały determinanty implementacji (97,4%; 37 na 38), dodatkowo, większość modeli uwzględniała także elementy dotyczące ewaluacji implementacji (73,7%; 28 na 38). Najmniejsza liczba modeli odnosiła się do aspektów procesu implementacji (57,9%; 22 na 38). Niespełna połowa (47.4%; 18 na 38) modeli uwzględniała zarówno proces, jak i determinanty oraz ewaluację. Większość modeli teoretycznych (68,5%; 25 na 38) koncentrowała się na trzech poziomach implementacji: indywidualnym, organizacji oraz systemowym, z czego poziom systemowy uwzględniany był rzadziej (76,3%; 29 na 38) niż poziomy indywidualny i organizacji (86,8%; 33 na 38).

Większość, czyli 84,2% (32 z 38) modeli zawierała elementy konstruktów o wyłącznie opisowym charakterze. Połowa modeli (50%; 19 z 38) zawierała niektóre elementy o charakterze preskryptywnym (opisującym etapy implementacji). Większość modeli (60,5%; 23 z 38) zawierała elementy wyjaśniające zarówno pod względem relacji jedno- i dwukierunkowym.). Żaden model nie uwzględniał typu relacji o charakterze predykcyjnym

(predictive), a więc nie uwzględniał relacji pomiędzy wszystkimi konstruktami danego modelu. Pozostałe 29 modeli (76,3%) łączyło 3 rodzaje elementów relacji o charakterze opisowym, preskryptywnym i wyjaśniającym. 8 z 38 modeli (21,1%) zawierało elementy systemu kompleksowych relacji pomiędzy konstruktami.

Ponad połowa modeli teoretycznych (55,3%; 21 z 38) nie uwzględniała w procesie implementacji interwencji/polityk żadnych aspektów równościowych. Jedynie 4 z 38 modeli uwzględniały wszystkie sześć badanych aspektów równości (np. status społeczno-ekonomiczny czy kontekst kulturowy, wiek, płeć).

Dyskusja wyników Badania 1

Wyniki badania wskazują, że większość modeli obejmuje konstrukty wielopoziomowe (chociaż determinanty na poziomie systemu są rzadziej uwzględniane niż te na poziomie indywidualnym lub organizacyjnym/społecznościowym). Modele teoretyczne implementacji interwencji mają w większości charakter opisowy, zawierając elementy preskryptywne i predykcyjnene. Niestety, modele rzadko uwzględniają aspekty równościowe lub elementy systemowe.

Tabela 1

Modele teoretyczne implementacji interwencji: ich przeznaczenie, poziomy, relacje pomiędzy konstruktami, determinant równości, populacje docelowe oraz zachowania

Modele teoretyczne implementacji/ Charakerystyki modeli	1 [5]	2s [28]	3s [29]	4s [30]	5 [31]	6s [46]	7 [47]	8s [48]	9 [51]	10 [52]	11 [49]	12 [50]	13 [53]	14 [54]	15 [36]	16 [55]	17s [56]	18 [57]	19 [58]	20 [59]	21s [62]	22 [60]	23 [61]	24 [63]	25 [27]	26 [64]	27 [65]	28 [66]	29 [67]	30 [68]	31 [69]	32 [70]	33 [71]	34 [72]	35 [73]	36 [32]	37 [13]	38 [33]
Przeznaczenie modelu																																				
Procesy implementacji	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			+		+	+											
Determinanty i strategie implementacji	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+
Ewaluacja implementacji	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+		+		+	+	+	+	+	+						
Poziomy uwzględnione w modelach implementacji																																				
Konstrukty wyrażone na poziomie indywidualnym	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+			+	+		+
Konstrukty wyrażone na poziomie społeczności/organizacji	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			+	+	+	+	+
Konstrukty wyrażone na poziomie systemowym	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+		+	+	+	+	+	+					+		+	+	+	+		
Typy relacji zachodzące pomiędzy konstruktami																																				
Modele opisowe (descriptive)						+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+
Modele preskryptywne (prescriptive) (etapy implementacji)	+	+	+	+	+	+	+	+	+		+	+	+	+			+	+			+		+		+				+							
Modele wyjaśniające (relacje jednokierunkowe)					+					+														+		+								+		
Modele wyjaśniające (relacje jednokierunkowe i dwukierunkowe)	+	+	+		+	+	+	+			+	+				+			+	+		+	+	+		+					+	+	+			
Modele predykcyjne																																				
Modele uwzględniające system kompleksowych relacji	+					+	+	+								+			+	+												+				
Determinanty równości																																				
Płeć	+	+	+	+		+	+	+	+	+									+	+														+		
Wiek	+	+	+	+		+	+	+	+										+	+	+									+				+		
Status ekonomiczny/wykształcenie	+	+	+	+		+	+	+	+	+	+								+		+									+		+		+		
Narodowość	+	+	+				+		+										+	+										+		+		+		
Izolacja geograficzna	+	+	+						+	+									+		+											+				
Normy kulturowe	+	+	+	+		+		+	+		+								+		+	+										+		+		
Determinanty równości: wspomniane (C) lub zoperacjonalizowane (O)	**O**	**O**	**O**	**O**		**O**	**O**	**O**	**O**	**C**	**O**								**O**	**C**	**O**	**C**								**C**		**O**			**C**	
Populacja docelowa oraz zachowanie																																				
Populacja określona		+				+		+		+		+	+	+			+			+		+		+		+		+		+		+	+	+	+	
Zdrowa dieta: zachowanie uwzględnione w modelu		+	+	+		+		+		+			+	+			+					+			+					+				+	+	
AF i ZS: Zdrowa dieta: zachowanie uwzględnione w modelu		+	+			+							+	+							+	+								+					+	

Informacja o możliwości zastosowania modelu dla zachowań zdrowotnych		+	+	+	+	+		+		+			+	+			+				+	+		+	+		+	+	+		+		+		+	+	+	+

Notka[1]: s – modele opracowane przez interesariuszy są oznaczone literą "s" w numeracji modelu ; (1) the Context and Implementation of Complex Interventions (CICI) framework [5]; (2s) the DPAS (Global Strategy on Diet, Physical Activity and Health") School Policy Framework) [28]; (3s) Global Strategy on Diet, Physical Activity and Health: A framework to monitor and evaluate implementation DPAS:[29]; (4s) Implementing a salt reduction strategy framework – a practical approach [30]; (5) PRECEDE-PROCEED planning model [31]; (6s) DPAS in the Eastern Mediterranean Region [46]; (7) Practical, Robust Implementation and Sustainability Model (PRISM) [47]; (8s) Stepwise approach: Four Steps to Design Public Food Procurement Initiatives [48]; (9) the pragmatic Ottawa Model of Research Use (OMRU) [51]; (10) Conceptual Model of Evidence-Based Practice Implementation in Public Service Sectors [52]; (11) Conceptual framework of Equity-focused Implementation Research (EquIR) of health programs; [49]; (12) The Nutrition Implementation Framework [50]; (13) Conceptual framework for designing and implementing health promotion programmes in schools [53]; (14) Not specified [54]; (15) Consolidated Framework for Implementation Research,(CFIR)[36]; (16) Normalization Process Model (NPM) [55]; (17s) framework without name [56]; (18) the Quality Implementation Metaframework (QIF) [57]; (19)) the Advocacy Coalition Framework (ACF) [58]; (20) The multilevel implementation quality framework [59]; (21s) Normalization Process Theory [62]; (22) Steps to health: a European framework to promote physical activity for health [60]; (23) Multilevel Implementation Framework (MIF) [61]; (24) The Behavior Change Ball [63]; (25) implementation science in nutrition framework (ISN) [27]; (26) Promoting Action on Research Implementation in Health Services (PARiHS) [64]; (27) Organization theory for determinants of effective implementation of worksite health promotion programs [65]; (28) RE-AIM evaluation model [66]; (29) framework for a "public health approach"- a global framework for the primary care response to chronic NCDs [67]; (30) Framework for design and evaluation of complex interventions to improve health [68]; (31) the Implementation Framework [69]; (32) the Interactive Systems Framework for Dissemination and Implementation (ISF) [70]; (33) The He Pikinga Waiora (Enhancing Wellbeing) Implementation Framework [71]; (34) Ecological framework for understanding effective implementation [72]; (35) Comprehensive school health framework (CSH) [73]; (36) Conceptual Framework for Organizational Readiness to Implement Nutrition and Physical Activity Programs [32]; (37) The ANalysis Grid for Environments Linked to Obesity ANGELO [13]; (38) Theoretical Domains Framework (TDF) [33];

Notka[2:] kolory symbolizują usystematyzowanie modeli: od najbardziej kompleksowych (kolor czerwony) do najmniej kompleksowych (kolor ciemnoszary);

Badanie 2

(por. Lobczowska, Banik, Brukalo i in., 2022)

Cel Badania 2

Celem badania było określenie jakie bariery i czynniki ułatwiające implementację (uwzględnione w modelu CFIR) występują najczęściej w procesie implementacji interwencji/polityk ukierunkowanych na promocję zdrowej diety, aktywności fizycznej oraz redukcji zachowań siedzących. Analizę przeprowadzono wykorzystując dane zebrane w systematycznych przeglądach badań i dokumentach wydanych przez interesariuszy, rozumianych jako jednostki, grupy i/lub organizacje, które mają wpływ na procesy decyzyjne, w tym wypadku, organizacje światowe zajmujące się promocją zdrowia (np. WHO; Brugha i Varvasovsky, 2000). W Badaniu 2 skoncentrowano się na interwencjach typu polityki (interwencje z udziałem instytucji rządowych lub samorządowych).

Sformułowano następujące pytania badawcze: (1) jakie determinanty implementacji polityk uwzględnione w pięciu domenach modelu CFIR zostały zidentyfikowane najczęściej jako znaczące; (2) jakie są różnice między determinantami implementacji, które zostały zidentyfikowane w przeglądach, w porównaniu z tymi, które zostały zidentyfikowane w dokumentach interesariuszy; (3) jakie są różnice między determinantami implementacji polityk/interwencji, które zostały zidentyfikowane w przeglądach/dokumentach interesariuszy koncentrujących się wyłącznie na interwencjach/politykach dotyczących zdrowego żywienia, w porównaniu z tymi, które zostały zidentyfikowane w przeglądach lub dokumentach interesariuszy dotyczących aktywności fizycznej oraz zachowań siedzących; (4) jakie są determinanty implementacji interwencji/polityk dotyczących promocji zdrowej diety i

aktywności fizycznej oraz redukcji zachowań siedzących zidentyfikowane w przeglądach/dokumentach dotyczących konkretnego typu środowiska (np., szkolnego).

Metoda Badania 2

Podstawę teoretyczną przeglądu stanowi CFIR (Damschroder i in., 2009), zawierający listę 26 czynników ułatwiających lub barier, zwanych determinantami implementacji polityk w 5 kategoriach: (1) Charakterystyki interwencji (ang. Intervention characteristics), które mogą determinować implementację, np. kompleksowość, koszt; (2) Cechy otoczenia zewnętrznego (ang. Outer setting), np. umiejętność współpracy z innymi organizacjami; (3) cechy otoczenia wewnętrznego (ang. Inner setting), np. atmosfera panująca w organizacji; (4) determinanty na poziomie indywidualnym (ang. Characteristics of induviduals), np. wiedza i przekonania; (5) charakterystyka procesu implementacji (ang. Process), np. planowanie i ewaluacja (Damschroder i in., 2009).

Przeprowadzono meta-przegląd, czyli systematyczny przegląd opublikowanych przeglądów systematycznych (k =25) oraz dokumentów interesariuszy (k=17). Badanie prowadzono zgodnie z wytycznymi Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher i in., 2009; Moher i in., 2015), przestrzegając zaleceń dotyczących najlepszych praktyk odnoszących się do meta-przeglądów (Hennessey i in., 2019). Protokół badawczy zarejestrowano w bazie PROSPERO (nr CRD42019133341). Systematycznie przeszukano 9 baz bibliograficznych (np. Medline) oraz dokumenty w 9 bazach głównych interesariuszy (np. WHO, the European Commission, the National Institute for Health and Care Excellence, Centers for Disease Control and Prevention). Na wstępnym etapie przeszukiwania danych wyłoniono 4243 przeglądów systematycznych oraz 52 966 dokumentów interesariuszy.

Włączone do badania przeglądy i dokumenty interesariuszy stanowiły syntezę badań oryginalnych dotyczących uwarunkowań implementacji polityk promujących zdrową dietę

oraz aktywność fizyczną lub/oraz redukcję zachowań siedzących. Przyjęto następujące kryteria włączenia danych oraz ocenę jakości włączonych przeglądów: zastosowano kombinacje pięciu grup słów kluczowych, odnoszących się do: (1) implementacji; (2) barier i czynników ułatwiających implementację polityk; (3) rodzaju interwencji (tj. polityki); (4) planu badania (np. przegląd systematyczny); (5) zachowań (np. aktywność fizyczna). Słowa kluczowe zostały opracowane na podstawie wcześniejszych przeglądów, dotyczących podobnej problematyki. Włączono przeglądy uwzględniające dane ilościowe i jakościowe (obejmujące przeglądy systematyczne, scoping i realist review) opublikowane w recenzowanych czasopismach anglojęzycznych. Kryteria włączenia dokumentów interesariuszy: dokumenty w języku angielskim; niesystematyczne przeglądy publikowane przez interesariuszy oraz dokumenty interesariuszy skupiające się na przeglądzie opartych na dowodach determinantów implementacji; dokumenty opracowane i oficjalnie zatwierdzone przez właściwych interesariuszy.

Dwóch badaczy niezależnie przeprowadziło ocenę jakości. Ocenę jakości przeglądów przeprowadzono przy użyciu kryteriów narzędzia ROBIS do oceny ryzyka stronniczości w przeglądach systematycznych (Whiting, 2016). Ryzyko stronniczości w dokumentach interesariuszy zostało ocenione za pomocą Methodological Quality Checklist for Stakeholder Documents and Position Papers (MQC-SP; [Horodyska i in., 2015]).

Wyniki Badania 2

Spośród 26 barier i facylitatorów implementacji interwencji/polityk opartych na modelu CFIR, 7 zidentyfikowano w ponad 60 % (wskazane w 66,7-76,2% analizowanych dokumentów/przeglądów jako znaczące w procesie implementacji). Były to: koszt (wszelkie koszty związane zarówno z interwencją, jak i jej implementacją, np. niezbędne wyposażenie); nawiązywanie kontaktów z innymi organizacjami/społecznościami (np. wymiana

doświadczeń z innymi organizacjami zajmującymi się wdrażaniem interwencji); polityki zewnętrzne (wszelkie strategie służące rozpowszechnianiu interwencji, w tym regulacje prawne); cechy strukturalne otoczenia (np. wielkość organizacji, wiek jej pracowników), klimat implementacji (gotowość do zmian, wspólna przychylność zaangażowanych osób do interwencji oraz zakres, w jakim korzystanie z tej interwencji będzie nagradzane, wspierane i oczekiwane w ich organizacji); gotowość do implementacji (bezpośrednie wskaźniki zaangażowania organizacji w decyzję o wdrożeniu interwencji) oraz wiedza/przekonania zaangażowanych osób (postawy wobec interwencji i postrzegana wartość interwencji, a także znajomość faktów, prawd i zasad związanych z interwencją). Szczegółowe wyniki przedstawiono na rycinie 1.

Porównania między politykami promującymi zdrową dietę a politykami dotyczącymi promocji aktywności fizycznej oraz redukcji zachowań siedzących ujawniły występowanie jedynie 3 wspólnych czynników ułatwiających implementację, zarówno dla interwencji dotyczących zdrowej diety, jak i tych dotyczących aktywności fizycznej i zachowań siedzących, były to: koszt, klimat implementacji i wiedza/przekonania. Co ciekawe czynniki indywidualne dotyczące implementatorów interwencji, takie jak motywacja do udziału w procesie implementacji interwencji i wartości utożsamiane z wartościami interwencji i/lub wartościami organizacji wdrażającej interwencję wskazano jako czynnik ułatwiający implementację jedynie w przypadku implementacji interwencji ukierunkowanych na promocję aktywności fizycznej i redukcję zachowań siedzących, z kolei determinanty otoczenia zewnętrznego (rozumianego jako złożony, wielopoziomowy kontekst, w którym funkcjonuje implementator, np. jeśli organizacją implementującą daną interwencję jest szkoła, jej otoczenie zewnętrzne stanowią inne szkoły, inne organizacje w mieście lub państwie, które również zajmują się implementacją podobnych interwencji; Damschroder i in., 2022)

wskazano jako znaczący czynnik ułatwiający implementację interwencji jedynie w przypadku implementacji działań dotyczących zdrowej diety.

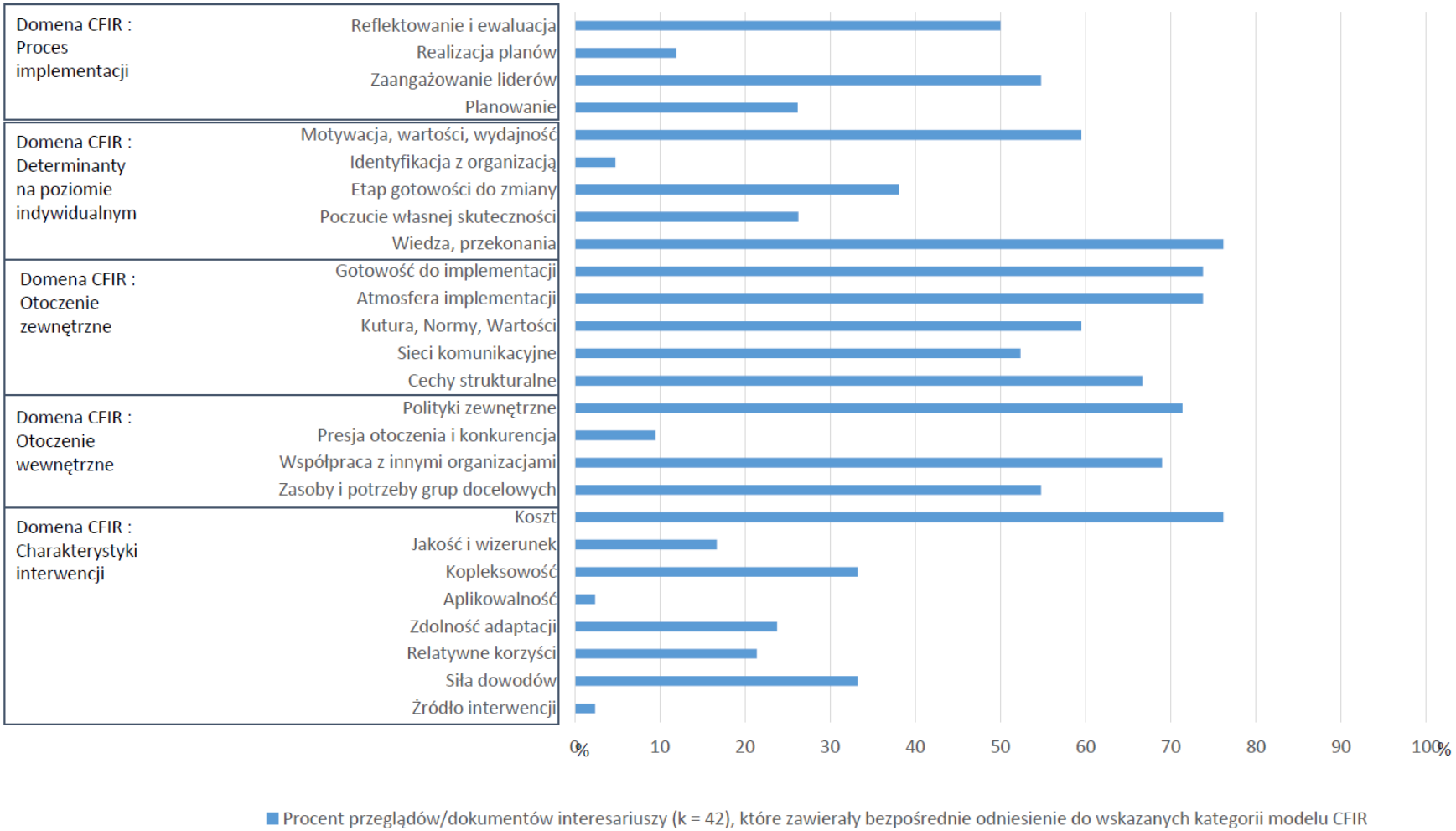
W porównaniu z dokumentami interesariuszy, wyniki uzyskane w przeglądach systematycznych wskazują na ważność determinantów indywidualnych implementatorów, które rzadziej były wskazywane jako znaczące w dokumentach interesariuszy. Jedynie w 10 przeglądach systematycznych zidentyfikowano determinanty implementacji interwencji dla kontekstu szkolnego, natomiast w analizowanych dokumentach interesariuszy nie uwzględniano kontekstu szkolnego.

Dyskusja wyników Badania 2

Wyniki analizy danych zebranych w przeglądach systematycznych, jak i dokumentach interesariuszy, pozwoliły zidentyfikować wąską grupę opartych o teorię (CFIR) czynników ułatwiających lub utrudniających implementację polityk promujących aktywność fizyczną/zdrową dietę. Wyniki badań mogą wspierać i informować decydentów, realizatorów i badaczy w zakresie kluczowych barier i czynników facylitujących, które mają szansę pojawić się w procesie implementacji i pomóc priorytetyzować wybór strategii implementacji i jej planowanie.

Rycina 1

Domeny oraz kategorie modelu CFIR reprezentowane w przeglądach oraz dokumentach interesariuszy



Badanie 3

(por. Lobczowska, Kuliś, Banik i in., złożone do Psychology & Health)

Cele Badania 3

Celem Badania 3 była ocena czy zależności między barierami i czynnikami ułatwiającymi implementację, spostrzeganymi przez eksperymentatorów, którzy przeprowadzili interwencję mającą na celu zapobieganie nadwadze i otyłości (Kulis i in., 2021; Kulis i in., 2023; Szczuka i in., 2021; Szczuka i in., 2024), pozwalają wyjaśnić skuteczność interwencji w zakresie zmiany poziomu aktywności fizycznej na poziomie od umiarkowanego do intensywnego (WHO, 2010, 2020).

W szczególności analizowano percepcję implementatorów, dotyczącą tego czy proces implementacji był skonstruowany w taki sposób, że bariery i czynniki ułatwiające implementację były adekwatnie zaadresowane, a w konsekwencji doprowadziły do wysokiej jakości procesu implementacji.

Wykorzystując wybrane 3 domeny modelu CFIR (Damschroder i in., 2009; Damschroder i in., 2022) w badaniu oceniono, czy istnieją zależności między barierami i czynnikami ułatwiającymi implementację interwencji a wskaźnikami skuteczności interwencji, takimi jak: zmiana poziomu aktywności fizycznej uczestników interwencji.

Metoda Badania 3

W badaniu wykorzystano dane uzyskane w ramach projektu: „*Aktywność fizyczna i jakość życia: badania diadyczne w kontekście formułowania planów indywidualnych, diadycznych i kolaboracyjnych”,* finansowanego ze środków przyznanych przez Narodowe Centrum Nauki, nr projektu 2014/15/B/HS6/00923 (Kulis i in., 2021; ; Kulis i in., 2023; Szczuka i in., 2021; Zarychta i in., 2020). W szczególności, wykorzystano dane dotyczące

zmiany poziomu aktywności fizycznej (ang. MVPA), uzyskane w pomiarze bazowym (przed interwencją) oraz 14 miesięcy później (12 miesięcy po zakończeniu interwencji). Dane uczestników interwencji zestawiono z danymi własnymi, zebranymi od implementatorów przeprowadzających interwencję.

Zebrane w Badaniu 3 dane, uzyskane od implementatorów, dotyczyły oceny barier oraz czynników ułatwiających implementację interwencji w 3 domenach modelu CFIR (Damschroder i in., 2009): (1) cechy otoczenia zewnętrznego (ang. Outer setting), m.in. Umiejętność współpracy z innymi organizacjami, uwzględnianie potrzeb; (2) cechy otoczenia wewnętrznego (ang. Inner setting), m.in. Atmosfera panująca w organizacji; (3) Determinanty na poziomie indywidualnym (ang. Characteristics of individuals), w szczególności mierzono przekonania implementatorów na temat własnej skuteczności (*ang. self-efficacy)* (Bandura, 1997; Damschroder i in., 2009).

Badanie 3 przeprowadzono w kontekście implementacji interwencji prowadzonej bez udziału władz samorządowych lub rządowych.

Metoda Badania 3

Procedura i plan interwencji promującej zdrowy styl życia

Interwencja została zaprojektowana w celu podniesienia poziomu umiarkowanej i intensywnej aktywności fizycznej wśród uczestników, przez zastosowanie procedury edukacji na temat aktywności fizycznej, diety i zachowań siedzących w połączeniu (lub bez) procedury planowania indywidualnego, diadycznego i kolaboracyjnego aktywności fizycznej w diadach dorosły-dorosły (Kulis i in., 2023) oraz rodzic-dziecko (Kulis i in., w rewizjach). Protokół badania i interwencji (w języku angielskim) został zarejestrowany w repozytorium ClinicalTrials.gov, nr. NCT02713438, por. też https://osf.io/vk2qe/. Procedura interwencji

obejmowała 7 spotkań: cztery spotkania osobiste, podczas których prowadzono interwencję indywidualnie dla każdej diady, „twarzą w twarz” oraz trzy rozmowy telefoniczne.

Pierwsze 3 spotkania osobiste odbywały się w tygodniowych odstępach czasu. Badanie rozpoczynało się od pierwszego spotkania i pomiaru bazowego (Pomiar 1), podczas którego osobom badanym dostarczano edukację na temat zdrowego odżywiania, dokonywano pomiaru masy ciała, wzrostu, składu ciała oraz informowano o tygodniowym pomiarze poziomu aktywności fizycznej za pomocą akcelerometrów ActiGraph model wGT3X-BT. Badani otrzymywali urządzenia wraz z instrukcją ich użytkowania. Pomiar 2 odbywał się po 7 dniach, podczas spotkania badani zdawali akcelerometry, dostarczano im edukację na temat aktywności fizycznej oraz zachowań siedzących. Badani ponownie przez 7 dni nosili akcelerometry do tygodniowego pomiaru aktywności fizycznej. Po każdym pomiarze akcelerometrycznym, osoby badane otrzymywały informację zwrotną na temat poziomu aktywności fizycznej wraz z wykresem odczytanym z urządzenia. W grupach eksperymentalnych dodatkowo dostarczano edukację na temat procedury planowania aktywności fizycznej (indywidualnego, diadycznego i kolaboracyjnego). Pomiar 3 odbywał się po kolejnych 7 dniach (14 dni od rozpoczęcia projektu), podczas którego badanym dostarczano drugą część edukacji na temat aktywności fizycznej i zachowań siedzących oraz planowania w grupach eksperymentalnych.

Sesje telefoniczne odbywały się w 3, 4 i 5 tygodniu od rozpoczęciu projektu. Ich zadaniem było przypomnienie najważniejszych informacji z zakresu edukacji oraz planowania. Po ostatniej sesji telefonicznej następowała czterotygodniowa przerwa. Po upływie 4 tygodni (28 dni od ostatniej sesji telefonicznej, 2 miesiące od pomiaru bazowego) odbywała się kolejna sesja przypominająca najważniejsze informacje oraz, tydzień później, podczas Pomiaru 5 wykonywano kolejną sesję telefoniczną. Po okresie 14 miesięcy od pomiaru bazowego odbywał się Pomiar końcowy (założenie akcelerometrów).

W Badaniu 3 analizowano dane dotyczące akcelerometrycznego pomiaru aktywności fizycznej (intensywnej i umiarkowane) zebrane podczas pomiaru początkowego (Pomiar 1, T1) oraz pomiaru końcowego (Pomiar 2, 14 miesięcy od pomiaru bazowego).

Osoby Badane: Uczestnicy Interwencji. Próba badawcza w przypadku interwencji „Rodzic-Dziecko" obejmowała: (1) dzieci w wieku od 9 do 15 lat z populacji ogólnej, które: (a) nie spełniały zaleceń WHO (2010, 2020b) dotyczących poziomu uprawianej aktywności fizycznej (od umiarkowanej do intensywnej) aktualnych w czasie pozyskiwania danych oraz (b) posiadały rodzica lub opiekuna prawnego, który był skłonny uczestniczyć z nimi w tym badaniu.

Próba badawcza w przypadku interwencji „Dorosły-Dorosły" (Pacjent-Partner") obejmowała: (1) dorosłych z populacji ogólnej, którzy: (a) nie spełniali zaleceń WHO (2010, 2020) dotyczących poziomu uprawianej aktywności fizycznej (od umiarkowanej do intensywnej) aktualnych w czasie pozyskiwania danych i/lub zalecono im zwiększenie poziomu aktywności fizycznej z powodu chorób sercowo-naczyniowych/cukrzycy typu 2; oraz (b) posiadały dorosłego partnera, który wyraził zgodę na udział w badaniu (Szczuka i in., 2021).

Uczestnicy badania, zostali przydzieleni losowo do grupy kontrolnej lub trzech grup eksperymentalnych, w których trenowano uczestników w zakresie planowania aktywności fizycznej (indywidualne, diadyczne i kolaboracyjne, odpowiednio w 3 grupach eksperymentalnych). Wszyscy badani (niezależnie od grupy) uczestniczyli w sesjach edukacyjnych na temat zmiany zachowań zdrowotnych w zakresie aktywności fizycznej, zachowań siedzących oraz zdrowej diety, z uwzględnieniem potrzeb uczestników z chorobami układu krążenia, cukrzycą typu 2 lub nadwagą (Szczuka i in., 2021).

W celu zebrania danych oraz implementacji interwencji (procedur edukacyjnych dostarczanych w grupie kontrolnej i eksperymentalnej) przeszkolono łącznie 38

implementatorów (psychologów, studentów psychologii, pielęgniarki, nauczycieli), którzy odbyli co najmniej dwie sesje szkoleniowe przed badaniem (dodatkowo zapewniono im regularny nadzór przez cały okres badania).

Dla celów Badania 3, spośród wszystkich uczestników interwencji (N = 1134; osoby z grupy kontrolnej lub eksperymentalnej) wybrano n = 372 uczestników, dla których poza danymi o aktywności fizycznej zgromadzono również dane od implementatorów interwencji (N = 21 osób; 55% wszystkich implementatorów). Pozostałe osoby badane, dla których nie pozyskano danych od implementatorów, zostały wyłączone z analizy.

Wiek uczestników interwencji uwzględnionych w analizie danych (N=372) wahał się od 9 do 86 lat (M=38,74, SD=18,78), z czego większość 66,9% stanowiły kobiety (n=249), a 33,1% mężczyźni (n=123). Dzieci w wieku 9-15 lat stanowiły 17,5% (n=65), natomiast dorośli stanowili 82,5% (n=307). Pod względem wykształcenia dorosłych uczestników interwencji 57,1% (n=160) miało wykształcenie wyższe; 24,3% (n=68) wykształcenie średnie.

Narzędzia Zastosowane Do Pomiaru Danych Zbieranych u Uczestników Interwencji. Dane zebrane od uczestników interwencji koncentrowały się na analizie pomiaru akcelerometrycznego (ActiGraph GT3X-BT) poziomu aktywności fizycznej (liczba minut aktywności umiarkowanej lub intensywnej na godzinę noszenia akcelerometru). Analizowano dane zebrane przed interwencją/procedurą przeprowadzoną w grupie kontrolnej oraz grupach eksperymentalnych i dane zebrane w 14 miesięcy później (12 miesięcy po zakończeniu interwencji).

Osoby Badane: Implementujący Interwencję. Dwudziestu dwóch wykonawców implementujących interwencję wyraziło zgodę na udział w badaniu; 21 osób dostarczyło danych. Implementatorami były kobiety (100%) w wieku od 25 do 46 lat (M=33, SD=5,78). Ponad połowa wykonawców 52,4% (n=11) nie brała udziału w podobnej interwencji przed

lub od czasu udziału w interwencji przeprowadzonej na w Badaniu 3. Implementatorzy prowadzili od 4 do 60 diad (*M*=19,18, *SD*=15,59), z czego połowa 50% (*n*=10) było implementatorami dla dwóch typów diad, zarówno Pacjent-Partner, jak i Rodzic-Dziecko.

W przypadku wykształcenia, 42,9% (*n*=9) wykonawców interwencji miało wykształcenie wyższe psychologiczne, natomiast 38,1% (*n*=8) było studentami psychologii (4 lub 5 rok studiów magisterskich). Cztery osoby (19%) posiadały inne wykształcenie wyższe niż ukończone magisterium z psychologii.

Narzędzia Zastosowane Do Ewaluacji Procesu Implementacji wśród Implementatorów Interwencji. Przygotowany w badaniu własnym kwestionariusz dotyczy ewaluacji procesu implementacji przez implementatorów, pod względem występujących w tym procesie barier i czynników ułatwiających.

W szczególności narzędzie służy do pomiaru: (1) oceny czy czynniki uwzględnione w 2 domenach modelu CFIR zostały w procesie implementacji uwzględnione w taki sposób, który sprzyjał procesowi implementacji oraz (2) percepcji czynników z jednej domeny CFIR (charakterystyki indywidualne) jako sprzyjających procesowi implementacji i efektywności interwencji. W odniesieniu do oceny barier i czynników ułatwiających narzędzie dotyczyło: (1) otoczenia zewnętrznego (ang. Outer setting) oraz (2) wewnętrznego (ang. Inner setting). W odniesieniu do domeny dotyczącej charakterystyk indywidualnych (ang. Characteristics of individuals) mierzono przekonania implementatorów na temat ich własnej skuteczności do wdrażania interwencji i efektywność interwencji.

Kwestionariusz składał się z 56 pytań zamkniętych, opracowanych na podstawie modelu CFIR. Zadaniem osób badanych była odpowiedź, na ile zgadzają się z poniższymi stwierdzeniami, do których należało ustosunkować się na czterostopniowej skali pomiarowej.

Trzy domeny modelu CFIR (Damschroder i in., 2009), badane w kwestionariuszu zawierają 20 czynników warunkujących implementację. Przykładowe pytania dla domeny „Cechy otoczenia zewnętrznego" (ang. Outer setting) dotyczą umiejętność współpracy z innymi organizacjami, uwzględnianie potrzeb pacjentów (np. „Na ile zgadzasz się ze stwierdzeniem, że indywidualne potrzeby uczestników interwencji były brane pod uwagę podczas projektowania interwencji?"). Przykładowe pytania dla domeny „Cechy otoczenia wewnętrznego" (ang. Inner setting), dotyczą m.in. atmosfery panującej w organizacji (np. „Na ile zgadzasz się ze stwierdzeniem, że kultura i klimat w zespole współpracowników wdrażających interwencję pozytywnie wyróżniała się w porównanie z kulturą Uniwersytetu SWPS?"). Przykładowe pytania dla domeny „Poziom indywidualny" (ang. Characteristics of induviduals), dotyczą przekonań implementatorów na temat własnej skuteczności (np. „Na ile zgadzasz się ze stwierdzeniem, że byłaś/byłeś przekonany/a o tym, że uda Ci się skutecznie wdrożyć interwencję?") (Damschroder i in., 2009). Pytania w kwestionariuszu zostały utworzone za pomocą narzędzia do generowania pytań służących ocenie/ewaluacji implementacji interwencji, dostępnego na oficjalnej stronie internetowej autorów CFIR (cfirguide.org).

Plan analiz

Wykonano analizy wariancji z powtarzanymi pomiarami testując efekt interakcji: (1) czasu między pomiarami (14 miesięcy) oraz (2) grupy (bycie uczestnikiem prowadzonym przez implementującego oceniającego bariery dla implementacji z danej domeny CFIR jako adekwatnie zaadresowane vs bycie uczestnikiem prowadzonym przez implementującego oceniającego poziom barier dla implementacji z danej domeny CFIR jako nieadekwatnie zaadresowany. Ze względu na to, że dane uczestników interwencji były zagnieżdżone (drugi

poziom danych stanowiły dane 21 implementatorów), za pomocą współczynnika ICC przeanalizowano czy istnieje tzw. clustering effect w danych uczestników interwencji.

Etyka Badań

Badanie którego uczestnikami byli implementatorzy uzyskało pozytywną opinię Komisji Etyki Badań Naukowych Wydziału Psychologii Uniwersytetu SWPS (numer decyzji: 02/P/02/2023).

Badanie pilotażowe

Procedurę badania rozpoczęto od przeprowadzenia badania pilotażowego, przeprowadzonego wśród 6 wykonawców/implementatorów. Celem badania była weryfikacja przygotowanego dla celów Badania 3 narzędzia badawczego. Ocena dotyczyła trafności kwestionariusza względem modelu CFIR i zrozumiałości pytań. Badanie miało formę indywidulanych konsultacji w czasie których zbierano informacje zwrotne. Po uwzględnieniu poprawek rozpoczął się proces rekrutacji uczestników badania - implementatorów.

Wyniki Badania 3

Wyniki ANOVA z powtarzanym pomiarem wskazały na istotną interakcję między czasem a wskaźnikami percepcji procesu implementacji w odniesieniu do dwóch domen modelu CFIR. Domeny te to: (1) postrzegana przez implementatorów adekwatność zaadresowania barier/facylitatorów w otoczeniu zewnętrznym (ang. Outer setting), np. Umiejętność współpracy z innymi organizacjami, efekt interakcji Czas x Grupa: F=8,76; df=1, 187; p=0,03; 2) postrzegana przez implementatorów adekwatność zaadresowania barier/facylitatorów w otoczeniu wewnętrzne (ang. Inner setting), np. Atmosfera panująca w organizacji, efekt interakcji Czas x Grupa: F=4,07; df=1, 239; p=0,45.

Wykazano, że w grupie uczestników interwencji (grupy eksperymentalnej lub kontrolnej), prowadzonych przez implementującego oceniającego jakość procesu implementacji niżej, poziom MVPA pomiędzy pomiarami T1 a T4 nie zmienił się lub spadł, natomiast w grupie uczestników prowadzonych przez implementującego oceniającego wyżej implementację interwencji w danej domenie modelu CFIR, czas spędzany na umiarkowanej do intensywnej aktywności fizycznej zwiększył się pomiędzy pomiarem bazowym a pomiarem przeprowadzonym 14 miesięcy później. Nie stwierdzono efektów Czas x Grupa dla trzeciej domeny CFIR (charakterystyki indywidualne) oceniającej przekonania o własnej skuteczności implementatorów w zakresie wdrażanej interwencji. Szczegóły wyników przedstawiono w tabeli 2.

Powtórzone analizy, kontrolowane w zakresie zmiennych ubocznych (rodzaj grupy eksperymentalnej, wiek i płeć) wykazały takie same wzory zależności między zmiennymi.

Tabela 2

ANOVA z powtarzanym pomiarem: Różnice w poziomach MVPA uczestników interwencji (ilość minut na godzinę) wyjaśnione przez postrzeganą przez implementatorów adekwatność zaadresowania barier i facylitatorów implementacji w środowisku zewnętrznym, wewnętrznym oraz w odniesieniu do postrzeganej własnej skuteczności

Efekty	F	df	*p*	η^2	MVPA Time 1 (pomiar początkowy) *M (SD)*		MVPA Time 2 (pomiar końcowy po 14 miesiącach) *M (SD)*	
					Niższy poziom adekwatności barier i facylitatorów	Wyższy poziom adekwatności barier i facylitatorów	Niższy poziom adekwatności barier i facylitatorów	Wyzszy poziom adekwatności barier i facylitatorów
Implementatorzy: postrzegana adekwatność zaadresowania barier i facylitatorów implementacji w środowisku zewnętrznym: wyższa vs niższa								
Czas	0.61	1, 187	.436	.993	5.63 (2.35)	4.47 (2.07)	5.05 (1.91)	4.64 (2.18)
Płeć	0.01	1, 187	.921	<.001				
Wiek	2.48	1,187	.116	.013				
Warunek badania	0.21	1,187	.650	.001				
Czas x Adekwatność barier/facylitatorów	8.76	1,187	.003	.045				
Czas x Adekwatność barier/facylitatorów x Warunek badania	0.55	3,182	.650	.009				
Implementatorzy: postrzegana adekwatność zaadresowania barier i facylitatorów implementacji w środowisku wewnętrznym: wyższa vs niższa								
Czas	0.20	1,239	.652	.001	5.33 (2.26)	4.91 (2.18)	4.88 (2.00)	4.98 (2.18)
Płeć	0.16	1,239	.689	.001				
Wiek	0.39	1,239	.532	.002				
Warunek badania	0.08	1,239	.774	<.001				
Czas x Adekwatność barier/facylitatorów	4.07	1,239	.045	.017				
Czas x Adekwatność barier/facylitatorów x Warunek badania	0.26	3,234	.885	.003				
Implementatorzy: postrzegana własna skuteczność: wyższa vs niższa								
Czas	0.02	1,237	.903	<.001	5.34 (2.38)	4.82 (2.10)	5.14 (2.21)	4.75 (1.95)
Płeć	0.11	1,237	.736	<.001				
Wiek	0.01	1,237	.975	<.001				
Warunek badania	0.04	1,237	.839	<.001				
Czas x Adekwatność barier/facylitatorów	0.22	1,237	.639	.001				
Czas x Adekwatność barier/facylitatorów x Warunek badania	0.60	3,232	.616	.008				

Nota[1]: MVPA = pomiar akcelerometryczny minut spędzonych na umiarkowanej do intensywnej aktywności fizycznej, obliczone na godzinę ważnego czasu noszenia; Warunek eksperymentalny - interwencja planowania aktywności fizycznej vs warunek kontrolny (edukacja). Interakcje dwukierunkowe zostały obliczone w analizach z warunkiem eksperymentalnym jako zmienną kontrolną (kowariancją); interakcje trójkierunkowe zostały obliczone w analizach z warunkiem eksperymentalnym jako czynnikiem (zmienną niezależną).

Dyskusja wyników Badania 3

W badaniu wykazano, że dla uczestników interwencji prowadzonych przez implementatorów, którzy wyżej oceniali proces implementacji interwencji w zakresie 2 z 3 analizowanych domen modelu CFIR, udział w badaniu wiązał się ze wzrostem aktywności fizycznej, co świadczy o tym, że nie tylko zawartość interwencji ma znaczenie dla jej efektywności, ale też sposób postrzegania interwencji w odniesieniu barier oraz czynników wspierających interwencję przez jej implementatorów.

Konkluzje dla Badań 1-3

Podsumowując, wyniki Badania 1 oraz Badania 2 stanowią syntezę wiedzy teoretycznej i empirycznej dotyczącą modeli implementacji interwencji mających na celu promocję zdrowej diety, aktywności fizycznej oraz redukcję zachowań siedzących. Wykazano, że większość modeli operuje wielopoziomowo, ma kompleksowy charakter pod względem rodzaju uwzględnionych czynników. Ponadto, modele teoretyczne implementacji interwencji mają w większości charakter opisowy, zawierając elementy preskryptywne i predykcyjne, rzadko uwzględniają aspekty równości oraz zależności dotyczące systemów złożonych. Wyniki badań stanowią wsparcie dla decydentów, implementatorów i badaczy w zakresie uwzględnienia kontekstu kulturowego, ekonomicznego i politycznego przy planowaniu implementacji interwencji ukierunkowanych na promocję zdrowej diety i aktywności fizycznej.

Jednym z modeli zidentyfikowanych w Badaniu 2 jest model CFIR, który określa 26 determinantów implementacji w 5 głównych kategoriach/domenach. Do głównych determinantów implementacji określanych jako bariery lub czynniki ułatwiające implementację, wyszczególnionych w Badaniu 1, które zyskały poparcie na poziomie 66,7-76,2% w analizowanych przeglądach oraz dokumentach interesariuszy, należą: koszt, nawiązywanie kontaktów z innymi organizacjami/społecznościami, polityki zewnętrzne,

strukturalny charakter otoczenia, klimat implementacji, gotowość do implementacji oraz wiedza/przekonania zaangażowanych osób.

Porównania między interwencjami promującymi zdrową dietę a interwencjami ukierunkowanymi na zwiększenie aktywności fizycznej i redukcję zachowań siedzących ujawniły wspólne występowanie tylko 3 determinantów implementacji polityk: koszt, klimat implementacji i wiedza/przekonania, co pozwala przyjąć wniosek na temat istnienia istotnych różnic pod względem determinantów implementacji interwencji ukierunkowanych na promocję zdrowej diety a tymi ukierunkowanymi na promocję aktywności fizycznej i redukcję zachowań siedzących.

Zidentyfikowane w tym przeglądzie, zarówno w przeglądach systematycznych, jak i dokumentach interesariuszy, determinanty implementacji, można uznać za priorytetowe dla planowania i monitoringu implementacji interwencji, dlatego model ten stał się podstawą ewaluacji interwencji w Badaniu 3, w którym dowiedziono, że istnieje związek pomiędzy wysoko ocenianym procesem implementacji interwencji a wskaźnikami efektywności interwencji, co przekłada się na realny, istotny wzrost poziomu aktywności fizycznej pomiędzy pomiarem początkowym a końcowym wśród uczestników interwencji obserwowalny w okresie 14 miesięcy od wdrożenia interwencji

Badanie 3 jest jednym z nielicznych wskazujących na zależności pomiędzy determinantami procesu implementacji interwencji a efektywnością interwencji**.**

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Spis publikacji naukowych stanowiących spójny tematycznie zbiór artykułów

Publikacja dotycząca Badania 1:

Lobczowska, K., Banik, A., Romaniuk, P.., Forberger, S., Kubiak, T., Meshkovska, B., Neumann-Podczaska, A., Kaczmarek, K., Scheidmeir, M.,Wendt, J., Scheller., D. A., Wieczorkowska-Tobis, K. Steinacker, J. M., , Zeeb, H., & Luszczynska A. (2022). Frameworks for implementation of policies promoting healthy nutrition and physically active lifestyle: systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, *19*(1), 16. https://doi.org/10.1186/s12966-021-01242-4

Publikacja dotycząca Badania 2:

Lobczowska, K., Banik, A., Brukalo, K., Forberger, S., Kubiak, T., Romaniuk, P., Scheidmeir, M., Scheller., D. A., Steinacker, J. M., Wendt, J., Wieczorkowska-Tobis, K., Bekker, M. P. M., & Luszczynska, A. (2022). Meta-review of implementation determinants for policies promoting healthy diet and physically active lifestyle: application of the Consolidated Framework for Implementation Research. *Implementation Science*, *17*, 2. https://doi.org/10.1186/s13012-021-01176-2

Publikacja dotycząca Badania 3:

Lobczowska, K., Kulis, E., Banik, A., Siwa, M., Boberska, M., Szczuka, Z., Zaleskiewicz, H., Wietrzykowska, D., Krzywicka, P., Misiakowska, J., Kornafel, A., Kuzminska, J., Paduszynska, N., Zalewska-Lunkiewicz, K., Luszczynska, A. (w recenzjach). Are implementation barriers adequately addressed? The associations between the implementation process characteristics reported by implementers and physical activity changes among participants of a planning intervention. *Psychology and Health*

Oświadczenia współautorów publikacji dotyczącej Badania 1

The Co-Authorship Statement

Name of the candidate: Karolina Łobczowska

Publication: Lobczowska, K., Banik, A., Romaniuk, P., Forberger, S., Kubiak, T., Meshkowska, B., Neumann-Podczaska, A., Kaczmarek, K., Scheidmeir, M., Wendt, J., Scheller, D.A., Wieczorowska-Tobis, K., Steinecker, J.A., Zeeb, H., & Luszczynska, A. (2022). Frameworks for implementation of policies promoting healthy nutrition and physically active lifestyle: systematic review. *International Journal of Behavioral Nutrition and Physical Activity, 19*, 16. https://doi.org/10.1186/s12966-021-01242-4.

We, the undersigned, co-authors of the above publication, confirm that the above publication has not been submitted as evidence for which a degree or other qualification has already been awarded.

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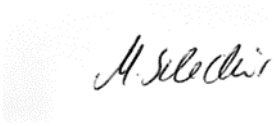

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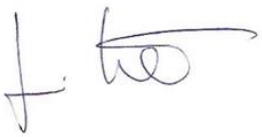

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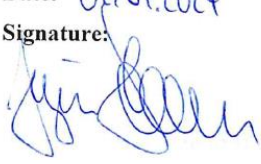

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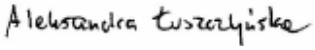

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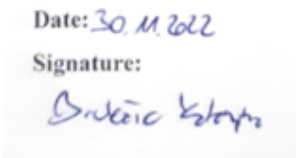

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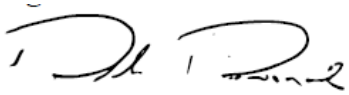

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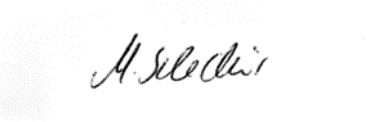

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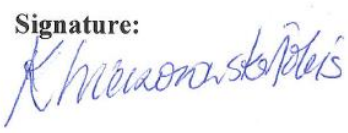

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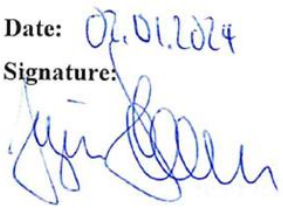

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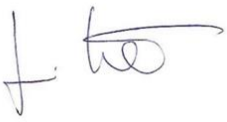

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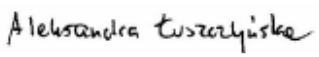

Oświadczenia współautorów publikacji dotyczącej Badania 3

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We, the undersigned, co-authors of the above publication, confirm that the above publication has not been submitted as evidence for which a degree or other qualification has already been awarded.

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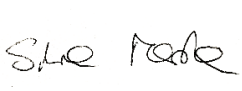

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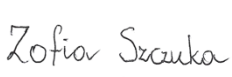

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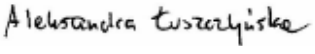

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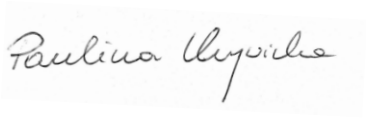

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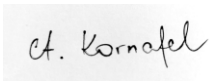

Publikacja dotycząca Badania 1

International Journal of Behavioral Nutrition and Physical Activity

REVIEW

Open Access

Frameworks for implementation of policies promoting healthy nutrition and physically active lifestyle: systematic review

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Abstract

Background: Policy frameworks focusing on policy implementation may vary in terms of their scope, included constructs, relationships between the constructs, and context factors. Although multiple policy implementation frameworks exist, the overarching synthesis characterizing differences between the frameworks is missing. This study investigated frameworks guiding implementation of policies aiming at healthy nutrition, physical activity promotion, and a reduction of sedentary behavior. In particular, we aimed at examining the scope of the frameworks and the content of included constructs (e.g., referring to implementation processes, determinants, or implementation evaluation), the level at which these constructs operate (e.g., the individual level, the organizational/community level), relationships between the constructs, and the inclusion of equity factors.

Methods: A systematic review (the PROSPERO registration no. CRD42019133251) was conducted using 9 databases and 8 stakeholder websites. The content of 38 policy implementation frameworks was coded and analyzed.

Results: Across the frameworks, 47.4% (18 in 38) addressed three aims: description of the process, determinants, and the evaluation of implementation. The majority of frameworks (65.8%; 25 in 38) accounted for constructs from three levels: individual, organizational/community, and the system level. System-level constructs were included less often (76.3%; 29 in 38) than individual-level or organizational/community-level constructs (86.8% [33 in 38 frameworks] and 94.7% [36 in 38 frameworks] respectively). The majority of frameworks (84.2%, 32 in 38) included at least some sections that were solely of descriptive character (a list of unassociated constructs); 50.0% (19 in 38) included sections of prescriptive character (general steps of implementation); 60.5% (23 in 38) accounted for explanatory sections (assuming bi- or uni-directorial associations). The complex system approach was accounted for only in 21.1% (8 in 38) of frameworks. More than half (55.3%; 21 in 38) of frameworks did not account for any equity constructs (e.g., socio-economic status, culture).

Conclusions: The majority of policy implementation frameworks have two or three aims (combining processes, determinants and/or the evaluation of implementation), include multi-level constructs (although the system-level determinants are less frequently included than those from the individual- or organizational/community-level),

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combine sections of purely descriptive character with sections accounting for prescriptive and/or explanatory associations, and are likely to include a little or no equity constructs.

Registration: PROSPERO, #CRD42019133251.

Keywords: Theory, Framework, Policy, Implementation, Nutrition, Diet, Physical activity, Sedentary behavior, Systematic review

Background

As the number of deaths attributable to poor diet and low levels of physical activity (PA) has been increasing over the last two decades [1], the number of public policies aiming at changes in dietary and physical activity behaviors has been growing [2]. For example, the World Cancer Research Fund [2] identified almost 700 national-level healthy diet policies and over 150 national-level PA policies. Policies are actions developed and implemented to directly or indirectly achieve specific goals within a society, for example, better health through better nutrition and PA, or a reduction of sedentary behavior (SB) [3]. Public policies entail a participation of national or regional governments that are involved in developing and implementing policies [3].

Policy implementation may be defined as translating policy goals into actions or integrating a policy within a setting or a system, or the actions aimed at maintaining the use and capacity of a policy [4]. Policy implementation refers to actions through which policies are operationalized within an organization, a community, or a society [5]. More than 60 approaches explaining implementation and dissemination of health-promoting interventions or policies were identified by Tabak et al. [6] whereas Nielsen and Bernjardsson [7] listed 17 frameworks/checklists of barriers and facilitators that influence implementation. Both reviews [6, 7] discussed frameworks without specifying if they refer to implementation of policies aiming at specific health outcomes. In contrast, Flynn et al. [8] identified 7 frameworks that may be used for the evaluation of implementation of policies targeting healthy diet and PA promotion.

Policy implementation frameworks are a subtype of policy frameworks, focusing on ways a policy is put into action [9]. Implementation frameworks are graphical or narrative representations of the key constructs to explain the phenomenon of implementation, and as a minimum they need to include the implementation processes (e.g., stages) or constructs relevant for implementation [4]. Comparisons between policy frameworks may address their specificity (e.g., general health-related actions vs. specific health outcomes the framework addresses), their content or their aims (e.g., explaining implementation processes, identifying implementation determinants, or describing implementation evaluation), the level at which the constructs operate (e.g., individual-, organizational-, or system-levels), relationships between the constructs (e.g., a lack of associations, uni- or bi-directorial associations), and the inclusion of a broader sociodemographic and economic context [9].

Not all implementation determinants or implementation processes can be anticipated during the policy development, therefore constant evaluation of policy implementation is required to adjust implementation and to enable the target groups to actively engage with the policy, and benefit in terms of better health [10]. In line with these observations, Nilsen [11] proposed that frameworks explaining implementation of health-related actions may have one of three types of scopes and include respective scope-related constructs. Process frameworks describe the steps and practical guidance in the planning and execution of implementation endeavors [11]. Determinant frameworks focus on barriers and facilitators that influence implementation processes and their outcomes. Finally, evaluation frameworks define how to assess implementation processes or specify which implementation outcomes should be measured [11]. The approach developed by Nilsen [7, 11] suggests that implementation frameworks belong to either of the three types. However, some frameworks may have a complex scope, for example attempt to explain implementation processes as well as their determinants [5].

In context of obesity-preventing behaviors, implementation of multi-level polices or interventions may have the highest public health potential and result in behavior change [12]. The frameworks guiding policy implementation may differ in terms of the levels accounted for, but even early frameworks explaining implementation of healthy nutrition and PA promotion accounted for individual-level factors and environmental-level factors [13]. According to the evidence-informed policy and practice approach to policies [14] the environmental level may be further divided into the organizational or community level, referring to processes, determinants or implementation evaluation taking place in a target organization or community, and a system level, referring to external lobbying groups, co-existing governmental policies and regulations, administrative structures, etc.

The constructs included in policy implementation frameworks may form different types of relationship.

The framework to knowledge approach [15, 16] suggests that any frameworks may be classified into four types, depending on the associations between the constructs. Descriptive frameworks describe the key constructs, including their properties, characteristics, and/or qualities, without assuming any specific relationships between the constructs [15, 16]. Prescriptive frameworks provide a general direction of the actions, explaining them in a series of steps to be taken. Explanatory frameworks include more specific uni- or bi-directional associations between domains (or concepts within the domains) contained within a framework. Predictive frameworks hypothesize directional relationships between all constructs included in the framework [15, 16].

Besides approaches focusing on linear associations between the constructs included in frameworks, the complex system approaches recognize that the constructs may be associated in a non-linear and multi-directional way [17, 18]. Complex system approaches assume that systems are more than the sum of the domains, constructs, and relationships between them [18]. For example, the associations between the constructs may take a form of feedback loops; a change in a feedback loop linking two constructs may result in changes reverberating throughout the system [18].

The main goal of public health policies may be described as promoting better health for everyone [19]. Therefore, an inclusion of equity-related constructs may be yet another dimension allowing to categorize implementation frameworks. When health policies and their implementation are considered, the key equity factors refer to economic status, education, gender, age, ethnicity, geographic isolation, and culture [19, 20]. For example, considering geographic isolation may foster implementation of healthy diet policies that would reach the individuals and communities in remote locations, whereas considering culture may result in including strategies for training cultural competences of the implementers [5].

Although several reviews of implementation frameworks exist [6–8, 11], they have some limitations. First, these reviews focus on various types of actions [6–8, 11], but none of them purposefully investigated policy-related frameworks. Compared to frameworks developed to guide interventions (focused on individual's behaviors, beliefs, and skills), policy frameworks may have their specificity, for example related to the role of the political context and involved institutions [9]. To the best of our knowledge, reviews of *policy* implementation frameworks, developed or applied to promote healthy diet and PA, are missing. Second, the existing reviews of implementation frameworks compare the frameworks in one preselected area, for example in terms of the aspects of evaluation [8] or implementation determinants [7]. Research on developments in policy frameworks suggested that there are several areas of key differences, referring to the scope of such frameworks, the types of included constructs, relationship between the constructs, and the context accounted for [9]. Comparing policy implementation frameworks in terms of their scope, included constructs, relationships between constructs, and the context may offer a useful guide for researchers and practitioners considering which framework to choose and how their chosen framework compares to other frameworks across these critical areas [9].

This review aims at identifying implementation frameworks for policies promoting healthy diet and physically active lifestyle (defined as promotion of physical activity and reduction of sedentary behavior) and characterizing their scope, the content of the frameworks, relationships between the included constructs, and the equity context factors accounted for. In particular, we analyzed if policy implementation frameworks: (1) aimed at identifying implementation processes, implementation determinants (e.g., barriers and facilitators), or implementation process evaluation; (2) accounted for constructs from individual, organizational/community, and system levels; (3) assumed any associations between constructs (and specific types of associations, i.e., if the frameworks were descriptive, prescriptive, explanatory, predictive or applied complex system approaches); and (4) accounted for equity constructs (economic status, education, age, gender, ethnicity, culture, and geographic isolation).

Methods

Search strategy

A systematic search of 9 databases of peer-reviewed journal was performed to identify peer-reviewed publications concerning frameworks for implementation of policies targeting nutrition and PA/SB. Next, to cover grey literature, 8 stakeholder databases were searched, consistently with the approach applied in previous reviews on implementation frameworks [8] and implementation determinants [21]. For the full list of searched databases see Supplementary Table S1, Additional File 2. In addition, manual searches of existing reviews and journals aiming at research on policy implementation was performed (e.g., *Policy Studies*). Documents and articles published between inception of the databases and February 2020 were included. The search was conducted using a combination of four groups of keywords (both for peer-reviewed journals and stakeholder databases) referring to: (1) process, determinants, and evaluation of implementation (e.g., implement*); (2) frameworks (e.g., model*); (3) the type of action (e.g., law OR strateg*); (4) behavior (e.g., diet*) (for the

full list of keywords see Additional File 2, Supplementary Table S1). The study was conducted in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [22, 23]. The review was preregistered with PROSPERO database (no. CRD42019133251). Besides the preregistered research aims, a question referring to the inclusion of the equity constructs into the policy implementation frameworks was added, consistently with recent research and developments in frameworks for policy and policy implementation [5, 8].

Inclusion and exclusion criteria

The following inclusion criteria were applied: (1) papers and documents discussing an original policy implementation framework (or its significantly revised versions); (2) papers discussing policy implementation in the context of nutrition, and/or PA and/or SB outcomes; (3) stakeholder documents officially approved by the respective organization; (4) only English-language stakeholder documents and peer-reviewed articles. The exclusion criteria were: (1) documents or papers presenting partial frameworks that include only one concept, variable, or factor; (2) documents or papers presenting frameworks that were developed as applicable solely to specific policies, other than promoting healthy nutrition, and/or PA and/or SB (e.g., safety at work policy implementation frameworks); (3) documents or papers presenting a framework that focuses on other aspects of policy than implementation (e.g., policy development frameworks, policy evaluation frameworks, or policy frameworks that used the term/concept of implementation without specifying what is included in the 'implementation'); (4) dissertations, protocols, conference materials, and book chapters.

Data collection and extraction

The initial search resulted in identifying 149,628 potentially relevant documents (see Fig. 1 for the details of data selection). The titles and abstracts of potentially relevant documents were screened. Next, the full-text versions of articles and documents were retrieved and reviewed in terms of their match with inclusion criteria. Overall, we included 31 articles (describing $n = 31$ frameworks) and 7 stakeholder documents (describing $n = 7$ frameworks) meeting all inclusion criteria (see Table 1).

To address the study objectives the following data were extracted (see Additional File 1, Supplementary Table S1): the target population and behavior (healthy diet, PA, SB), equity factors included in the framework (such as gender, age, ethnicity), the scope of framework and the type of constructs included (processes, determinants, or evaluation of implementation), levels accounted for (individual, organizational/community, system levels or a complex system approach), and the types of associations between the constructs (descriptive, prescriptive, explanatory, or predictive).

All stages of data search, selection, extraction and coding were conducted by at least two researchers. Any disagreements during these stages were resolved by the consensus method (searching for possible rating errors, followed by a discussion and an arbitration by a third researcher [7]).

Data coding, analysis and synthesis

Data regarding each included policy implementation frameworks were coded according to five categories: (1) the scope of the content of the framework (specifying implementation processes, determinants [and/or strategies] and/or evaluation) [11]; (2) levels of constructs the framework accounts for: the individual-level, the organizational/community-level, and/or the outer setting/system-level [14]; (3) the types of relationships between the framework constructs (was the framework descriptive, predictive, explanatory – unidirectional or bidirectional, predictive or using a complex system approach) [16]; (4) equity factors included in the framework (gender, age, economic status/education/literacy, ethnicity, geographic isolation/distance, culture); (5) frameworks that indicated a direct focus on a particular behaviors (e.g., nutrition included directly into the framework) vs. discussed applications for these behaviors (e.g., nutrition listed as one of potential areas of possible application).

In case a framework included a particular category it was coded as accounting for this criterion (+). Coding was performed following the definitions provided by Nielsen [11] (aims of the framework; see Table 1), Bowen and Zwi [14] (levels that the framework accounts for), Rycroft-Malone and Bucknall [16] (types of relationships), and the Organization for Economic Co-operation and Development as well as Bleich et al. proposals [19, 20] for key equity factors in health policies. Additional File 2 (Supplementary Table S2) provides criteria applied in coding of the extracted data.

The variables for which data were sought were defined as follows:

- *Policies* are decisions, plans and actions developed and implemented to directly or indirectly achieve specific goals within a society, for example, better health through better nutrition and PA, or a reduction of SB [3]. Policies involve a participation of national or regional governments that are involved in developing and implementing policies [3].

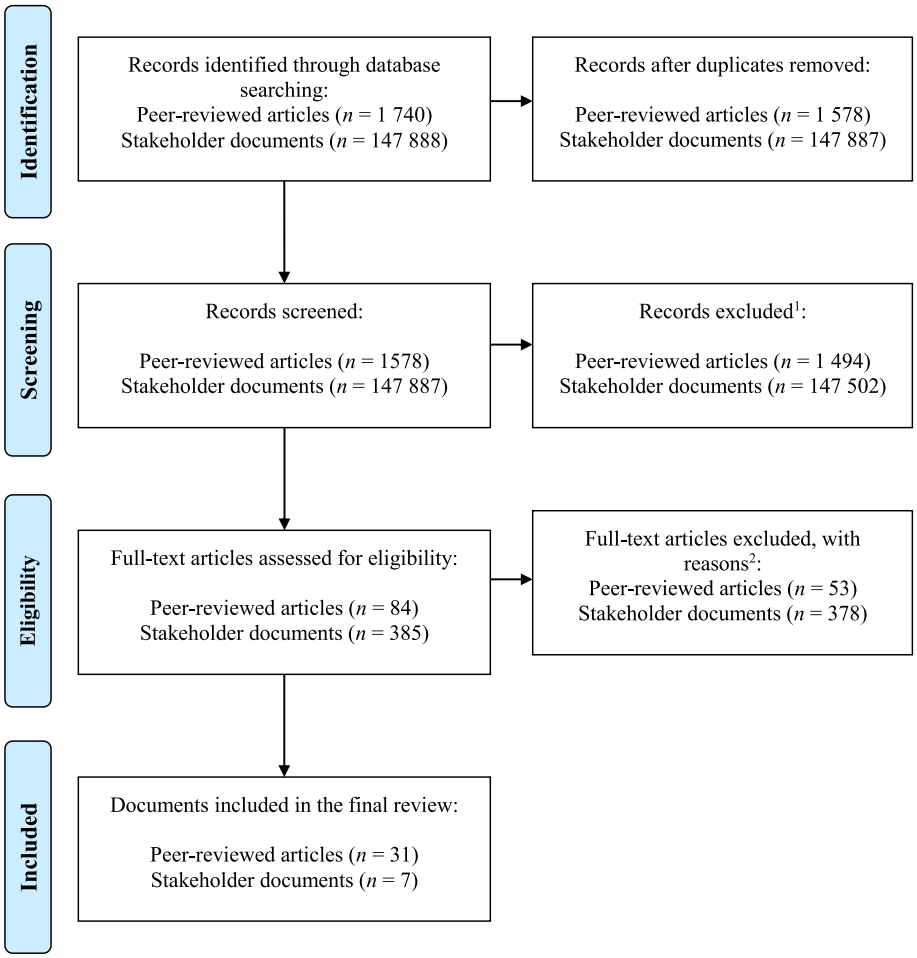

Fig. 1 The flow chart: selection processes for peer reviewed articles and stakeholder documents. Note: [1] - Records excluded with reasons: document missing any kind of scientific considerations (not a framework, key analyses unrelated to nutrition, physical activity, sedentary behavior; unrelated to policies); [2] - Full-text articles excluded, with reasons: not an implementation framework, only mentioning a framework but not the original source of the framework, documents lacking any deeper description or discussion over the frameworks mentioned, documents discussing a general context for policy implementation or strategy, not being put in any structured framework

- *Implementation* is defined as the process of putting to use or integrating a policy within a setting or a system, or the process of maintaining the use and capacity of a policy [4]. *Public policy implementation* can be considered as a process of carrying out a government decision [60], and reflects a complex change process where government decisions are transformed into programs, procedures, regulations, or practices aimed at social betterment [61].
- *Framework* is defined as "a graphical or narrative representation of the key factors, concepts, or variables to explain the phenomenon of implementation" [4]. Specifically, implementation frameworks should include either implementation steps, or implementation determinants, or strategies [4]. Frameworks may specify the relationships between the included constructs [16]. As the framework development progresses through an integration of new evidence, the constructs may evolve from relatively broad or vague to more specific and well-defined [62].

Results

Overall, $N = 38$ frameworks were identified. The characteristics of the frameworks, including their aims and respective constructs, associations between constructs, equity factors included, and the target behavior are presented in Table 1.

Table 1 Policy implementation frameworks: aims, levels accounted for, associations between the included constructs, and equity factors

Frameworks (numbered according to Additional File 1)/ characteristics of the frameworks	1 [5]	2s [24]	3s [25]	4s [26]	5 [27]	6s [28]	7 [29]	8s [30]	9 [31]	10 [32]	11 [33]	12 [34]	13 [35]	14 [36]	15 [37]	16 [38]	17s [39]	18 [40]	19 [41]	20 [42]	21s [43]	22 [44]	23 [45]	24 [46]	25 [47]	26 [48]	27 [49]	28 [50]	29 [51]	30 [52]	31 [53]	32 [54]	33 [55]	34 [56]	35 [57]	36 [58]	37 [13]	38 [59]
Framework aims at specifying:																																					
Implementation processes	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			+		+	+												
Implementation determinants, also implementation strategies	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+
Implementation evaluation	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+		+		+	+	+	+	+	+	+						
Levels accounted for																																					
Individual-level constructs	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			+	+	+	+	+	+	+	+	+	+		+		+	+	+	+		+
Organizational/community-level constructs	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			+	+	+	+	+	+
Outer setting/systemic-level constructs	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+		+	+	+	+	+	+				+		+		+	+	+	+	+	
Associations: Type of frameworks relations																																					
Descriptive						+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Prescriptive (stages)	+	+	+	+	+	+	+	+	+		+	+	+	+			+	+			+		+		+				+								
Explanatory -unidirectional					+					+															+		+								+			
Explanatory - unidirectional and bidirectional (e.g., feedback loops)	+	+	+		+	+	+	+			+	+				+			+	+		+	+	+		+					+	+	+				
Predictive																																					
Complex system approach	+					+	+	+								+			+	+														+			
Equity factors included																																					
Gender	+	+	+	+		+	+	+	+	+										+	+														+	
Age	+	+	+	+		+	+	+	+											+	+	+								+					+	
Economic status/education/literacy	+	+	+	+		+	+	+	+	+	+								+		+									+		+			+	
Ethnicity	+	+	+				+		+										+	+										+		+			+	
Geographic isolation/distance	+	+	+						+	+									+		+											+				
Culture	+	+	+	+		+		+	+		+								+		+	+										+			+	
Equity factors mentioned only (C) or are operational constructs (O)	O	O	O	O		O	O	O	O	C	O								O	C	O	C								C		O			C	
Target population and behavior																																					
Population specified		+				+		+		+		+	+	+			+			+		+				+		+		+		+	+	+	+	+	
Nutrition: Target behaviors included in the framework		+	+	+		+		+		+			+	+			+					+		+						+				+	+	+	
PA and SB: Target behaviors included in the framework		+	+			+							+	+							+	+								+					+	+	
Discusses applications to PA, SB and/or nutrition behaviors		+	+	+	+	+		+		+			+	+			+				+	+		+	+		+	+	+		+		+		+	+	+

Note:s – the frameworks developed by a stakeholder are indicated with 's' after the framework number; PA - physical activit; SB - sedentary behavior (1) The Context and Implementation of Complex Interventions (CICI) framework [5]; (2s) The DPAS (Global Strategy on Diet, Physical Activity and Health) School Policy Framework) [24]; (3s) Global Strategy onDiet, Physical Activity and Health: A framework to monitor and evaluateimplementation DPAS:[25]; (4s) Implementing a salt reduction strategyframework – a practical approach [26]; (5) PRECEDE-PROCEED planning model [27]; (6s) DPAS inthe Eastern Mediterranean Region [28]; (7) Practical, Robust Implementation and Sustainability Model (PRISM)[29]; (8s) Stepwise approach: Four Steps to Design Public Food ProcurementInitiatives [30]; (9) The pragmatic Ottawa Model of Research Use (OMRU) [31]; (10) Conceptual Model of Evidence-Based Practice Implementation in Public Service Sectors [32]; (11) Conceptual framework of Equity-focused Implementation Research (EquIR) of health programs; [33]; (12) The Nutrition Implementation Framework [34]; (13) Conceptual frameworkfor designing and implementing health promotion programmes in schools [35]; (14) Not specified [36]; (15) Consolidated Framework for Implementation Research,(CFIR) [37]; (16) Normalization Process Model (NPM) [38]; (17s) a framewowk without a specified name [39]; (18) The Quality Implementation Metaframework (QIF) [40]; (19)) The Advocacy CoalitionFramework (ACF) [41]; (20) the multilevel implementation quality framework [42]; (21s) Normalization Process Theory [43]; (22) Steps to health: a European framework to promote physical activity for health [44]; (23) Multilevel Implementation Framework (MIF) [45]; (24) The Behavior Change Ball [46]; (25) Implementation science in nutrition framework (ISN) [47]; (26) Promoting Action onResearch Implementation in Health Services (PARiHS) [48]; (27) Organization theoryfor determinants of effective implementation of worksite health promotion programs [49]; (28) RE-AIM evaluation model [50]; (29) Framework for a "public health approach"- a global framework for the primary care response to chronic NCDs [51]; (30)Framework for design and evaluation of complex interventions to improve health [52]; (31) The Implementation Framework [53]; (32) the Interactive Systems Framework for Dissemination and Implementation (ISF) [54]; (33) The He Pikinga Waiora (Enhancing Wellbeing) Implementation Framework [55]; (34) Ecological framework for understanding effective implementation [56]; (35) Comprehensive school health framework (CSH) [57]; (36) Conceptual Framework for Organizational Readiness to Implement Nutrition and Physical Activity Programs [58]; (37) The ANalysis Grid for Environments Linked to Obesity ANGELO [13]; (38) Theoretical Domains Framework (TDF) [59]

The scope and the content of policy implementation frameworks

Except of one [47], all frameworks (97.4%; 37 in 38 frameworks) included implementation determinants. The majority accounted for evaluation of implementation (73.7%; 28 in 38 frameworks), whereas implementation processes were addressed the least frequently (57.9%; 22 in 38 frameworks; see Fig. 2).

Overall, 7 in 38 (18.4%) frameworks accounted for one type of content-related constructs only (either process only, or determinants only, or evaluation only), whereas 18 in 38 (47.4%) frameworks included a mix of all three types of constructs (the process, determinants, and the evaluation). Nine (23.7%) in 38 frameworks addressed both implementation determinants and the evaluation of implementation. The smallest number of frameworks aimed at describing two remaining scopes, namely implementation processes and implementation determinants (7.9%, 3 in 38), or combined aims referring to implementation processes and implementation evaluation (2.6%, 1 in 38).

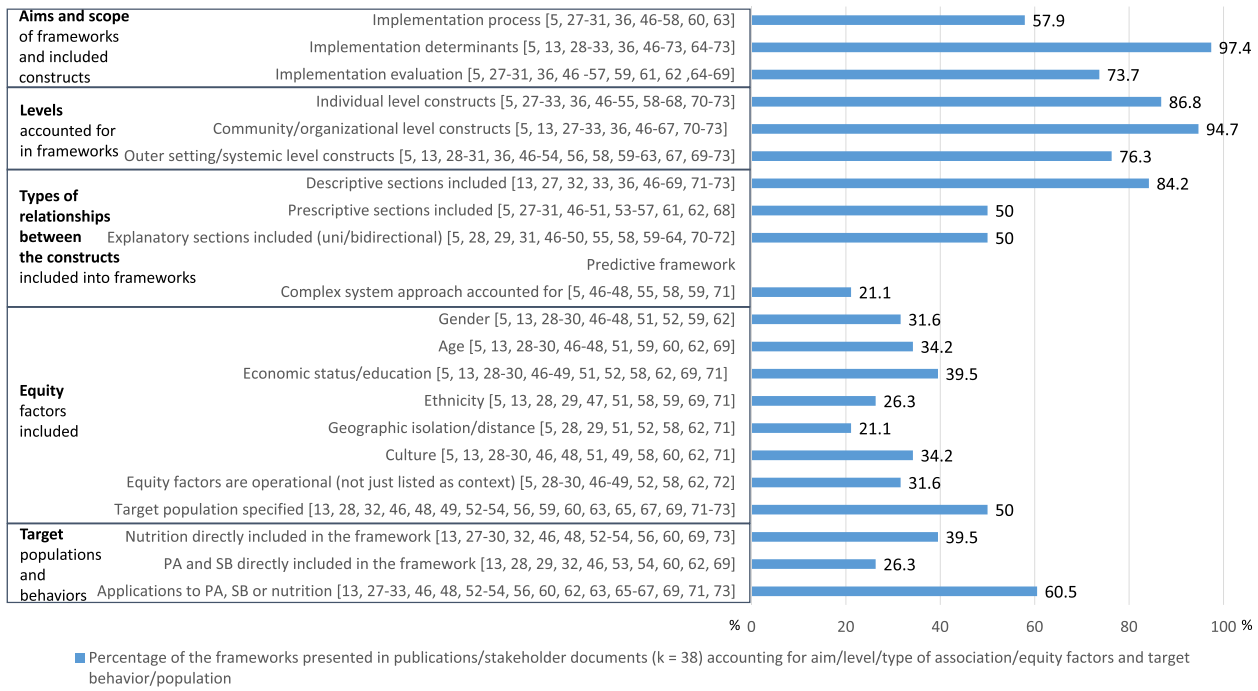

Fig. 2 Summaryof policy implementation frameworks' focus. Percentage of policiesaccounting for aims/focus of the frameworks, levels accounted for,types of frameworks in terms of relationships between the constructs,equity factors, target populations, and target behaviors

Individual, community, and system levels in policy implementation frameworks

The majority of policy implementation frameworks (65.8%, 25 in 38) included constructs from all three analyzed levels (individual, organizational/community, and system), whereas only 7.9% (3 in 38) accounted for one level only. Organizational/community-level variables were included in almost all frameworks (94.7%; 36 in 38). Individual-level constructs were included in the majority of frameworks (86.8%; 33 in 38). The system-level constructs were accounted for in majority of frameworks as well (76.3%; 29 in 38), albeit the least frequently (Fig. 2).

Relationships between the constructs included in policy implementation frameworks

Overall, 84.2% of frameworks (32 in 38) included at least some sections which were of solely descriptive character (a list of constructs that were not associated in any specific manner). A half of the frameworks (50.0%, 19 in 38) included sections that were of prescriptive character (e.g., stages). The majority of frameworks (60.5%, 23 in 38) included explanatory sections assuming uni-directorial and/or bi-directorial associations between included constructs. Bi-directorial associations were indicated in 50.0% (19 in 38) of frameworks. Elements of the complex system approach were included in 21.1% (8 in 38) frameworks only (Fig. 2).

Across the frameworks, 18.4% (7 in 38) were of descriptive character solely, one framework (2.6%) was of prescriptive only, and one (2.6%) was solely of explanatory character. None of the frameworks was of predictive character, that is assuming that all constructs are linked in a specific (uni- or bi-directional) manner. The remaining 29 frameworks (76.3%) combined aspects typical of descriptive, predictive, or explanatory frameworks. In particular, 18.4% (7 in 38) of frameworks included sections which were of solely descriptive character combined with sections presenting prescriptive associations, whereas 28.9% (11 in 38) of frameworks included descriptive sections combined with sections assuming explanatory associations (uni- or bi-directional). Furthermore, 10.5% (4 in 38) frameworks included prescriptive and explanatory sections combined. Finally, 18.4% (7 in 38) of frameworks included sections combining descriptive, prescriptive, and explanatory (uni- or bi-directional) associations.

Equity factors included in policy implementation framework

Overall, the findings indicate that across the included frameworks 55.3% (21 in 38) did not account for any of the equity factors included in this study, whereas 10.5%

(4 in 38) accounted for all six equity factors investigated in the present review (Fig. 2).

Thirteen (34.2% of 38) frameworks included from 2 to 5 equity factors. Economic factors were most frequently included in the frameworks (39.5%, 15 in 38), followed by age and culture-related factors (both accounted for in 34.2%, 13 in 38 frameworks), and gender (31.6%, 12 in 38 frameworks). The least frequently included equity factors were ethnicity (26.3%, 10 in 38 frameworks) and geographic isolation/infrastructure (21.1%, 8 in 38 frameworks).

Target behaviors included in policy implementation frameworks

Regarding the target behavior, 60.5% (23 in 38) of policy frameworks included nutrition, PA, and SB-related behaviors into the framework directly, or indicated that the framework may be used for implementation of healthy nutrition, PA and/or SB policies. The remaining 39.5% (15 in 38) of frameworks were generic in terms of the target behavior for the policy implementation, which means that they did not indicate that they were developed to guide implementation of policies targeting change of specific health behaviors (Fig. 2).

In particular, 39.5% (15 in 38) of all frameworks directly referred to implementation of healthy nutrition policies, whereas 26.3% (10 in 38) referred to implementation of physical activity or sedentary behavior-related policies. Among these, 36.0% (9 in 25) frameworks addressed both nutrition and PA/SB, 24.0% (6 in 25) addressed nutrition only and 4.0% (1 in 25) addressed PA/SB only.

Across all policy implementation frameworks, 50.0% (19 in 38) specified a target population. The remaining 50.0% (19 in 38) frameworks did not focus on any specific population.

The frameworks with a complex scope versus frameworks focused on a specific scope

As presented in Table 1, 39.5% (15 in 38) frameworks accounted for all three investigated scopes (processes, determinants, evaluation of implementation) and the three levels (individual, community and outer setting/systemic level). Among them, 13.2% (5 in 38) provided some clarification on the associations between all constructs included in the framework [5, 24–27], whereas 26.3% (10 in 38) included some areas of the framework which were of the descriptive character. Among these 5 frameworks addressing all scopes, levels, and avoiding purely descriptive sections, only 3 included all analyzed equity factors (gender, age, economic status, ethnicity, geographic isolation, and culture) [5, 24, 25]. There were 7 (18.4% of 38) frameworks that addressed only one aim, and thus had a narrowed-down and specific scope [13, 55–59]. All of these 7 frameworks [13, 55–59] focused on listing implementation determinants. Four of these frameworks addressed 3 levels (individual, organizational/community, and system-related) and 6 included some areas of descriptive character (i.e., without specifying the relationship between the included constructs).

Discussion

This review identified 38 implementation frameworks developed for (or applied in the context of) healthy nutrition, PA promotion, and SB reduction policies. The findings indicate that almost half (47.4%, 18 in 38) of the frameworks had a complex scope, combining aims and constructs referring to processes, determinants, and evaluation or implementation, with additional 13 frameworks (34.2% of $n = 38$) combining two of these aims. Furthermore, the majority of frameworks (65.8%, 25 in 38) accounted for constructs from all three levels: individual, organizational/community, and the system levels. Regarding the relationships between the constructs, the majority of policy implementation frameworks (84.2%, 32 in 38) included at least some sections that were of solely descriptive character (a list of constructs which were not associated in any specific manner). Slightly more than half (55.3%, 21 in 38) of frameworks did not account for any of the equity-related constructs. Finally, we have found that only 3 (7.9% of 38) frameworks [5, 24, 25] accounted for all 3 investigated scopes (processes, determinants, evaluation of implementation), the 3 levels (individual, community/organizational, and system levels), specified relationship between all included constructs, and addressed all analyzed equity factors.

As suggested in Nilsen's [11] typology, implementation frameworks may be divided into three distinct groups, depending on their scope: (1) addressing implementation process, (2) implementation determinants, or (3) evaluation of implementation. Our findings indicated that the majority of policy implementation frameworks included more aims than one. Thus, the results are in contrast to the assumption made by Nilsen [7, 11] suggesting that implementation frameworks belong to either of the three types.

The identified frameworks were most likely to include policy implementation determinants and the least likely to describe policy implementation processes. This is in contrast to many definitions, highlighting processual aspects of implementation, e.g., defining implementation as a *process* of putting to use or integrating new practices within a setting [63, 64]. It should be noted that several frameworks that focus mostly on determinants (e.g., the Consolidated

Framework of Implementation Research; CFIR [37]) highlight that at least some implementation determinants are process-specific, namely they may be particularly relevant during some implementation processes. Our study shows that frameworks including aspects of implementation processes were also more likely to include community and system-level constructs (besides individual-level-constructs) as well as equity constructs. The inclusion of multi-level constructs and equity factors may result from attempts to explain complexity of the implementation process. For example, such process may account for strategies of engaging key stakeholders, adapting policies to the context, prioritizing implementation goals, monitoring the process of implementation among all involved stakeholders, implementers, and the target population [65]. If such processes strategies are included, the framework is likely to include constructs typical of organization/community or system level, and address the diversity of the target population.

The majority of policy implementation frameworks (65.8%, 25 in 38) used a multi-level approach, accounting for individual, organizational/community, and outer setting/systemic level constructs. This is in line with accumulating evidence, pointing towards the highest public health potential of multi-level actions (i.e., policies or interventions) targeting obesity reduction [12, 13]. On the other hand, the system-level determinants were included less frequently than determinants from the individual and organizational/community levels. Furthermore, even if the system-level constructs were addressed, they were described in a relatively general manner (e.g., accounting for 'external policies') [37]. Recent framework-guided research on implementation suggested that to increase the usability of policy implementation frameworks in research and practice, the frameworks should include a higher number of specific system-level constructs such as external funding agent priorities, resource source, resource continuity, and strategic policy alignment [66].

As suggested by the framework to knowledge approach [15, 16], theoretical approaches may evolve in a way that descriptive frameworks represent an early stage of a model development, which progresses to more specific (explanatory) and precisely defining all potential relationships (predictive). Our findings indicated that a majority of policy implementation frameworks included at least some descriptive areas, thus they require further theoretical developments. In line with a framework-based research it may be assumed that an inclusion of more specific links between the sections or the constructs would benefit the use of the framework in research and practice [58].

Elements of the complex system approach [17, 18] were rarely integrated into the policy implementation frameworks. Across the last decade, researchers and practitioners have been advocating for the use of the complex system approach to explain obesity and obesity related behaviors (such as nutrition, PA and SB) [67, 68]. The complex system approach was mostly used to map the determinants of obesity or obesity-related behaviors [68, 69]. Future theoretical developments may benefit from the use of system mapping approach [68] and propose complex system-based policy implementation frameworks.

Last but not least, we found that half of the frameworks did not account for any of the equity constructs analyzed in this review. Previous research aiming at adjusting a more generic implementation framework to a specific context (e.g., care transition from being hospitalized to ambulatory care) showed that tailoring the frameworks results in an inclusion of equity factors, such as age, gender or ethnicity [70, 71]. This is in line with the findings of the present study showing that implementation frameworks which were developed specifically for (or addressing) healthy nutrition, PA or SB policy implementation were more likely to account for the equity factors, compared to the frameworks that were developed as more generic.

While this study has several strengths, many limitations are present. This review did not account for policy implementation frameworks that were developed and mostly used in other contexts than changing nutrition, PA, and SB [9, 72], therefore any conclusions are limited to the frameworks that were already applied in research on these behaviors. We did not include books and book chapters into the systematic review, whereas several frameworks that account for policy implementation were originally presented in these types of sources. One of key criteria for comparisons between policy frameworks may refer to their inclusion of events: (1) anticipated, such as elections that produce limited change or introduce new actors with different ideas, or (2) unanticipated, such as social or natural crises (e.g., the COVID-19 pandemic), or major and technological changes [9, 73]. Such criteria are particularly relevant if sustainability of the policy implementation is considered. The criterion referring to an inclusion of the event was not applied in this study. Future research may need to account for this criterion, but also compare policy implementation frameworks using such criteria as inclusion of characteristics of actors making choices or networks and subsystems of 'pressure participants' [9]. Although a large number of original stakeholder documents were retrieved during the search, the majority (147,880 in 147,887) were

subsequently excluded during the screening process. It is possible that due to a large number of screened documents some of stakeholder frameworks were not identified. As the number of the policy implementation frameworks increases over time, the findings of this review should be updated in upcoming years in order to integrate newer approaches.

Conclusions

This study provides an overarching synthesis of frameworks guiding implementation of healthy nutrition and PA/SB policies, summarizing their scope, the content of the included constructs, the level at which the constructs operate, relationships between the constructs, and the inclusion of equity factors. The majority of frameworks have a complex scope (combining process, determinants and/or evaluation of implementation), include multi-level constructs (although system level determinants are less frequently included than those at individual or organizational/community level), combine sections of purely descriptive character with sections accounting for prescriptive and/or explanatory associations, and are likely to include a little or no equity constructs.

By summarizing the characteristics of policy implementation frameworks this review may inform directions for future theoretical developments. In particular, existing frameworks could benefit from integrating equity factors and the complex-system approach thinking. When faced with a myriad of policy implementation frameworks, policy makers, researchers, and policy implementation actors may seek guidance on how to select an optimal framework. The findings of this review may facilitate the process of selecting the framework that represents the best match for their needs and aims. It may also help them to put their chosen framework into the context of other existing frameworks, differing in such aspects as the inclusion of equity factors, systemic-level constructs, or accounting for implementation evaluation.

Abbreviations

ACF: Advocacy Coalition Framework; ANGELO: ANalysis Grid for Environments Linked to Obesity; CFIR: Consolidated Framework for Implementation Research; CICI: Context and Implementation of Complex Interventions framework; CSH: Comprehensive School Health framework; DPAS: Global Strategy on Diet, Physical Activity and Health; EquIR: Conceptual framework of Equity-focused Implementation Research of health programs policies and systems; ISN: Integrated Framework for Implementation Science in Nutrition; MIF: Advocacy Coalition Framework; NPM: Normalization Process Model; OMRU: Ottawa Model of Research Use; PA: physical activity; PARiHS: Promoting Action on Research Implementation in Health Services; PRISM: Practical, Robust Implementation and Sustainability Model; QIF: Quality Implementation Metaframework; RE-AIM: Reach, Efficacy, Adoption, Implementation, Maintenance model; SB: sedentary behavior; TDF: Theoretical Domains Framework.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12966-021-01242-4.

Additional file 1: TableS1 Details of data extraction.

Additional file 2: Table S1: Full list of 4 groups of keywords applied in the searching strategy and databases searched. Table S2: Additional coding principles for included policy implementation model/frameworks and definitions of key variables. The list of included peer-reviewed articles and stakeholder documents.

Acknowledgements

Not applicable.

Authors' contributions

AL, KL, AB: design of the theoretical construction of the review as well as the searching strategy process; PR, KK, ANP, KWT, MS, DAS, JW, KL, AL: screening of potentially relevant documents; KL, AL: data extraction; AB: data extraction verification; KL, AL, AB: data analysis; KL, AL, AB: writing the manuscript draft; SF, TK, KWT, BM, HZ, JMS, MS: critical revision of the intellectual content of the manuscript. All authors read and approved the final manuscript.

Funding

This review was prepared as a part of the PEN project. The PEN project (www.jpi-pen.eu) is funded by the Joint Programming Initiative "A Healthy Diet for a Healthy Life" (JPI HDHL), a research and innovation initiative of EU member states and associated countries. The funding agencies supporting this work are: Germany: Federal Ministry of Education and Research (BMBF); Norway: The Research Council of Norway (RCN); Poland: The National Centre for Research and Development (NCBR).
In particular, the work was supported by the following grants: KL, AB, AL report grant from NCBR, Poland (no. JFA PEN/I/PEN44/03/2018); DAS, JW, JMS report grant from BMBF, Germany (no. FKZ:01EA1818D/PEN70/03/2018); SF, HZ report grant from BMBF, Germany (no. FKZ:01EA1818A/PEN76); PR, KK report grant fromNCBR, Poland, (no. JFA PEN/I/PEN14/04/2019); MS, TK report grant from BMBF, Germany (no. PEN75/01EA1818B); ANP, KWT report grant from (NCBR, Poland (no. JFA PEN/I/PEN47/01/2019); BM reports grant from RCN, Norway (no. 297894/H10).
The funding bodies had no influence on the design on the study, its aim, data collection, data analysis, data interpretation, and in writing the manuscript.

Availability of data and materials

All data analysed during this study are either secondary (retrieved from original studies included in the review) or included in this published article (and its supplementary information files).

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no conflicting interests.

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Received: 2 July 2021 Accepted: 23 December 2021
Published online: 12 February 2022

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Publisher's Note

Publikacja dotycząca Badania 2

Implementation Science

SYSTEMATIC REVIEW

Open Access

Meta-review of implementation determinants for policies promoting healthy diet and physically active lifestyle: application of the Consolidated Framework for Implementation Research

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Abstract

Background: Although multiple systematic reviews indicate that various determinants (barriers and facilitators) occur in the implementation processes of policies promoting healthy diet, physical activity (PA), and sedentary behavior (SB) reduction, the overarching synthesis of such reviews is missing. Applying the Consolidated Framework for Implementation Research (CFIR), this meta-review aims to (1) identify determinants that were systematically indicated as occurring during the implementation processes and (2) identify differences in the presence of determinants across reviews versus stakeholder documents on healthy diet/PA/SB policies, reviews/stakeholder documents addressing healthy diet policies versus PA/SB policies targeting any population/setting, and healthy diet/PA/SB policies focusing on school settings.

Methods: A meta-review of published systematic scoping or realist reviews ($k = 25$) and stakeholder documents ($k = 17$) was conducted. Data from nine bibliographic databases and documentation of nine major stakeholders were systematically searched. Included reviews (72%) and stakeholder documents (100%) provided qualitative synthesis of original research on implementation determinants of policies promoting healthy diet or PA or SB reduction, and 28% of reviews provided some quantitative synthesis. Determinants were considered strongly supported if they were indicated by ≥ 60.0% of included reviews/stakeholder documents.

Results: Across the 26 CFIR-based implementation determinants, seven were supported by 66.7–76.2% of reviews/stakeholder documents. These determinants were cost, networking with other organizations/communities, external policies, structural characteristics of the setting, implementation climate, readiness for implementation, and knowledge/beliefs of involved individuals. Most frequently, published reviews provided support for inner setting and individual determinants, whereas stakeholder documents supported outer and inner setting implementation

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determinants. Comparisons between policies promoting healthy diet with PA/SB policies revealed shared support for only three implementation determinants: cost, implementation climate, and knowledge/beliefs. In the case of healthy diet/PA/SB policies targeting school settings, 14 out of 26 implementation determinants were strongly supported.

Conclusions: The strongly supported (i.e., systematically indicated) determinants may guide policymakers and researchers who need to prioritize potential implementation determinants when planning and monitoring the implementation of respective policies. Future research should quantitatively assess the importance or role of determinants and test investigate associations between determinants and progress of implementation processes.

Trial registration: PROSPERO, #CRD42019133341

Keywords: Policy, Implementation, Diet, Physical activity, Sedentary behavior, Barrier, Facilitator, Consolidated Framework For Implementation Research

Contributions to the literature

- Using the Consolidated Framework for Implementation Research, this study provides an overarching synthesis of evidence accumulated in reviews and stakeholder documents, reporting the occurrence of barriers and facilitators of implementation of policies targeting healthy diet, physical activity, or sedentary behavior.
- Seven determinants were indicated as occurring in implementation processes in 66.7–76.2% of analyzed reviews/stakeholder documents. These were: cost, networking with other organizations/communities, external policies, structural characteristics of the setting, implementation climate, readiness for implementation, and knowledge/beliefs.
- The findings may inform policymakers, implementers, and researchers in preselecting or narrowing down the number of potential implementation determinants when planning and monitoring implementation.

Introduction

According to the Global Burden of Disease Study [1], the number of deaths attributable to poor diet (e.g., low fruit and vegetable intake, high energy-dense food intake) and low levels of physical activity (PA) has significantly increased between 2007 and 2017. Poor diet and low levels of physical activity are key risk factors for noncommunicable diseases, such as cardiovascular diseases, cancer, type-2 diabetes [1], and obesity [2]. The number of public policies directly or indirectly aiming at changes in dietary and physical activity behaviors has been growing in the last decade. The World Cancer Research Fund [3] identified over 690 national-level nutrition policies and over 150 national-level physical activity-promoting policies.

Policies may be defined as actions that are developed and implemented to directly or indirectly achieve specific goals within a society, such as better health through changes in dietary behaviors, PA promotion, and a reduction of sedentary behavior (SB) [4, 5]. National and regional governments participate in policy development and implementation. In contrast, interventions may be defined as actions with similar goals but not yet endorsed, enabled, or executed by regional or national governments or supranational organizations that have legal powers [5]. In contrast to interventions, policies result from value-driven decision-making processes in a setting where multiple values and interests are negotiated toward a shared consensus [6]. Thus, policies are evidence-based only to a limited extent [6].

Policy implementation may be defined as the process of putting to use or integrating a policy within a setting or a system, or the process of maintaining the use and capacity of a policy [7]. Implementation is a two-way social process through which policies are operationalized within an organization/community or a process in which practices are operationalized into policies [8]. The process involves implementation actors, implementation settings, implementation strategies, target population, and characteristics of a policy (e.g., its content) interacting with the broader cultural, social, economic, and political context [8, 9]. The characteristics of the context, setting, implementation actors, and target populations may constitute implementation determinants (or implementation conditions) that occur during the implementation [10]. Barriers (impediments) and facilitators (enablers) may also refer to the characteristics of the strategies used to influence the implementation [10].

Key implementation determinants: existing evidence and its limitations

Systematic reviews have already discussed which barriers and facilitators occur during the implementation of policies and interventions to promote healthy diet, an increase in PA, and SB reduction [11–15]. Some reviews are narrowly focused and identify implementation determinants for policies with specific aims or settings (e.g., taxation for sugar-sweetened beverages) [16, 17]. Others have a moderately broad focus (e.g., healthy diet policies for any population in any setting) [18], or they attempt

to synthesize evidence for the presence of determinants in the implementation of policies targeting various health behaviors across populations and settings (e.g., any obesity-related policies operating in any setting) [19]. Existing meta-reviews provide overviews of the occurrence of implementation determinants, assuming that the same determinants operate during the implementation of policies vs. interventions and that the same determinants are operating in case of the implementation of policies promoting healthy diet vs physically active lifestyle [19–21]. However, the comparisons of determinants (e.g., their relevance for healthy diet vs. PA/SB policies) were not conducted; thus, the assumption of common implementation determinants should be investigated further [20, 21].

Meta-reviews by Horodyska et al. [20, 21] discussed implementation processes, strategies, and determinants that were elicited in research that most frequently analyzed interventions (i.e., actions that do not involve national/regional governments). A synthesis of research that directly focus on the determinants of policy implementation processes is missing.

Childhood and adolescence are critical developmental periods when dietary and PA habits are formed, with schools representing the critical environment for the implementation of policies aimed at obesity prevention in young people [12–14, 22]. Research has provided evidence for numerous determinants operating during the implementation of either healthy diet policies [13] or PA/SB policies specific to the school setting [12, 14] as schools are the major implementers of healthy diet and PA/SB policies [22]. A synthesis of studies on key determinants that occur in the implementation of dietary, PA, and SB policies for the school setting is missing.

Using the accumulating evidence, major international and national stakeholders are issuing documents on developing, implementing, and evaluating healthy diet and PA/SB policies (e.g., the World Health Organization, the National Institute of Clinical Excellence). These documents are developed to guide governments in the formation and implementation of national and regional strategies and policies [22]. A synthesis of stakeholder documents may help to identify similarities/differences between empirical evidence (accumulating in reviews) and policy-guiding documents. It is unclear whether or how published reviews differ in their findings on implementation determinants, compared to the position of stakeholders, thus guiding the decisions of policymakers and practitioners.

The Consolidated Framework for Implementation Research

Across the theoretical frameworks describing implementation determinants, the Consolidated Framework for Implementation Research (CFIR) [23] is among the most frequently used by implementation researchers and practitioners [24]. The CFIR [23] is a descriptive framework that lists 26 key determinants of implementation grouped into five broad domains: (1) characteristics of policies that may determine implementation (e.g., complexity); (2) the outer setting characteristics (e.g., networking with other organizations); (3) the inner setting characteristics (e.g., organizational climate); (4) individual-level determinants (e.g., knowledge and beliefs); and (5) characteristics of implementation processes (e.g., implementation plans). The CFIR merely lists the 26 determinants that may occur during the implementation processes. As a descriptive framework, the CFIR does not provide insight into how the determinants operate (e.g., which stages of implementation they hinder or facilitate; whether or how they are linked with other characteristics of the implementation processes or implementation outcomes).

Existing meta-reviews addressing aspects of the implementation of policies and interventions promoting healthy diet and a physically active lifestyle described best practices and determinants without referring to a specific implementation framework [20] or using generic frameworks such as Reach-Efficacy-Adoption-Implementation-Maintenance (RE-AIM) [21]. Although RE-AIM is popular among implementation researchers [24], it does not provide a comprehensive list of specific implementation determinants. Research on the criteria for the selection of the framework indicated that optimal frameworks are characterized by high usability (e.g., inclusion of relevant constructs; the use of the framework in research and practice), testability (e.g., the scale to which the framework contributes to evidence accumulation), and acceptability (e.g., being familiar to key stakeholders, including researchers and practitioners) [25]. The CFIR proposes well-defined implementation determinants and has been extensively used in research that specifically aimed to elicit the key determinants of implementation processes in various settings and across numerous target populations [26–28]. Therefore, the CFIR was selected as the guiding framework for this review.

Aims

Using the CFIR framework and methods of meta-synthesis of reviews and stakeholder documents, the present study identifies which determinants occur in the processes of implementation of policies targeting healthy diet, PA promotion, and/or SB reduction. In particular, we intended to specify the following: (1) Which determinants from five domains of the CFIR [23] were identified as occurring in the policy implementation process? (2) What were the differences between determinants identified in reviews compared to those identified in

stakeholder documents? (3) What were the differences between determinants of policy implementation that were identified in reviews/stakeholder documents addressing healthy diet policies only and those that were identified in reviews/stakeholder documents addressing PA/SB policies? (4) What were the determinants of healthy diet and PA/SB policy implementation identified in reviews/documents addressing a specific setting, i.e., schools?

We also explored whether the evidence accumulated in reviews/stakeholder documents would allow for synthesizing the roles played by the CFIR-based determinants, namely associations between determinants and other constructs operating during implementation processes, as well as the direction of these associations (hindering or facilitating the progress of implementation processes).

Method

Materials and general procedures

A meta-review (systematic review of reviews) [29]), integrating empirical evidence from existing reviews and stakeholder documents was conducted. This study was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [30, 31]. It was registered with the PROSPERO database (no. CRD42019133341). Two types of documents were retrieved and analyzed: (1) peer-reviewed systematic reviews [32], or scoping [33], or realist reviews [34], analyzing original studies (henceforth: reviews), and (2) documents issued by major international stakeholders (henceforth: stakeholder documents).

Published reviews: search strategy and criteria of inclusion and exclusion

The following databases were searched: MEDLINE, Academic Search Ultimate, AGRICOLA, PsycINFO, PsycARTICLES, Health Source: Nursing/Academic Edition, the Cochrane Database of Systematic Reviews (CDSR), Database of Abstracts of Reviews of Effects (DARE), and Scopus. Documents published between the inception of the databases and February 2020 were included. Additionally, manual searches of reference lists of reviews were conducted, and keyword-based searches of implementation journals (e.g., *Implementation Science*, *Health Research Policy and Systems*, *Policy Studies*) were performed. In line with the search strategies used in previous meta-reviews [13, 20, 21, 35], combinations of five groups of keywords were applied, referring to: (1) implementation; (2) barriers and facilitators; (3) the type of action (e.g., policy); (4) the design of the study (e.g., systematic review); and (5) the behavioral outcomes (e.g., physical activity; for details, see Supplement 2, Table S1).

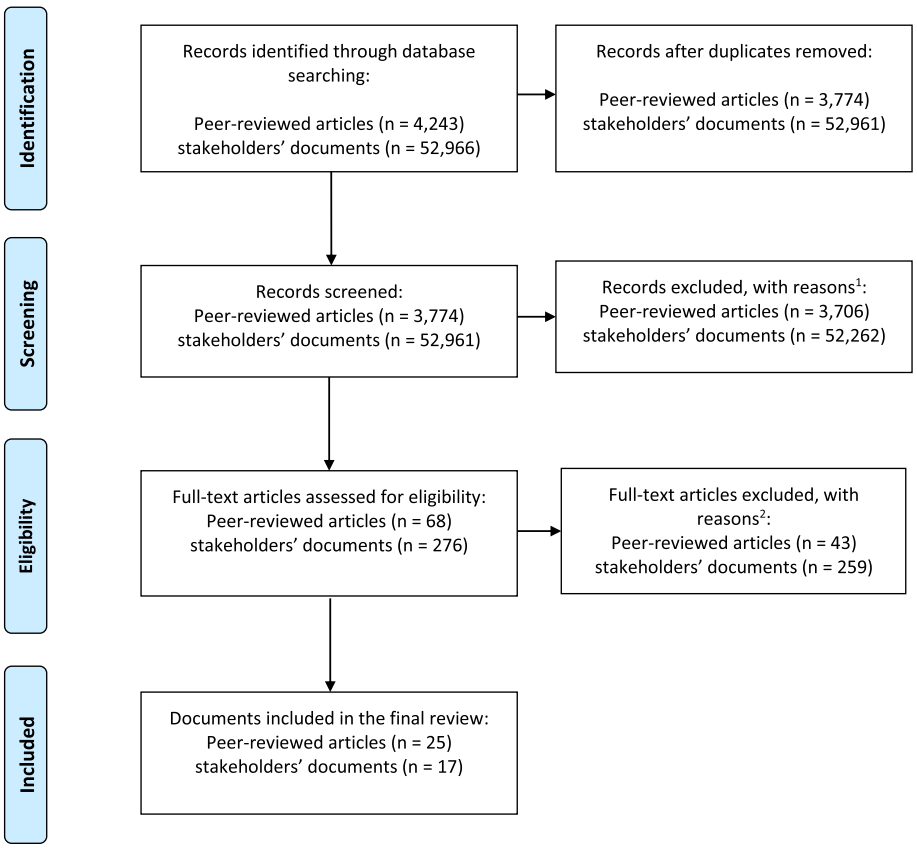
The stages of the data selection process are presented in Fig. 1. The initial search step yielded $k = 4243$ records, which used a combination of keywords from all five categories in the title, abstract, or subject terms. Each abstract was screened by two researchers (KL and AB), and any potential conflicts were resolved through discussion with a third researcher (AL).

We included quantitative and qualitative reviews, applying methods of systematic reviews [32], scoping reviews [33], or realist reviews [34]. The reviews were included if they (1) were published in peer-reviewed English-language journals and (2) provided an analysis of original research on implementation determinants for policies promoting healthy diet or PA or SB reduction. The following types of documents were excluded: dissertations, protocols, conference materials, book chapters, reviews that did not test the role/effects of implementation determinants, publications addressing policies targeting other health behaviors (e.g., smoking), reviews of policy guidelines (not reviews of original research), reports of one original study or testing determinants in one implementation process, and reviews of theoretical models.

Stakeholder documents: search strategy and criteria of inclusion and exclusion

In line with previous research [20, 21], we included documents from stakeholders representing governmental and non-governmental organizations, issuing evidence-based policy guidelines (in English) for diet, PA, and/or SB policies at the national or international level. The documents from the following stakeholders were included: the European Commission, the World Health Organization, the National Institute for Health and Care Excellence (United Kingdom), Centers for Disease Control and Prevention (USA), National Academy of Medicine (USA), Australian Department of Health, the National Health and Medical Research Council, the Organization for Economic Co-operation and Development, and the Food and Agriculture Organization of the United Nations.

Publicly available stakeholder websites (e.g., repositories of strategy documents, policy guidelines, and best practice guidelines) were searched to identify potentially relevant documents. The search was conducted from the inception of the databases until February 2020, using the same combination of five groups of keywords as those applied in the search for reviews (for details see, Supplement 2, Table S1). In line with previous research [20, 21, 36], the criteria for selecting the stakeholder documents were as follows: issued in English; discussing the stakeholder's proposal of practice guidelines or best practices in policy development and/or implementation; addressing diet, PA, and/or SB policies; using research evidence



[1] Records excluded with reasons: key analyses unrelated to nutrition, physical activity, sedentary behavior; unrelated to policies; unrelated to barriers to/facilitators for implementation; a report of a single study, a theoretical paper/position paper. [2] Full-text articles excluded, with reasons: barriers and facilitators for implementation not analyzed/discussed in detail; document duplicating a report of findings presented elsewhere (i.e., not an original systematic review or an evidence-based stakeholder document); not a review/evidence-based stakeholder guidelines document, or unrelated to determinants of implementation

Fig. 1 The flow chart: selection processes for peer-reviewed articles and stakeholder documents

to discuss implementation process and/or its determinants (e.g., including references to original research or reviews of original research).

The exclusion criteria applied in the screening of stakeholder documents were the same as those used for reviews. The initial search identified $k = 57$, 209 potentially relevant documents (Fig. 1), each of which was screened by at least two researchers (PR, KB, KWT, MS, DAS, JW, and KL or AL).

Data extraction

All stages of data extraction, selection, and coding were conducted by at least two researchers. Any disagreements during the data extraction process were resolved by a consensus involving a third researcher [32]. Descriptive data (see Supplement 1) were extracted by two researchers (KL and AL) and verified by a third researcher (AB). Extracted data included: (1) the descriptive characteristics of the included reviews/stakeholder documents (the number, design, and objectives of studies included in the review; the framework used to guide or organize the findings of the review/document; target population and settings; analyzed behavior; the type of action [intervention and/or policies]); (2) information about implementation determinants (the name, definition, and operationalization of determinants, as provided by authors of original documents); (3) the type of support provided for the respective determinant, as reported in the results sections of the included reviews; and (4) data necessary for the quality evaluation of reviews/stakeholder documents.

Data coding

Supplement 2 (Table S3) provides definitions and criteria applied in coding the following constructs: policy,

implementation, healthy diet policy, PA/SB policy, and school setting policies (addressing healthy diet, PA/SB).

The coding for the CFIR determinants was conducted using the descriptions and definitions included in Damschroder et al. [23]. All retrieved barriers and facilitators, derived separately from reviews and stakeholder documents, were allocated into five domains of the CFIR [23]. The domains of the CFIR include 26 implementation determinant categories (*k*): (1) policy characteristics ($k = 8$; policy source, evidence strength, relative advantage, adaptability, triability, complexity, quality, cost); (2) outer setting characteristics ($k = 4$; target group needs and resources, networking with other organizations, peer pressure, external policies); (3) inner setting characteristics ($k = 5$; structural character, networks and communication, culture/norms/values, implementation climate, readiness for implementation); (4) characteristics of individuals ($k = 5$; knowledge/beliefs, self-efficacy, stages of change/enthusiasm, identification with organization, motivation/values/capacity); and (5) implementation process ($k = 4$; planning, engaging leaders/agents/champions, executing plans, reflecting and evaluating). The researchers (KL, AB, PR, KB, MS, KWT, DAS, and JW) worked in pairs independently to extract and code the data, and any disagreements were discussed with a third researcher (AL). Further details regarding coding implementation determinants using 26 CFIR [23] categories are reported in Supplement 2, Table S3.

Risk of bias assessment

The risk of bias in reviews was assessed using phases two and three of the ROBIS tool [37]. The risk of bias in stakeholder documents was assessed using the Methodological Quality Checklist for Stakeholder Documents and Position Papers, (MQC-SP) [20, 21]. Two researchers (KL and AB) independently rated all included reviews and stakeholder documents, and disagreements were resolved by involving a third researcher (AL). The obtained scores are reported in Supplement 1. For the two types of analyzed documents, the concordance coefficients (intraclass correlation) for quality assessment ranged from .71 to .90 (all *p*s < .003).

Data analysis and synthesis

Reviews and stakeholder documents were coded as not corroborating (-) or providing corroboration (+) for the presence of the determinant in the process of policy implementation (Supplement 2, Tables S4 and S5). The reviews of original quantitative studies were coded as providing corroboration for the presence of the respective determinant in implementation processes if the results section of the review indicated that: (1) the respective determinant was identified in the original studies as being significantly associated with another characteristic of the implementation process or its outcome (e.g., acceptability of a policy); (2) the determinant was identified in the original studies as occurring during the implementation process (e.g., the level of intensity/frequency or median/range values of the determinant that was assessed through a questionnaire and interpreted as indicating the presence of the determinant in processes analyzed in a respective study). The included reviews used various thresholds for identifying the occurrence of a determinant (e.g., mean/range provided in at least one study or at least 50% of participants in the original study mentioning that the determinant influenced the implementation). Therefore, in the present review, the determinant was coded as "indicated in the original review" if its results section concluded that the determinant was present in the respective implementation process. The reviews of qualitative studies were coded as providing corroboration for the respective determinant if the results section of the review indicated that the respective determinant was identified in original qualitative data (e.g., the thematic analysis indicated that participants recognized a respective factor as influencing implementation processes).

Stakeholder documents were coded as providing corroboration for the presence of the respective determinant in the implementation process if the sections of the documents discussing guidelines/best practices listed a determinant and indicated its significance/importance/need for consideration in the process of policy implementation, as well as providing reference to original research backing a respective statement.

In line with previous meta-reviews synthesizing evidence for healthy diet or PA [38, 39], support thresholds of 50.0% and 60.0% were applied. Determinants that were indicated in between 50.0 and 59.9% of reviews/stakeholder documents were considered obtaining preliminary support for their presence in the implementation process. Determinants that were indicated in $\geq$ 60.0% of analyzed reviews/stakeholder documents were considered obtaining strong support for the presence of a determinant in the implementation processes.

Additionally, to synthesize the findings on the role of the determinants, we coded if the methods of the included reviews indicated that determinants were categorized (based on evidence obtained in original studies) as barriers or facilitators. This type of coding was conducted in the reviews only. Reviews were coded for the provision of evidence for the significant association between a respective determinant and any other implementation process variables (or implementation outcomes or effectiveness of policies). Finally, the reviews were coded in terms of conducting quantitative analysis,

showing the proportion/frequency of the occurrence of a determinant in original research (compared to a narrative synthesis only, illustrating the occurrence of the determinants with examples of references).

Comparisons of reviews vs. stakeholder documents and healthy diet vs. PA/SB policies were conducted. We listed determinants that obtained strong support, both overlapping and differing according to document type and policy type. Comparisons of diet vs. PA/SB policies were limited to reviews/stakeholder documents that addressed only the implementation of policies targeting the respective behavior (i.e., healthy diet policies only vs. PA/SB policies only). Data referring to healthy diet and PA/SB policies in the school setting were summarized, listing the implementation determinants that obtained strong support for their presence in the implementation process.

Results

Description of analyzed material

The final selection included 25 reviews [11–13, 16–19, 40–57] and 17 stakeholder documents [22, 58–73]. The characteristics of target populations, behaviors targeted by policies, and policy settings are reported in Supplement 2, Table S2.

The scores obtained using ROBIS [37] and MCQ-SP [20, 21], indicating the quality of the included reviews and documents, are reported in Supplement 1. Regarding the risk of bias, 48% ($k = 12$) of reviews evaluated as representing a low risk of bias across five criteria of ROBIS [37], 24% ($k = 6$) had a low risk across four criteria, and 8% ($k = 2$) had a low risk in three criteria. The remaining 20% ($k = 5$) of the reviews were evaluated as having a high or unclear risk in ≥ 3 criteria. Among the stakeholder documents, 47% ($k = 8$) had a low risk of bias (high quality in MQC-SP tool) [20, 21], 29% ($k = 5$) had moderate quality, and 24% had a high risk/low quality ($k = 4$).

Across reviews, 20.0% (5 out of 25) [41, 44, 52, 53, 56] included quantitative studies only, and the remaining 20 reviews combined data obtained from quantitative and qualitative studies (Supplement 1). Fifty-six percent of the reviews (14 out of 25) specified their aims to identify facilitators and barriers (determinants positively or negatively associated with the implementation process or its outcomes). However, only 3 of the 25 reviews [13, 50, 56] reported any quantitative results that indicated associations between a determinant and any other implementation process-related variable (Supplement 1). Only one review reported findings of a meta-analysis showing non-significant weighted effects of determinants (facilitators) on implementation outcome variables, based on three included studies [56] (Supplement 1).

All reviews (25 out of 25) provided a narrative summary of original qualitative and/or quantitative research, listing the determinants that occurred in the implementation process (Supplement 1). The majority of reviews (72.0%, 18 out of 25) provided a narrative synthesis only, in which a determinant identified in original studies was indicated, followed by examples of original studies that reported respective determinants. Only 7 of the 25 reviews (28.0%) [12, 17, 40, 48, 50, 51, 56] provided a frequency analysis, clarifying a proportion of original studies indicating the occurrence of a respective determinant, compared to the total number of relevant original studies.

Support for the occurrence of CFIR-based determinants

Across all reviews and stakeholder documents included in this study ($k = 42$), 7 of the 26 CFIR determinants received strong support (see Table 1, Fig. 2). In particular, strong support (76.2%, 32 out of 42 reviews/documents) was obtained for cost, the only determinant from the policy characteristic domain. Regarding the outer setting domain, two determinants received strong support, namely networking between organizations/institutions/communities (69.0%, 29 out of 42 reviews/documents) and external policies (71.4%, 30 out of 42 reviews/documents). Three inner-setting determinants received strong support: implementation climate (73.8%, 31 out of 42 reviews/documents), readiness for implementation (73.8%, 31 out of 42 reviews/documents), and structural determinants (66.7%, 28 out of 42 reviews/documents). One individual characteristic domain determinant obtained strong support (knowledge/beliefs; 76.2%, 32 out of 42 reviews/documents), whereas no process-related determinants were strongly supported.

Support for the occurrence of CFIR-based determinants of implementation processes: reviews vs. stakeholder documents

Across published reviews, knowledge/beliefs (84.0%, 21 out of 25 reviews), implementation climate (80.0%, 20 out of 25 reviews), cost (76.0%, 19 out of 25 reviews) constituted the top three determinants (most frequently indicated), followed by readiness for implementation (72.0%, 18 out of 25 reviews), motivation/values/capacity (72.0%, 18 out of 25 reviews), and external policies (64.0%, 16 out of 25 reviews). Overall, 10 out of 26 implementation determinants were indicated in at least 60.0% of the reviews (Table 1 and Supplement 2, Table S4).

Compared to published reviews, the barriers/facilitators most frequently corroborated by stakeholder documents differed in terms of the top determinants (Table 1 and Supplement 2, Table S5). The most frequently corroborated characteristics included external policies

Table 1 Percentage of systematic reviews and stakeholder documents corroborating occurrence of CFIR-based implementation determinants

Policy implementation determinants: CFIR domains and categories of determinants	Total: % (number of reviews/documents supporting the determinant in all $k = 42$ reviews/documents)	Reviews vs. stakeholder documents comparisons		Diet vs. PA/SB comparisons (reviews and stakeholder documents)		Diet, PA, SB policies in schools: % (number of reviews/documents supporting the determinant in $k = 10$ reviews/documents)
		Reviews: % (number of reviews supporting the determinant in $k = 25$ reviews)	Stakeholder documents: % (number of documents supporting the determinant in $k = 17$ documents)	Diet: % (number of reviews/documents supporting the determinant in $k = 12$ reviews/documents)	PA/SB: % (number of reviews/documents supporting the determinant in $k = 9$ reviews/documents)	
Domain: Policy characteristic						
Intervention source	2 % (1 out of 42)	4 % (1 out of 25)	0	0	0	0
Evidence strengths	33 % (14 out of 42)	24 % (6 out of 25)	47 % (8 out of 17)	42 % (5 out of 12)	0	0
Relative advantage	21 % (9 out of 42)	28 % (7 out of 25)	12 % (2 out of 17)	8 % (1 out of 12)	22 % (2 out of 9)	30 % (3 out of 10)
Adaptability	24 % (10 out of 42)	24 % (6 out of 25)	24 % (4 out of 17)	8 % (1 out of 12)	11 % (1 out of 9)	20 % (2 out of 10)
Triability	2 % (1 out of 42)	4 % (1 out of 25)	0	0	0	0
Complexity	33 % (14 out of 42)	*56 % (14 out of 25)*	0	33 % (4 out of 12)	**78 % (7 out of 9)**	**70 % (7 out of 10)**
Quality (design, package)	17 % (7 out of 42)	28 % (7 out of 25)	0	25 % (3 out of 12)	11 % (1 out of 9)	30 % (3 out of 10)
Cost	**76 % (32 out of 43)**	**76 % (19 out of 25)**	**77 % (13 out of 17)**	**83 % (10 out of 12)**	**67 % (6 out of 9)**	**70 % (7 out of 10)**
Mean % across determinants from policy characteristic domain	26 %	30 %	20 %	25 %	24 %	28 %
Domain: Outer setting						
Target groups' needs and resources	*55 % (23 out of 42)*	48 % (12 out of 25)	**65 % (11 out of 17)**	33 % (4 out of 12)	44 % (4 out of 9)	**60 % (6 out of 10)**
Networking with other organizations	**69 % (29 out of 42)**	**64 % (16 out of 25)**	**77 % (13 out of 17)**	**75 % (9 out of 12)**	*56 % (5 out of 9)*	**60 % (6 out of 10)**
Peer pressure	10 % (4 out of 42)	16 % (4 out of 25)	0	17 % (2 out of 12)	11 % (1 out of 9)	0
External policies	**71 % (30 out of 42)**	**64 % (16 out of 25)**	**82 % (14 out of 17)**	**83 % (10 out of 12)**	*56 % (5 out of 9)*	**60 % (6 out of 10)**
Mean % across determinants from outer setting domain	*51 %*	48 %	*56 %*	*52 %*	42 %	45 %
Domain: Inner setting						
Structural character	**67 % (28 out of 42)**	**68 % (17 out of 25)**	**65 % (11 out of 17)**	*58 % (7 out of 12)*	**78 % (7 out of 9)**	**90 % (9 out of 10)**
Networks, communication	*52 % (22 out of 42)*	40 % (10 out of 25)	**71 % (12 out of 17)**	*50 % (6 out of 12)*	44 % (4 out of 9)	40 % (4 out of 10)
Culture, norms, values	*60 %* (25 out of 42)*	**64 % (16 out of 25)**	*53 % (9 out of 17)*	*58 % (7 out of 12)*	33 % (3 out of 9)	**60 % (6 out of 10)**
Implementation climate	**74 % (31 out of 42)**	**80 % (20 out of 25)**	**65 % (11 out of 17)**	**67 % (8 out of 12)**	**78 % (7 out of 9)**	**80 % (8 out of 10)**
Readiness for implementation	**74 % (31 out of 42)**	**72 % (18 out of 25)**	**77 % (13 out of 17)**	**67 % (8 out of 12)**	44 % (4 out of 9)	**80 % (8 out of 10)**
Mean % across determinants from inner setting domain	**65 %**	**65 %**	**66 %**	**60 %**	*56 %*	**70 %**

Table 1 (continued)

Policy implementation determinants: CFIR domains and categories of determinants	Total: % (number of reviews/documents supporting the determinant in all $k = 42$ reviews/documents)	Reviews vs. stakeholder documents comparisons		Diet vs. PA/SB comparisons (reviews and stakeholder documents)		Diet, PA, SB policies in schools: % (number of reviews/documents supporting the determinant in $k = 10$ reviews/documents)
		Reviews: % (number of reviews supporting the determinant in $k = 25$ reviews)	Stakeholder documents: % (number of documents supporting the determinant in $k = 17$ documents)	Diet: % (number of reviews/documents supporting the determinant in $k = 12$ reviews/documents)	PA/SB: % (number of reviews/documents supporting the determinant in $k = 9$ reviews/documents)	
Domain: Individual characteristics						
Knowledge, beliefs	**76 % (32 out of 42)**	**84 % (21 out of 25)**	**65 % (11 out of 17)**	**83 % (10 out of 12)**	**89 % (8 out of 9)**	**90 % (9 out of 10)**
Self-efficacy	26 % (11 out of 42)	44 % (11 out of 25)	0	17 % (2 out of 12)	33 % (3 out of 9)	**70 % (7 out of 10)**
Stage of change/enthusiasm	38 % (16 out of 42)	*56 % (14 out of 25)*	12 % (2 out of 17)	33 % (4 out of 12)	**67 % (6 out of 9)**	**70 % (7 out of 10)**
Identification with organization	5 % (2 out of 42)	8 % (2 out of 25)	0	8 % (1 out of 12)	0	0
Motivation, values, capacity	*60 %* (25 out of 42)*	**72 % (18 out of 25)**	41 % (7 out of 17)	42 % (5 out of 12)	**78 % (7 out of 9)**	**70 % (7 out of 10)**
Mean % across determinants from individual characteristics domain	41 %	*53 %*	24 %	37 %	*53 %*	**60 %**
Domain: Implementation process						
Planning	26 % (11 out of 42)	24 % (6 out of 25)	29 % (5 out of 17)	17 % (2 out of 12)	33 % (3 out of 9)	10 % (1 out of 10)
Engaging leaders, external agents, champions	*55 % (23 out of 42)*	**64 % (16 out of 25)**	41 % (7 out of 17)	42 % (5 out of 12)	*56 % (5 out of 9)*	**80 % (8 out of 10)**
Executing plans	12 % (5 out of 42)	16 % (4 out of 25)	6 % (1 out of 17)	8 % (1 out of 12)	11 % (1 out of 9)	10 % (1 out of 10)
Reflecting and evaluating	*50 % (21 out of 42)*	40 % (10 out of 25)	**65 % (11 out of 17)**	42 % (5 out of 12)	44 % (4 out of 9)	40 % (4 out of 10)
Mean % across determinants from implementation process domain	36 %	36 %	35 %	27 %	36 %	35 %

Note: *PA* physical activity, *SB* sedentary behavior, *CFIR* Consolidated Framework for Implementation Research. %—the percentage of the reviews/stakeholder documents that reported the occurrence of respective CFIR-based domain/category of implementation determinants. Total—reviews/stakeholder documents ($k = 42$) addressing implementation determinants for healthy diet, PA/SB policies. Reviews—reviews ($k = 25$) addressing implementation determinants for healthy diet, PA/SB policies. Stakeholder—stakeholder documents ($k = 17$) addressing implementation determinants for healthy diet, PA/SB policies. Diet—reviews/stakeholder documents ($k = 12$) addressing implementation of healthy diet policies across various populations/settings. PA/SB—reviews/stakeholder documents ($k = 9$) addressing implementation of PA/SB policies across various populations/settings. Schools—reviews/documents ($k = 10$) addressing implementation of healthy diet or PA/SB policies for school settings. The percentages of implementation determinants that were corroborated in $\geq$ 50.0% up to 59.9% of reviews/stakeholder documents (considered preliminarily supported) are italicized. The percentages of implementation determinants corroborated in $\geq$ 60% of analyzed reviews/stakeholder documents (considered strongly supported) are in bold font. *in the case where between 55.5 and 59.99% of reviews/stakeholder documents supported the occurrence of a determinant, they were rounded to 60%; however, they were not considered an indication of strong support because the actual values were lower than 60.0%

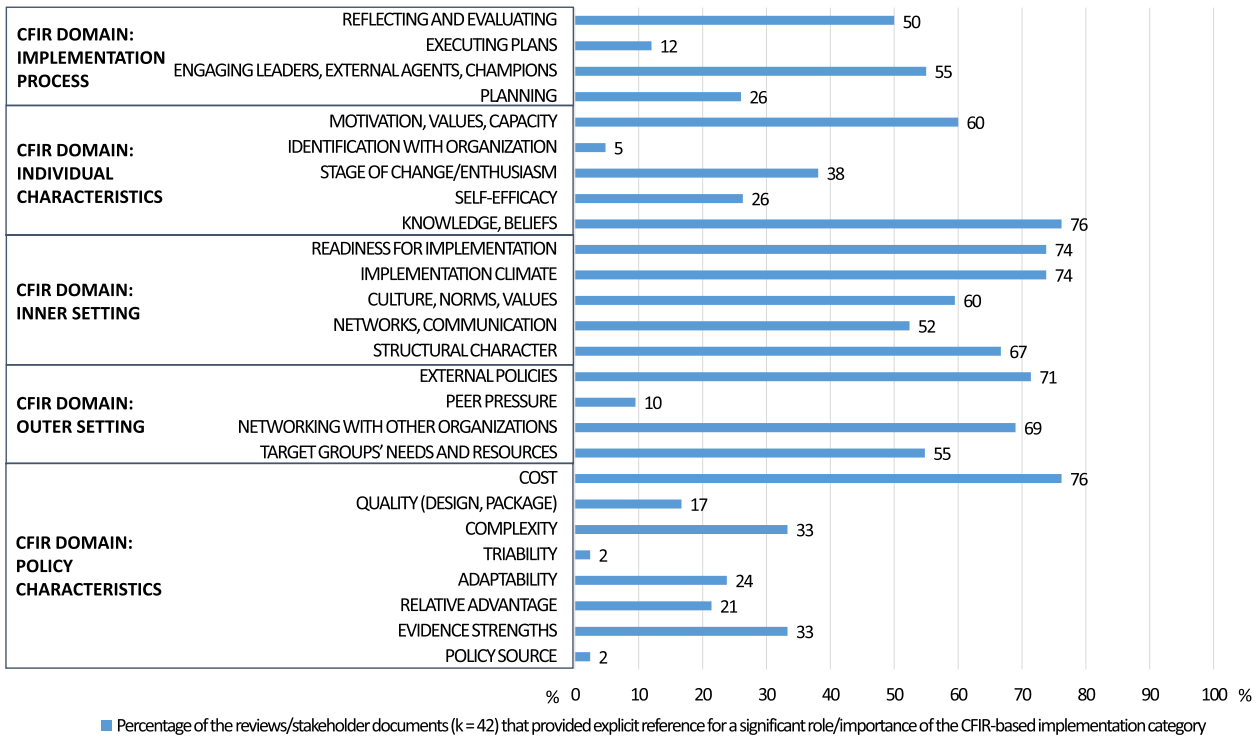


Fig. 2 The support for policy implementation determinants according to the CFIR, obtained in $k = 42$ reviews and stakeholder documents

(82.4%, 14 out of 17 documents) and, equally, networking with other organizations/institutions/communities, readiness for implementation, and cost (each characteristic was corroborated in 76.5% reviews/stakeholder documents, i.e., 13 out of 17 documents). The characteristics of networks/communication were corroborated in 70.6% (12 out of 17) of the stakeholder documents. Additionally, five determinants were corroborated equally often (in 64.7%, i.e., 11 out of 17 documents), namely target groups' needs and resources, structural characteristics, implementation climate, knowledge/beliefs, and reflecting/evaluating. Overall, 10 implementation determinants obtained strong support in stakeholder documents (Table 1 and Supplement 2, Table S5).

Support for the occurrence of CFIR-based determinants of implementation processes: healthy diet vs. physical activity/sedentary behavior policies

The comparison of healthy diet vs. PA/SB policies yielded several differences in policy implementation determinants that received strong support (Table 1 and Supplement 2, Tables S4 and S5). Regarding reviews/stakeholder documents ($k = 12$, including eight reviews and four stakeholder documents) addressing healthy diet policies, strong support was obtained for six implementation determinants, including: cost (83.3%, 10 out of 12 reviews/documents), knowledge/beliefs (83.3%, 10 out of 12 reviews/documents), and implementation climate in the inner setting (66.7%, 8 out of 12 reviews/documents). Strong support was also obtained for external policies (83.3%, 10 out of 12 reviews/documents), networking with organizations/institutions/communities in the outer setting (75.0%, 9 out of 12 reviews/documents), and readiness for implementation in the inner setting (66.7%, 8 out of 12 reviews/documents). The latter three determinants did not reach a strong support threshold in the case of PA/SB policies.

Regarding reviews and stakeholder documents addressing PA/SB policies only ($k = 9$, reviews/stakeholder documents), three determinants that received strong support were common with those indicated in reviews/documents addressing healthy diet policies, namely cost (66.7%, 6 out of 9 reviews/documents), implementation climate in the inner setting (77.8%, 7 out of 9 reviews/documents), and knowledge/beliefs (88.9%, 8 out of 9 reviews/documents). Additionally, four determinants received strong support in the case of PA/SB policies (but not in healthy diet policies), namely complexity within policy characteristic domain (77.8%, 7 out of 9 reviews/documents), structural characteristics of the inner setting (77.8%, 7 out of 9 reviews/documents), and two determinants from the domain of individual characteristics, in

particular stages of change/enthusiasm (66.7%, 6 out of 9 reviews/documents), and motivation/values/capacity (77.8%, 7 out of 9 reviews/documents).

Support for the occurrence of CFIR-based determinants of implementation processes: healthy diet and PA/SB policies in the school setting

Regarding the school setting, 10 reviews addressed the implementation of healthy diet and PA/SB policies solely in this setting (stakeholder documents did not address the school setting). Reviews provided strong support for three outer setting determinants, namely target group needs/resources, networking with other organizations, and external policies (all three supported in 60.0%, 6 out of 10 reviews). The presence of four inner setting determinants was strongly supported: structural characteristics (90.0%, 9 out of 10 reviews), implementation climate and implementation readiness (80.0% each, 8 out of 10 reviews), and institutional culture (60.0%, 6 out of 10 reviews). The occurrence of four individual characteristics was strongly supported: knowledge/beliefs (90.0%, 9 out of 10 reviews), self-efficacy, stages of change/enthusiasm, and motivation/values/capacity (70.0% each, 7 out of 10 reviews). Additionally, engaging leaders (80.0%, 8 out of 10 reviews) from the process domain was strongly supported, along with two determinants from the policy characteristics domain: complexity and cost (70.0% each, 7 out of 10 reviews). Overall, 14 out of the 26 categories of determinants were strongly supported (Table 1).

Discussion

Applying the CFIR framework, this meta-review provides an overarching synthesis of evidence for the presence of determinants of implementation processes of policies aimed at healthy diet, promotion of physical activity, and a reduction of sedentary behaviors. Between 66.7% and 76.2% of analyzed reviews and stakeholder documents corroborated the occurrence of seven CFIR-based determinants in policy implementation processes. The determinants included cost, networking with other organizations/communities, external policies, structural characteristics of the setting, implementation climate, readiness for implementation, and knowledge/beliefs of the involved individuals.

Compared to stakeholder documents, the findings obtained in reviews show strong support for the occurrence of determinants from the individual characteristics domain (knowledge/beliefs, motivation/values/capacity). The difference may result, among others, from the use of frameworks such as the theoretical domain framework [74], focusing on individual characteristics of the target group and the implementers. Such frameworks were not used by stakeholders as the background to present the implementation determinants. Instead, stakeholders such as the World Health Organization often rely on their own frameworks [75], focus on policy development, and thus pinpoint outer setting determinants. The focus on outer setting implementation determinants in stakeholder documents becomes even more evident when analyzing the content of the barriers and facilitators listed in stakeholder documents (see Supplement 1) [22, 58, 76]. These outer setting determinants refer to inter-sectoral collaboration, co-occurring governmental regulations, national and local policies, characteristics of legal regulations, and funding schemes, operating in the respective country [22, 58, 76]. These implementation determinants are not well reflected in the CFIR, which accounts for the broader setting characteristics, but in a relatively general manner (e.g., accounting for "external policies"). In line with other approaches to policy implementation (e.g., the evidence-informed policy and practice framework) [77], so-called system-level determinants could be accounted for in a separate domain. These determinants may be divided into characteristics referring to other policies, economics (cf. [77]), or focus on macro-level determinants referring to legal contexts [8]. This conclusion is in line with a recent review on the use of the CFIR in original research, where a new CFIR domain of "characteristics of a system" was proposed [27].

In terms of strong support obtained for the occurrence of determinants of implementation processes, there are more differences than similarities when healthy diet policies are compared to PA/SB policies. Cost, implementation climate, and individuals' knowledge/beliefs were commonly supported determinants. Implementation determinants strongly supported in reviews and documents analyzing PA/SB policies (but not healthy diet policies) included the complexity of policy implementation, structural characteristics of the setting, and enthusiasm of the individuals involved. Complexity (or rather, a lack thereof) and structural characteristics may play a role, particularly if the implementation takes place in specific settings (e.g., schools), where multiple complex policies are already operating; thus, simpler policies may be easier to integrate. Furthermore, the physical/built environment characteristics of such settings (e.g., a lack of stairs) may reduce the likelihood of successful implementation of PA policies [12, 43]. In contrast, reviews/stakeholder documents addressing the implementation of healthy diet policies strongly supported determinants such as networking with other organizations and readiness for implementation. The occurrence of determinants coded as "networking with other organizations" was reported in documents analyzing the implementation of food retail and food labeling policies (corroborating the importance of networking and communication between

food producers, retailers, and customer organizations) [18, 40] or school-based policies (networking with parent organizations, food producers, food retail organizations) [42]. Conclusions should be drawn cautiously from the comparisons of implementation determinants for healthy diet and PA/SB policies, as the analyzed reviews/stakeholder documents were heterogeneous in terms of the type of policies and their breadth (e.g., healthy diet for preschoolers, food labeling, acceptability of taxation of sugar-sweetened beverages).

As many as 14 out of 26 implementation determinants were indicated in over 60% of published reviews analyzing determinants of implementation of school policies for healthy diet or PA/SB. One of the reasons for the large number of determinants occurring in schools' implementation may be the characteristics of the policies themselves. For example, several analyzed policies dealt with complex education programs referring to healthy diet, consistent with changes in school food retail/catering, and/or integration of PA programs into complex curricula and limited built facilities [12, 13, 47]. Compared to taxation policies, the implementation of education policies may be dependent on multiple inner setting characteristics (e.g., built structures, training for implementers) or characteristics of individuals (teachers, students, parents, school managers). Consequently, eight out of ten determinants from these two CFIR domains were strongly supported. The inner setting domain and the individual characteristics domain are described in detail in the CFIR [23], in contrast to system-level complexities (e.g., legal solutions or strategic policy alignment) [27], which may be crucial, for example, for taxation policies.

Although the CFIR is among the most frequently used frameworks to capture implementation determinants [24, 28], and thus its application may facilitate cross-study comparisons, the framework has some limitations. First, it is a descriptive framework that lists the domains and included determinants [78], but does not provide an insight into the way the determinants may operate together (e.g., in a multidirectional manner, influencing each other and the implementation processes or implementation outcomes). In particular, if a complex system-logic approach is considered [79], the implementation of healthy diet and PA/SB policies should recognize the complex interplays (or associations) between as well as within the distinct domains included in the model (e.g., between inner setting and outer setting determinants). The data obtained in this meta-review provided no insight into the potential interplays between implementation determinants, mostly because neither the theoretical framework nor analyzed data included information on such interplays.

The CFIR was not developed with a focus on public policies but, rather, to address organizational or professional policies that do not have to comply with or are not set according to democratic requirements, consisting of the political deliberation and designation of social, collective problems, public values, and shared interests in the decision-making and formulation processes that are typical of public governmental policies [6]. Although the framework has been applied to public policy evaluations, it should be noted that the CFIR model offers a narrow, limited view on the characteristics mentioned above.

The meaning and effects of the seven most frequently occurring determinants across different policy types, contexts, and/or settings should be further explored by stakeholders, policymakers, and researchers. The specific context in which determinants operate (e.g., food retail or nutrition education) or directionality of their effects (facilitating or hindering the implementation) may differ across policies, depending on the target population, setting, and the content of policies. The associations between determinants and other factors operating in the implementation process or their influences on the progress of implementation or implementation outcomes remain unclear. The qualitative and quantitative data collected in the original research and the subsequently included reviews/stakeholder documents allow only to conclude which determinants are indicated as present and operating in the process of implementation of healthy diet, PA, or SB policies.

Regardless of these limitations, the seven implementation determinants supported in this meta-review may be considered the top priority when planning and monitoring the implementation of healthy diet and PA/SB policies. These determinants may be considered a safe choice in the research and practice of policy implementation if a preselection of implementation determinants is needed [28]. Policymakers, researchers, implementation actors, and other stakeholders should prepare strategies to address the respective determinants when planning for the implementation of healthy diet and PA/SB policies.

The present study has several limitations. The coding of the CFIR determinants relied on the specificity of the operationalization and descriptions of barriers and facilitators in reviews and stakeholder documents. Thus, several determinants were not assigned to any of the 26 implementation determinants (e.g., "putting daily physical activity in schedule"). Furthermore, several system-level determinants were not coded (e.g., "political climate promoting 'being Australian'") as they were not directly captured by the CFIR. Further theoretical developments are needed to better guide empirical research collecting evidence for the occurrence of determinants of policy implementation processes. Even the extended

version of the CFIR [27] may not capture climate/geography-related barriers or specific system-level determinants. New hybrid frameworks that combine the CFIR with frameworks addressing the context of implementation processes [8] or clarifying the associations between determinants and other implementation-related constructs [80] may offer a better fit between the guiding framework and empirical data. Furthermore, the included reviews and stakeholder documents are highly heterogeneous in terms of the scope of the analyzed policies, target groups, policy settings, or quality of the review/stakeholder document. Due to the heterogeneity of the analyzed material and the variability regarding the risk of bias, conclusions, if any, should be drawn with great care. Although the heterogeneity of the aims and scope of included documents reduces the overlap in original studies (included in reviews), it may not be totally eliminated [29], and its effect should be investigated systematically. The CFIR [23] does not allow for a differentiation between the determinants referring to the target group, implementation support system actors (e.g., system administrators), or those who are directly responsible for implementation (e.g., educators). Therefore, the present study does not distinguish between determinants, such as the beliefs of the target population (e.g., children) and the beliefs of the implementers (e.g., teachers). Original quantitative research and reviews applied various theoretical frameworks and questionnaires, which may result in an increased likelihood of reporting some determinants, while missing others. The included reviews and stakeholder documents varied in terms of their focus on policies (the majority accounted for both policies and interventions). It is possible that the implementation of policies depends more on determinants from the outer setting (or the system level), whereas interventions may depend more on the inner setting determinants of individual characteristics.

The key limitation of the present study is the applied methods of analysis and synthesis. The obtained data allowed only counting the occurrence (compared to a lack of the presence of a respective determinant in the analyzed material). The majority (72%) of reviews lacked a quantitative analysis, for example, indicating the proportion of studies supporting vs. not supporting the occurrence of a respective determinant. The fact that a determinant was supported in a respective stakeholder document (vs. a lack of such support) may, among others, result from the influences of political context variables (e.g., political strategies and priorities of governments) [5, 6]. Future original research and reviews should provide quantitative data and quantitative analyses that would allow better estimation of the importance of a respective determinant.

Conclusions

Despite these limitations, this study provides the first overarching synthesis of evidence accumulated in reviews and stakeholder documents on determinants facilitating and/or hindering the implementation of policies targeting healthy diet, an increase in PA, or SB reduction. The findings indicate seven determinants that are likely to occur in the implementation process, namely cost of implementation, networking with other organizations/communities, external policies, structural characteristics of the setting, implementation climate, readiness for implementation, and knowledge/beliefs of the involved individuals. The findings may inform policymakers, implementers, and researchers if they need to preselect or narrow down the number of potential implementation determinants when planning and monitoring the implementation of policies promoting healthy diet and physically active lifestyle.

Abbreviations

CFIR: Consolidated Framework For Implementation Research; PA: Physical activity; SB: Sedentary behaviors; TDF: Theoretical domain framework.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s13012-021-01176-2.

Additional file 1: Supplement 1: Details of data extraction and quality evaluation scores.

Additional file 2: Supplement 2: Details of searching strategy, analyzed materials, and data coding.

Acknowledgements

This publication was prepared as a part of research conducted by the Policy Evaluation Network (PEN) Consortium (https://www.jpi-pen.eu/). PEN aims to evaluate policy measures to promote a healthy diet and physical activity of the population in terms of their content, implementation, and effectiveness. E-mail address for PEN Consortium: jpi-pen@leibniz-bips.de

Authors' contributions

AL, KL, AB: design of the theoretical construction of the meta-review as well as the searching strategy process; PR, KB, KWT, MS, DAS, JMS, JW, KL, AL: screening of potentially relevant documents; KL, AL: data extraction; AB: data extraction verification; KL, AL, AB: data analysis; KL, AL, AB: writing the manuscript draft; SF, HZ: critical revision of the intellectual content of the manuscript; JW, DAS, MS, TK, KWT, MPMB: substantial contribution to the manuscript draft preparation. All authors read and approved the final manuscript.

Funding

The meta-review was funded as a part of the project "Policy Evaluation Network (JPI HDHL PEN): The Joint Programming Initiative - A Healthy Diet for a Healthy Life"; a project of the European Commission's Joint Programming Initiative. In particular, the work was supported by the following grants/funding agencies: KL, AB, AL report grant from National Centre for Research and Development (NCBiR), Poland, during the conduct of the study (no. JFA PEN/I/PEN44/03/2018); DAS, JW, JMS report grant from Federal Ministry of Education and Research (BMBF), Germany (no. FKZ:01EA1818D/PEN70/03/2018); SF, HZ report grant from Federal Ministry of Education and Research (BMBF), Germany (no. FKZ:01EA1818A/PEN76); KB, PR reports grant from National Centre for Research and Development (NCBiR), Poland, (no. JFA PEN/I/

PEN14/04/2019); MS, TK report grant from Federal Ministry of Education and Research (BMBF), Germany (no. PEN75/01EA1818B); KWT reports grant from National Centre for Research and Development (NCBiR), Poland (no. JFA PEN/I/PEN47/01/2019).

Availability of data and materials
The datasets used and analyzed during the current study are available from the corresponding author on a request.

Declarations

Ethics approval and consent to participate
Not applicable

Consent for publication
Not applicable

Competing interests
The authors declare that they have no conflicting interests.

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Received: 7 January 2021 Accepted: 29 November 2021
Published online: 06 January 2022

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Publikacja dotycząca Badania 3

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Are Implementation Barriers Adequately Addressed? The Associations Between the Implementation Process Characteristics Reported by Implementers and Physical Activity Changes Among Participants of a Planning Intervention

Submission ID	245115798
Article Type	Research Article
Keywords	implementation, physical activity, intervention
Authors	Karolina Lobczowska, Ewa Kulis, Anna Banik, Maria Siwa, Monika Boberska, Zofia Szczuka, Hanna Zaleskiewicz, Dominika Wietrzykowska, Paulina Krzywicka, Jowita Misiakowska, Anna Kornafel, Julia Kuzminska, Natalia Paduszynska, Karolina Zalewska-Lunkiewicz, Aleksandra Luszczynska

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Are Implementation Barriers Adequately Addressed? The Associations Between the Implementation Process Characteristics Reported by Implementers and Physical Activity Changes Among Participants of a Planning Intervention

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Abstract

Objective: The present study applies the Context and Implementation of Complex Intervention framework to investigate the associations between (1) implementation process indicators, namely implementers' evaluations of the adequacy of addressing barriers/facilitators found in the outer and inner implementation setting, (2) implementers' self-efficacy, and (3) changes in moderate-to-vigorous physical activity (MVPA) among participants of two intervention studies (physical activity planning interventions versus control [education] conditions).

Methods and Measures: Data collected among 372 participants (66.9% women; 9-86 years old) were matched with data of implementers (n = 21, 100% women, 25-46 years old). MVPA was assessed with accelerometers at the baseline and 14-month follow-up. Implementation process indicators were self-reported by implementers.

Results: We found significant interaction effects of Time x Implementation process indicators on MVPA. Participants who were supported by implementers reporting that barriers/facilitators in the inner and outer implementation setting were adequately addressed, maintained their MVPA at 14-month follow-up. A decline in MVPA was found among participants supported by implementers indicating lower adequacy of addressing respective barriers/facilitators. Implementers' self-efficacy was unrelated to MVPA of participants of intervention studies.

Conclusions: Adequately addressing barriers/facilitators in the implementation setting may protect intervention and control group participants from a decline in MVPA time.

Key-words: physical activity, implementation, planning, efficacy, intervention

Background

Regular performance of moderate-to-vigorous physical activity (MVPA) is a key protective factor for the prevention and management of cardiovascular disease, type-2 diabetes, obesity, and several types of cancers, as well as a crucial factor in the prevention of cognitive decline and symptoms of depression or anxiety (WHO, 2020). Global estimates indicate that 27.5% of adults and 81% of adolescents do not meet the physical activity (PA) recommendations formulated by WHO (2010; 2020).

Health behavior change research usually focuses on the influence of the intervention on health-related outcomes (so-called efficacy trials), whereas it provides limited information about implementation processes (Hagger & Weed, 2019; Luszczynska et al., 2020). Implementation theories suggest that these processes may co-determine the effects of an intervention on a behavior change (Bauer et al., 2015). An alternative to efficacy trials is to investigate effects of an intervention on a health behavior or health outcomes while simultaneously collecting implementation process data (see hybrid trials; Bauer et al., 2015). The hybrid approach allows for insights into the associations between the implementation characteristics and behavior change.

Implementation of Behavior Change Interventions

Implementation is a social *process* through which interventions are operationalized in an organization or community (see the context and implementation of complex interventions [CICI] framework; Luszczynska et al., 2020; Pfadenhauer et al., 2017). The process involves two sets of *implementation actors* (Leeman et al., 2017): (1) the implementers or *delivery system actors,* that is, professionals who deliver an intervention in respective settings, and (2) *support system actors*, that is, the administrators, planners, and decision-makers, who are responsible for the adoption of an intervention in a setting, promote and support the implementation of an intervention. Implementation actors operate in a specific *implementation*

setting (Luszczynska et al., 2020; Pfadenhauer et al., 2017). The characteristics of the implementation setting and characteristics of implementation actors may constitute *barriers or facilitators* of the implementation process (Nilsen, 2015). The implementation process results in *implementation outcomes*, such as acceptability of the intervention, usually defined as satisfaction with the specific intervention and its characteristics (Proctor et al., 2011).

Feedback received by the authors of this study, provided by the implementers delivering two MVPA planning interventions (Kulis et al., 2022; Kulis et al., in press), drew our attention to yet another characteristic of the implementation process, namely implementers' evaluations of the adequacy of the ways the support team dealt with the problems at hand. Such evaluations of adequacy or satisfaction of the implementation actors may constitute another characteristic of the implementation process.

The majority of implementation frameworks applicable to the area of physical activity promotion are so-called determinant frameworks (Lobczowska et al., 2022), which focus on barriers and facilitators that influence the implementation process and its outcomes (Nilsen, 2015). The Consolidated Framework for Implementation Research (CFIR; Damschroder et al., 2009; Damschroder et al., 2022) is one of the most widely used determinant frameworks (Birken et al., 2017; Skolarus et al., 2017). The original version of the CFIR framework lists barriers and facilitators of the implementation process, grouped into five broad domains: (1) characteristics of interventions that may determine the implementation (e.g., intervention complexity); (2) the outer setting characteristics (e.g., networking with other organizations); (3) the inner setting characteristics (e.g., organizational climate); (4) individual-level determinants (e.g., beliefs of implementers); and (5) characteristics of implementation processes (e.g., development of implementation plans; Damschroder et al., 2009).

The two most complex domains of the CFIR framework (Damschroder et al., 2009) are the outer and inner settings. Because these domains address two key implementation

constructs included in the CICI framework (Pfadenhauer et al., 2017), namely implementation *setting* and *actors,* they may be of primary interest to implementation research. The barriers and facilitators in the outer setting domain refer to: perceptions of participants' needs, networking with other organizations, competitive advantage or competitive pressure from other organizations/institutions to implement similar interventions, external strategies (including external policies and guidelines), and securing adequate financial resources for implementation. The inner setting domain in the CFIR framework (Damschroder et al., 2009) encompasses barriers and facilitators such as: structural characteristics of the organization, networking and communication within the organization, norms and values respected in the organization, implementation climate, compatibility of implementation, relative priority, incentives and rewards systems, goals and feedback, learning climate, readiness for implementation (e.g., leadership engagement), and available resources.

In the area of health psychology, implementation studies are dominated by research on feasibility and acceptability of interventions, assessed among (prospective or actual) intervention participants using qualitative methods (for reviews see: Devereux-Fitzgerald et al., 2016; Han et al., 2023). Furthermore, interventions' efficacy and their implementation are analyzed separately, without testing for the interrelations between the implementation processes and efficacy (for reviews see Hardeman et al., 2019; Letton et al., 2024).

Adequacy of Addressing Barriers/Facilitators Occurring in the Implementation Process, Evaluated by Implementers

The CFIR authors guide its users to elicit perceptions of "the degree to which each construct manifests in the implementation process" (Damschroder et al., 2009; Damschroder et al., 2022). The framework is mainly used in qualitative research (Lobczowska et al., 2022). A systematic review of the CFIR-based barriers and facilitators for the process of implementation of PA interventions confirmed that existing research allows only for

indicating which barriers/facilitators *are present* during the implementation (Lobczowska et al., 2022). To date, few studies addressed the *associations* between the intervention outcomes (e.g., behaviors) and the presence of barriers and facilitators, as identified by implementers or the target population (Weatherson et al., 2017; Wolfenden et al., 2020).

In contrast to addressing the mere occurrence of CFIR-based implementation barriers and facilitators (Damschroder et al., 2009; Damschroder et al., 2022), we propose focusing on the evaluation of the implementers that barriers/facilitators are adequately addressed, allowing for a relatively easier implementation. It may be expected that barriers and facilitators operating in the inner and outer settings may be tackled mainly by implementation support system actors such as the administrators, intervention developers, and the supervising team, although the implementers themselves may also face situations in which they need to address barriers at hand to secure successful implementation.

The proposed construct, adequacy of addressing barriers and facilitators, shares some features with acceptability, which is an implementation outcome (Proctor et al., 2011). Acceptability refers to the satisfaction of implementation actors; however, it focuses on characteristics of the intervention itself, not the characteristics of the setting or the implementers.

Besides evaluations of the adequacy of addressing barriers/facilitators occurring in the outer and inner implementation settings, individual characteristics of the implementers may constitute a facilitator of successful implementation. The domain of individual characteristics of the CFIR framework (Damschroder et al., 2009; Damschroder et al., 2022) accounts for the implementers' self-efficacy that is, beliefs about the ability to deliver an intervention successfully and effectively. This type of self-efficacy, also called provider self-efficacy (Shapiro et al., 2021), is investigated mostly in the context of beliefs of cognitive-behavioral

therapists, whereas no research testing an interaction between provider self-efficacy and changes in intervention outcomes was found (for a review, see Shapiro et al., 2021).

Physical Activity Planning Interventions, their Efficacy, and Implementation

Evidence-based interventions to enhance MVPA use theory-based constructs, such as planning (Gollwitzer & Sheeran, 2006; Hagger & Luszczynska, 2014). Individual ("I-for-me") planning encompasses creating new associations between a cue (e.g., a place) and a behavioral response (e.g., a specific type of exercise; Gollwitzer & Sheeran, 2006). Integrating planning theories (Gollwitzer & Sheeran, 2006) with insights into the role of social contexts (Huelsnitz et al., 2022; Rhodes et al., 2020) allows to extend the notion of planning. For example, Prestwich et al. (2012) and Burkert et al. (2011) proposed two socially-embedded types of planning. In dyadic ("we-for-me") planning, a target person (e.g., a child, a patient) forms a plan about "when", "where", and "how" they can enact a behavior, whereas their dyadic partner (e.g., a parent or a partner) supports the target person during the plan formation. Collaborative ("we-for-us") planning (e.g., Prestwich et al., 2012) refers to both, the target person (e.g., a child or a patient) and the dyadic partner (e.g., a parent or a partner) forming a joint plan for performing behavior together. Previous research evaluated the efficacy of PA interventions addressing one or two types of planning (Knoll et al., 2017; Prestwich et al., 2012; Rhodes et al., 2019; Wooldridge et al., 2019), and yielded mixed results in terms of long-term improvement of MVPA or PA. Two recent dyadic studies (Kulis et al., 2022; Kulis et al, in press; Szczuka et al., 2021; 2024) tested the efficacy of three types of planning ("I-for-me", "we-for-me", and "we-for-us") in terms of changes of MVPA (the primary outcome) and sedentary behavior (the secondary outcome) among patient-partner dyads and parent-child dyads. In contrast to a control (education) condition, dyadic ("we-for-me") PA planning resulted in an increase of MVPA among patient-partner dyads at a 36-week

follow-up (Kulis et al., 2022), however, there were no improvements in MVPA in parent-child dyads (Kulis et al., in press).

Aims

The study investigates whether the implementers' evaluations of the adequacy of addressing implementation barriers/facilitators are related to changes in MVPA time between baseline (Time 1) and 14-month follow-up (Time 2). Barriers and facilitators from three domains of the CFIR framework (Damschroder et al., 2009; Damschroder et al., 2022), namely the outer setting domain, the inner setting domain, and the domain of individual characteristics of the implementer (implementer's self-efficacy) were tested. In particular, it was hypothesized that the participants of intervention studies, who received support from the implementers who evaluated addressing implementation barriers/facilitators as adequate, would spend more time on MVPA at 14-month follow-up compared to participants supported by the implementers that inadequate attention to implementation barriers and facilitators. Additionally, the interaction between the group assignment (the participants of PA planning intervention vs. those from the control groups) was explored.

Methods

Study Design

The study reports secondary findings obtained among participants of two randomized controlled trials, pre-registered with ClinicalTrials.gov (NCT03011385 and NCT02713438). These trials (henceforth: intervention studies) were designed to investigate the effects of individual, dyadic, and collaborative PA-related planning, compared with the effects of a control (education-based) condition. They used the same protocol (see https://osf.io/va8h3) and involved patient-partner dyads or parent-child dyads. The findings for the primary outcome, accelerometer-assessed MVPA at 8-month follow-up, indicate a significant increase of MVPA in patients and partners assigned to the dyadic planning condition (Kulis et al.,

2022), and a significant reduction of MVPA in children (9-15-years-old; Kulis et al., in press) assigned to the dyadic planning condition, compared to participants of the control condition. The reduction in MVPA among children was compensated by a reduction of energy-dense food intake (Kulis et al., in press). No other significant Time x Group interactions for MVPA at 8-month follow-up were observed.

Procedures

Data Collection in Two Intervention Studies

The intervention/control group procedures encompassed 8 in-person individual meetings (one dyad with one implementer) and 4 booster phone calls, taking place across 14 months. Follow-up assessments were conducted at 8 and 14 months after baseline measurement (T1). The current study uses only data that were collected at T1 and the last follow-up (conducted 14 months later). For details of the procedures of intervention studies see Kulis et al. (2022; in press).

Data were collected at 31 locations (24 urban, 7 rural) in Poland between 2016 and 2023 (until reaching the targeted sample sizes). The implementers were 38 persons (psychologists, psychology master students, nurses, teachers) who were trained prior the study to recruit participants and deliver the intervention/control group procedures. The training included at least two individual sessions prior to the study. Implementers received regular supervision (weekly or bi-weekly meetings) across the implementation process. All implementers delivered the procedures of the experimental and control conditions and were not blinded.

Data collection meetings were organized at a location agreed upon by the experimenter and a dyad (e.g., at school, the university, a non-governmental organization, etc.). Participants were informed about the study aims, anonymity, and data protection. In case of children, child and parental consent (for their child participation) were obtained, parents provided their own consent as well. Participants of the intervention studies did not receive financial

compensation. At each measurement, a small thank-you gift (a value of 10 EUR) was offered. Both intervention studies were approved by the Ethics Committee at SWPS University, Wroclaw, Poland.

In both studies, participating dyads were randomized to three intervention conditions (individual, dyadic, or collaborative PA planning) or the control (education) condition (see Kulis et al., 2022; Kulis et al., in press). No stratification was applied.

Control Condition. Among participants analyzed in this study, 82 were assigned to the control condition. The face-to-face sessions included: healthy nutrition education, PA and sedentary behaviors (SB) education (a total of 3 sessions). Respective elements of the education were repeated during four weekly booster phone calls (see Kulis et al., 2022; Kulis et al, in press).

Intervention Conditions. Among participants analyzed in this study, 270 were assigned to one of the three intervention conditions. Healthy nutrition, PA, and sedentary behavior education were also delivered using the same procedures as in the control condition. Next, intervention groups received one of three types of PA planning interventions.

Individual ("I-for-me") PA planning sessions included the following steps: (1) instruction about the aims and the content of action plans ("when, where, and how you will perform physical activity individually"); (2) presenting each member of the dyad with planning sheets; (3) inviting them to write up an individual plans about performing these activities independently in the following week; (4) a discussion on whether the plans fit participants' schedule and needs; (5) instruction about the aims and the content of individual coping plans; (6) writing up to three potential barriers and respective coping plans; (7) a discussion on whether the coping plan fit participants schedule/needs. During the booster phone calls, participants were asked individually about implementing their PA plans in the

previous week. Next, both participants were asked to form individual plans for the following week using the provided spare copies of the planning sheets (Kulis et al., 2022).

Dyadic ("we-for-me") PA planning sessions followed similar procedures as individual PA planning, tailored to the dyadic action plan. In particular, dyadic PA planning refers to writing up plans by children/patients, specifying their own MVPA, whereas parents/partners were assisting their child /the patient. Collaborative ("we-for-us") PA planning sessions followed procedures similar to those applied in individual PA planning. Parent-child dyads (or patients-partner dyads) were asked to write up their plans together and plan a joint physical activity ("when, where, how we will be active together"). For details of intervention procedures see Kulis et al., 2022; Kulis et al., in press).

Procedures of Data Collection Among the Implementers

After the collection of data among participating dyads was completed (Spring 2023), all implementers ($N = 38$) who delivered the intervention and control group procedures in both intervention studies were invited to respond to an online questionnaire and provide their evaluations of the degree to which barriers/facilitators occurring in the implementation process were adequately addressed by the team who developed the intervention and supported its implementation. Informed consent was obtained, and data were anonymized. Implementers were not reimbursed for their participation. A separate approval of the Ethics Committee at SWPS University, Wroclaw Faculty of Psychology, was obtained for data collection among implementers.

Participants

Data obtained among participants enrolled in the two intervention trials (total $N =$ 1,134; Kulis et al., 2022, Kulis et al., in press) were matched with data collected in a sample of the implementers who delivered the intervention and control group procedures ($N = 21$, 55.3% of total $N = 38$ implementers). The participant-implementer data matching resulted in

creating a dataset encompassing records of 510 participants of intervention studies at T1 (45% of total number of the participants in the two original samples, analyzed by Kulis et al., 2022, and Kulis et al,. in press), combined with data collected among 21 implementers. The participants' attrition between T1 (baseline) and T2 (14-month follow-up) was 27.1%. Consequently, 372 participants in the intervention studies provided accelerometer-based data at T1 and T2 (14-month follow-up). This final sample of completers (n = 372) and matched data from implementers (n = 21) was analyzed in the present study.

Participants of the Two Intervention Studies

Eligible dyads included a child or a patient who did not meet the WHO recommendations (2010, 2020) for PA, as self-reported during the recruitment. At least moderate intention to increase PA levels among children and patients was also the inclusion criterion. In patient-partner dyads, people with cardiovascular diseases or type-2 diabetes who were recommended by a physician to increase MVPA levels were also included. In patient-partner dyads, both participants should be in a close relationship (e.g., romantic partners, close friends, family members living together. For further details of the studies see Kulis et al. (2022) and Kulis et al. (in press).

The participants whose data were included in the present study (n = 372) were 9 to 86 years old (M = 38.74, SD = 18.78), with 66.9% of women/girls (n = 249), and 33.1% men/boys. Sixty-five participants (17.5%) were children aged 9-15 years old, whereas adults accounted for 82.5% (n = 307). Among adults, 61.8% had a university degree; 6.3% had some post-secondary education, 23.7% had a high school degree; 7.1% had a primary education or some basic vocational training; 1.1% of data were missing. Half of the adults (54.2%) indicated that their economic status was similar to the average family in the country, 7.3% indicated that their status was below the average, and 38.5% indicated that their status was above the average. All participants were White, as 98% of the country's population.

Implementers

All implementers were White women, aged from 25 to 46 years old (M = 33.00, SD = 5.78). For 52.4% of implementers, this was the first and only experience of the intervention implementation, whereas 47.6% of implementers have delivered a similar intervention before or after the current study. The implementers were supporting 4-60 dyads (M = 19.18, SD = 15.59), of which 47.6% were supporting two types of dyads, that is both patient-partner dyads and parent-child dyads. In regard to education: 42.9% of intervention implementers had a university degree in psychology, 19.0% had a university degree in other areas (e.g., education sciences, clinical nutrition, nursing), and 38.1% were psychology students.

Materials

Moderate-to-Vigorous Physical Activity (Intervention Study Participants)

Hip-worn ActiGraph accelerometers (wGT3X-BT) were used to assess MVPA minutes per hour of valid wear time. Data were collected at T1 (baseline) and at T2 (14-month follow-up). Accelerometers were worn on a belt (the right hip) during waking hours (at least 14 hours), for six consecutive days at both assessment points. Valid wear time consisted of data from accelerometers worn for > 3 days and for > 8 hours per day (i.e., valid wear day; e.g., Prescott et al., 2020). Evenson et al. (2008) and Sasaki et al. (2011) algorithms were used to calculate MVPA minutes in children and adults, respectively. Data management included: (1) an exclusion of first valid wear days at T1; (2) calculating a sum of MVPA minutes per each valid wear day, divided by the number of valid wear hours; (3) winsorizing the univariate outliers (z > |3.29|) to one unit higher than the next highest value in the distribution. Mean values of MVPA per hour were M = 5.17 minutes (SD=2.24) at T1 and M = 4.94 (SD = 2.08) at T2.

Controlled Variables (Intervention Study Participants)

Covariates assessed at T1 included age and gender. Additionally, adults reported their education levels (ranging from 8 years = a primary education to 17 years = a university degree) and economic status ("Compared with the average economic status of families in the country, how would you rate the economic status of your family?"), the responses ranged from 1 (*much below the average*) to 5 (*much above the average*).

Adequacy of Addressing Barriers/Facilitators during the Implementation (Implementers)

For the purpose of this study, we developed a CFIR-based (Damschroder et al., 2009) questionnaire, assessing implementers' evaluations of the adequacy of addressing the implementation barriers and facilitators by the implementation support system actors and implementers themselves. Previous research used qualitative methods to assess CFIR-related constructs (e.g., Nevedal et al., 2021). The limitations of such an approach (e.g., implementer burden due to interviews lasting many hours) prompted us to develop an alternative measure.

As the questionnaire was constructed and piloted in Spring 2022, it addressed barriers and facilitators from three domains of the original version of the CFIR framework: outer setting, inner setting, and individual characteristics (Damschroder et al., 2009). Definitions and examples of the CFIR constructs provided by the authors of the CFIR (Damschroder et al., 2009) were used to develop the content of the items. The items were developed by 2 researchers (KL, AL), revised by two other researchers (EK, MS), and then piloted in early 2023 among 4 implementers familiar with the CFIR framework to test the comprehensiveness, intelligibility, and the degree to which the items cover the constructs from the two respective domains of CFIR (Damschroder et al., 2009). The items were revised in line with the suggestions obtained during the pilot. The final version included 56 items (see Online Supplement 1).

Outer Setting Subscale. Items addressed the adequacy of addressing the following types of barriers and facilitators in the implementation process: participants' needs,

networking with other organizations, competitive advantage or pressure from other organizations/institutions to implement similar interventions, external policies, and guidelines, securing adequate financial resources. The adequacy of addressing barriers/facilitators in the outer setting encompassed 12 items, e.g., "When developing the intervention, the coordinating and support team made sure that the individual needs of the intervention participants were well addressed," "Compared to other organizations/institutions implementing similar interventions, this institution has at least comparable capabilities and competencies," and "Networking with other organizations and institutions was adequately established and facilitated the implementation." The responses were provided on a 4-point scale, ranging from "*strongly disagree*" to "*strongly agree*". The internal consistency of the "Outer setting" subscale, used in the sample of 21 implementers, was relatively low, with Cronbach's alpha = .53. Mean item response was 3.05 (*SD* = 0.26, range 2.50—3.42).

Inner Setting Subscale. This subscale addresses barriers/facilitators in areas such as: structural characteristics of the organization, networking, and communication within the organization, norms and values respected in the organization, implementation climate (including tension for change, the relative priority of an intervention), incentives and rewards systems, goals and feedback, learning climate, and readiness for implementation (including leadership engagement, available resources). The indicator of the implementation adequacy referring to addressing barriers/facilitators in the inner setting included 41 items, e.g., "The implementation of this intervention was aided by the implementation of other programs already operating at this institution," "Institutional climate and the culture in the coordinating and supporting teams was positive and distinguishing this institution from other institutions," and "The architectural design/physical environment in the institution was adequate for the implementation." The responses were provided on a 4-point scale, ranging from "*strongly disagree*" to "*strongly agree*". The internal consistency of the subscale, evaluated in the

sample of 21 implementers, was adequate, with Cronbach's alpha = .85. Mean item response was 3.21 (*SD* = 0.29, range 2.78—3.83).

Individual Characteristics: Implementer Self-Efficacy Subscale. This scale was developed by the authors of the present study based on the characteristics of individuals, listed in the CFIR framework (Damschroder et al., 2009). The scale refers to implementers' self-efficacy beliefs about their ability to implement the study procedures. Three items were included: "Before the initiation of the implementation process, was confident that the intervention delivered by me will be effective," "I was confident that I was able to implement the intervention well," and "I was convinced that I had all necessary skills that were essential to implement the intervention." The responses were provided on a 4-point scale, ranging from "*strongly disagree*" to "*strongly agree.*" The internal consistency of the scale was adequate, with Cronbach's alpha = .83. Mean item response was 3.42 (*SD* = 0.50, range 1.67—4.00).

Controlled Variables (Implementers)

Participants reported their education levels (ranging from 8 years = a primary education to 17 years = a university degree), number of dyads supported in the intervention studies, the type of dyads that they supported (patient-partner vs. parent-child), and any other experience in implementing other interventions.

Data Analysis

Complete-case analyses were conducted. Repeated measures ANOVA (IBM SPSS version 29.0) was applied to test whether the T1-T2 MVPA minutes (per hour of valid wear time) differed between participants supported by implementers indicating high adequacy in the implementation process, and those supported by implementers indicating low adequacy. The implementation adequacy indicators were used as the independent variable. The mean item scores for the implementation adequacy indicators were relatively high, and the variance was low; therefore, we decided to compare the data of those participants for whom their

implementers' rating of implementation adequacy fell into the top tertile (values falling into the top 33.3%) and the bottom tertile (the values falling into the lowest 33.3%). Data from participants whose implementers rated the implementation as of medium adequacy (middle tertile) were excluded from the repeated measures ANOVA. The cutoff points for the top 33.3% were values above: 3.17 (outer setting), 3.38 (inner setting), 3.67 (implementer self-efficacy). The cutoff points for the bottom 33.3% were values below: 2.83 (outer setting), 2.98 (inner setting), 3.00 (implementer self-efficacy).

The analyses were conducted by controlling for participants' age (years) and gender (coded as: 1 = male, 2 = female), as well as the intervention group assignment (coded as: the control group = 0, any of the three PA planning conditions = 1). Additional analyses explored the interactions between the intervention group assignment (any PA planning vs. control group) and the adequacy of addressing barriers/facilitators in the implementation process (high adequacy – the top tertile vs. low adequacy – the bottom tertile).

The data of intervention study participants were nested in $k = 21$ implementers. Consequently, the intraclass correlation coefficient (ICC) was used to evaluate whether there were significant clustering effects across the main study variable, MVPA. ICC was calculated for implementers supporting > 5 participants.

Results

Preliminary Analyses

Dropout Analysis

Participants of intervention studies who provided their data at T1 assessment did not differ from completers in MVPA levels (T1), gender, the group assignment (all *p*s >.608); however, completers were older ($M = 38.59$ years, $SD = 19.01$) than those who dropped out ($M = 32.02$ years, $SD = 17.92$), $F(1, 508) = 13.49$, $p < .001$. There were no differences in adequacy of addressing barriers/facilitators during the implementation (inner setting, outer

setting, individual characteristics; reported by implementers) when participants who completed T1 and T2 and those who dropped-out were compared, all $p > .070$.

Randomization Check

At T1, participants assigned to any of the PA planning groups and control group did not differ in MVPA levels, F (1, 508) = 0.02, $p = .884$.

Clustering Effect

The intraclass correlation coefficients, evaluating the implementer-dependent clustering effects, were not significant for the MVPA at T1 ($p = .394$) and T2 ($p = .217$).

Mean Levels of Adequacy of Addressing Implementation Barriers and Facilitators.

Among implementers falling into the top tertile of perceived adequacy of addressing implementation barriers/facilitators, mean levels of perceived adequacy were high, with M = 3.29 (SD = 0.07) for the outer setting, M = 3.20 (SD = 0.12) inner setting, and high for implementer self-efficacy (M = 4.00, SD = 0.00). Among implementers falling into the bottom tertile of perceived adequacy of addressing implementation barriers/facilitators, mean levels of perceived adequacy were moderate, with M = 2.67 (SD = 0.09) for the outer setting, M = 2.88 (SD = 0.07) for the inner setting, and M = 2.93 (SD = 0.22) for implementers' self-efficacy.

Correlations Between the Study Variables

Among all participants, MVPA levels at baseline and 14-month follow-up were associated, $r = .57$, $p < .001$. The three types of barriers and facilitators were also positively correlated, with $r = .68$ ($p < .001$) for associations between the adequacy of addressing barriers and facilitators in inner and outer setting; $r = .34$ ($p < .001$) for associations between the adequacy of addressing barriers and facilitators in outer setting and implementers' self-efficacy; and $r = .52$, $p < .001$ for associations between the adequacy of addressing barriers and facilitators in inner setting and implementers' self-efficacy.

Effects of Implementation Adequacy on MVPA of Participants

Findings for the Implementation Adequacy for Barriers/Facilitators in the Domain of Outer Setting

Repeated measured ANOVA was conducted to test if the T1-T2 MVPA changes depend on the implementation adequacy (barriers/facilitators from the domain of outer setting), as evaluated by the implementers. Participants' age, gender, and the group assignment (the control vs. experimental group) were accounted for as covariates. Implementation adequacy (addressing barriers/facilitators in the outer setting) was included as the independent variable.

The analyses indicated no significant effect of time, the group assignment (the control versus experimental groups), age, or gender (see Table 1) on MVPA minutes per hour. There was a significant interaction of Time x Implementation adequacy (addressing barriers/facilitators in the outer setting), $p = .003$. Specifically, as reported in Table 1 among participants supported by the implementers who evaluated the implementation as of low adequacy (the outer setting domain) there was a decline in MVPA minutes per hour (T1: $M = 5.63$, $SD = 2.35$, T2: $M = 5.05$, $SD = 1.91$), whereas MVPA minutes per hour among participants supported by the implementers who reported high adequacy of implementation (domain of outer setting), MVPA minutes per hour were stable and slightly increasing over time (T1: $M = 4.47$, $SD = 2.07$, T2: $M = 4.64$, $SD = 2.18$), $d_{ppc2} = 0.274$.

Additional analyses indicated that Time x Implementation Quality x Group assignment interaction term was not significant (see Table 1).

Findings for Adequacy of Addressing Implementation Barriers/facilitators in the Domain of Inner Setting

The same analytical procedures were repeated for the second independent variable, the adequacy of the implementation barriers/facilitators in the inner setting domain. The analyses indicated no significant effect of time, the group assignment (the control versus experimental

groups), age, or gender (see Table 1). There was a significant interaction of Time x Implementation Adequacy (barriers/facilitators from the inner setting), $p = .038$. As reported in Table 1, when participants were supported by the implementers who evaluated the implementation as of low adequacy (in terms of addressing barriers/facilitators from the inner setting), there was a decline in MVPA minutes per hour (T1: $M = 5.33$, $SD = 2.26$, T2: $M = 4.88$, $SD = 2.00$). In turn, among participants supported by the implementers who reported high adequacy of addressing barriers in the inner setting, MVPA minutes per hour were stable over time (T1: $M = 4.91$, $SD = 2.18$, T2: $M = 4.98$, $SD = 2.18$), $d_{ppc2} = 0.234$.

Additional analyses indicated that Time x Implementation Adequacy x Group assignment interaction term was not significant (see Table 1).

Findings for Implementer Self-Efficacy (Facilitators from the Domain of Individual Characteristics of Implementers)

In the final step, the analytical procedures were repeated for the implementer self-efficacy as the indicator of the independent variable. The analyses indicated no significant effect of time, the group assignment (the control versus experimental groups), age, gender, nor there was an interaction of Time x Implementer Self-Efficacy indicator for the T1-T2 MVPA changes (see Table 1). Additional analyses indicated that Time x Implementer Self-Efficacy x Group assignment interaction term was not significant (see Table 1).

Discussion

The findings provide novel evidence for associations between the implementation process indicators and behavior change among participants of two intervention studies (using the same intervention protocol). Participants who were supported by implementers perceiving higher adequacy of the implementation process (in terms of addressing barriers/facilitator arising in the inner or outer setting) maintained their accelerometer-assessed MVPA levels at 14-month follow-up. In contrast, participants supported by the implementers who reported

lower adequacy of addressing respective barriers/facilitators reduced their MVPA time at 14-month follow-up. It should be noted that "lower levels" of perceived adequacy represent moderate values. Finally, the associations between implementer self-efficacy and participants' MVPA trajectories were not significant.

Interrelations between MVPA patterns among intervention studies participants and implementers' evaluations of the implementation process in outer and inner settings are in line with the general assumptions made by the CICI framework (Pfadenhauer et al., 2017), suggesting an interaction between characteristics of setting, implementers, implementation process, and intervention outcomes. Previous research addressing indicators of implementation (e.g., feasibility or acceptability of an intervention) usually reported implementation indicators separately from the behavioral or health outcomes of interventions without testing the associations between implementation indicators and effectiveness indicators, such as behavior change (see e.g., systematic reviews by Devereux-Fitzgerald et al., 2016; Han et al., 2023; Hardeman et al., 2019). Consequently, while existing research usually informs about the levels of the implementation indicators it does not address their actual role in the behavior change process. Our study fills this gap.

This study fills yet another important gap in research on the implementation of PA-promoting intervention. Existing studies on implementation indicators usually address adequacy/risibility of *intervention participants*' perceptions of *the content/structure* of the intervention itself (Devereux-Fitzgerald et al., 2016; Han et al., 2023; Hardeman et al., 2019), whereas our study covers *implementers' evaluations* of various *barriers and facilitators arising in the implementation setting*. In line with the CFIR framework (Damschroder et al., 2009; Damschroder et al., 2022) and CFIR-based research (for meta-review see Lobczowska et al., 2022), barriers and facilitators may refer to the intervention content, but also to social processes (supervision and in-person training, contacts with the support system actors and

their responsiveness to implementers needs, leadership, and conflicts), the physical characteristics of the environment (adequacy of built facilities and space where intervention is delivered), organizational processes (organization climate, values), and other co-existing interventions and policies, actions of other institutions/organizations. Also, in line with the CFIR framework, we addressed *implementers' evaluations* of *barriers and facilitators referring to characteristics of implementers and the intervention study participants*. For example, we considered how well the intervention aligned with the participants' needs.

The findings should be discussed in the context of the results addressing the efficacy of the delivered PA planning intervention. The efficacy studies conducted for datasets analyzed in the present study indicated an increase of MVPA (8-month follow-up) only in one of the three intervention groups ("we-for-me" PA planning) in adult patient-partner dyads and a decline of MVPA among children assigned to "we-for-me" PA planning condition from parent-child dyads (Kulis et al., 2022; Kulis et al, in press). Importantly, across the study groups, we observed high levels of accelerometer-assessed MVPA at the baseline (>1h across all groups, except for children, with the average total MVPA per day >50 min). Baseline assessment took place after recruitment meetings, where only participants' self-reporting low MVPA levels (below levels recommended by the WHO, 2010, 2020) in previous weeks were enrolled. It is likely that baseline assessment was already influenced by participants' reactivity to wearing the accelerometer (Dössegger et al., 2014) and their intentions to change MVPA levels. The motivation to change one's lifestyle and 'cross the Rubicon,' might have been boosted by participating in the first session of the study, and consequently, might have increased participants' engagement in MVPA, resulting in higher levels of MVPA recorded by accelerometers at T1 (baseline), compared to MVPA levels in weeks prior to the study. This effect might have reduced the possibility of obtaining a further increase in MVPA, and keeping up similar MVPA levels (with approximately 60 min per day) at 14-month follow-up.

This may be considered successful behavior maintenance, as defined by guidelines by the WHO guidelines (150-300 min of MVPA per week in adults, 60 min of MVPA per day in children; WHO, 2010, 2020).

The present study indicated that participants supported by implementers who reported higher adequacy of the implementation process were likely to maintain these initial high MVPA levels and did not reduce their MVPA time, regardless of the group assignment (the control vs. the PA planning condition). The implementers' perception of adequately addressing the barriers/facilitators may be an important protective factor, reducing the likelihood of an MVPA decline, regardless of being assigned to the control (education) or experimental (PA planning) condition. In turn, less adequate addressing of the respective barriers/facilitators (as perceived by implementers) may be an important risk factor, facilitating a decline in MVPA levels. The observed effects were small therefore the clinical significance of respective changes requires further investigation. Any conclusions should be drawn with caution.

We found no interactions between the implementers' perceptions of the adequacy of the implementation process and the experimental group assignment among participants (control vs. PA planning conditions). This might have been expected, as all implementers were delivering procedures in both conditions, and they were not asked to report implementation barriers specific to the intervention group procedures. Future research may consider addressing barriers/facilitators specific to different study groups (intervention vs. control) and different target groups (e.g., children vs. adults).

Interestingly, implementer self-efficacy levels were unrelated to participants' MVPA change patterns. Provider (or implementer) self-efficacy is one of the most frequently studied individual characteristics of the implementer (Shapiro et al., 2021); however to the best of our knowledge, there are no studies on implementer self-efficacy and the efficacy of behavior

change interventions. The effects of self-efficacy were expected in line with social cognitive theory (Bandura, 1997; Luszczynska & Schwarzer, 2020). A lack of hypothesized associations may be due to the assessment occurring after the implementation process had been completed. Anecdotal observations made by the support system actors who were training the implementers suggest that many implementers were initially unsure of their competencies. It is possible that including measurements of the implementers' self-efficacy during the early or middle stages of implementation would provide more insight.

Our study has some implications for practice. The efforts of implementation support system actors (the supervising/training team, the developers of the intervention, and the administrators) to address the barriers or exploit opportunities arising during the implementation process are likely to contribute to behavior change in the target group. Perceived moderate adequacy of addressing barriers and facilitators arising in the implementation process may be insufficient to secure the maintenance of MVPA among participants of PA-planning interventions.

The study has several limitations. The first refers to the weaknesses of the questionnaire to assess the implementation process indicator developed for the purpose of this study. The questionnaire was not validated using other measures. There are no quantitative tools addressing implementation barriers and facilitators in outer/inner settings. Instead of dividing the outer and inner settings subscales into narrower subdomains, we used very broad domains as the organizing principles, as originally proposed in the CFIR Framework (Damschroder et al., 2009). This procedure may affect the internal consistency of the scales. Indeed, the internal consistency of the subscale assessing barriers/facilitators in the outer setting was low. To secure theoretical validity, we decided to include items representing all areas of barriers/facilitators listed in the outer setting domain of the CFIR framework, even if they were weakly related to other items. Further research addressing the validity and reliability of

the proposed questionnaire is essential. The questionnaire was based on the older version of CFIR (2009), whereas the new version (Damschroder et al., 2022) adds some additional constructs into the inner and outer setting domains. Only three out of five domains of CFIR were covered; associations for the two further domains remain unknown. The second main limitation refers to the fact that the evaluations of the adequacy of addressing barriers/facilitators were conducted using a retrospective design, with implementers recalling the whole process. Memory bias may affect such evaluations. A preferable design would account for providing reports by the implementers when they were in the middle of the implementation process (e.g., after the first year of work), besides the retrospective assessment. Only half of the implementers agreed to provide their data. Participants of the two intervention studies were better educated than the average in the country, and only a minority reported economic status lower than average, which further limited the generalizability of the results.

Conclusions

Despite its limitations the study has provided several novel insights. Stable patterns of accelerometer-assessed MVPA time, indicating maintenance of exercise levels, were observed among the participants of intervention studies. These participants were supported by implementers reporting that barriers/facilitators occurring in the outer and inner setting were adequately addressed by the implementation support system actors or by the implementers themselves. This was true for participants exposed either to PA-planning or to the control (education) procedures. A small reduction of MVPA levels (a pattern suggesting a decrease in exercise from baseline to 14-month follow-up) was observed among those participants, who were supported by implementers who evaluated addressing barriers and facilitators as only moderately adequate. Implementers' self-efficacy was unrelated to time spent on MVPA by the intervention studies participants.

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Funding

The study was supported by the National Science Centre, Poland, under Grants 2014/15/B/HS6/00923 and 2017/27/B/HS6/00092, awarded to Aleksandra Luszczynska

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Disclosure statement

The authors report there are no competing interests to declare.

Data availability statement

Data are available upon request, from the corresponding author.

Table 1

Repeated measures ANOVA: Differences in intervention participants' MVPA levels (minutes per hour) explained by implementers' evaluations of the adequacy of addressing implementation barriers/facilitators in outer and inner implementation settings and the individual characteristic, implementer self-efficacy

Effects	F	df	*p*	η^2	MVPA Time 1 (baseline) *M (SD)*		MVPA Time 2 (14-month follow-up) *M (SD)*	
					Lower adequacy of addressing barriers/ facilitators	Higher adequacy of addressing barriers/ facilitators	Lower adequacy of addressing barriers/ facilitators	Higher adequacy of addressing barriers/ facilitators
Implementers' evaluations of the adequacy of addressing implementation barriers/facilitators in the outer setting: Higher vs lower								
Time	0.61	1, 187	.436	.993				
Gender	0.01	1, 187	.921	<.001				
Age	2.48	1,187	.116	.013				
Experimental condition	0.21	1,187	.650	.001				
Time x Adequacy of addressing barriers/facilitators	8.76	1,187	.003	.045				
					5.63 (2.35)	4.47 (2.07)	5.05 (1.91)	4.64 (2.18)
Time x Adequacy of addressing barriers/facilitators x Experimental condition	0.55	3,182	.650	.009				
Implementers' evaluations of the adequacy of addressing implementation barriers/facilitators in the inner setting: Higher vs lower								
Time	0.20	1,239	.652	.001				
Gender	0.16	1,239	.689	.001				
Age	0.39	1,239	.532	.002				
Experimental condition	0.08	1,239	.774	<.001				
Time x Adequacy of addressing barriers/facilitators	4.07	1,239	.045	.017	5.33 (2.26)	4.91 (2.18)	4.88 (2.00)	4.98 (2.18)
Time x Adequacy of addressing barriers/facilitators x Experimental condition	0.26	3,234	.885	.003				
Implementer self-efficacy: Higher vs lower								
Time	0.02	1,237	.903	<.001				
Gender	0.11	1,237	.736	<.001				
Age	0.01	1,237	.975	<.001				
Experimental condition	0.04	1,237	.839	<.001				
Time x Adequacy of addressing barriers/facilitators	0.22	1,237	.639	.001	5.34 (2.38)	4.82 (2.10)	5.14 (2.21)	4.75 (1.95)
Time x Adequacy of addressing barriers/facilitators x Experimental condition	0.60	3,232	.616	.008				

Note[1]: MVPA = accelerometer-assessed minutes of moderate-to-vigorous physical activity, calculated per hour of valid wear time; Experimental condition = Physical activity planning intervention (individual, dyadic or collaborative planning) vs. control (education) condition; barriers and facilitators are based on the CFIR framework (Damschorder et al., 2009, 2022), the domains of the inner setting, outer setting and individuals' characteristics; two- way interactions were calculated in analyses with the experimental condition as the control variable (covariate); three-way interactions were calculated in analyses with the experimental condition as the factor (independent variable).

Are Implementation Barriers Adequately Addressed? The Associations Between the Implementation Process Characteristics Reported by Implementers and Physical Activity Changes Among Participants of a Planning Intervention

Supplementary Material 1

Table S1

Questionnaire items based on the CFIR framework (Damschroder et al., 2009) included in the survey on the adequacy of addressing barriers and facilitators during the implementation process

#	Item
Adequacy of addressing barriers and facilitators arising in the outer setting domain	
1.	When developing the intervention, the coordinating and support team made sure that the individual needs of the intervention participants were well-addressed
2.	The individual needs of the intervention participants were well-addressed by the implementers themselves
3.	Taking part in the intervention procedures was associated with a high number of barriers in the intervention setting that participants had to tackle themselves
4.	For the successful implementation, it was important that adequate ways to contact/reach the coordinating and support team, implementers, and other institutions were established early
5.	Networking with other organizations and institutions was adequately established and facilitated the implementation
6.	Compared to trainings in other institutions, the implementation training delivered to the implementers was adequate to their needs and skills
7.	Compared to other organizations/institutions implementing similar interventions, this institution has at least comparable capabilities and competencies
8.	This institution has several advantages when compared to other organizations/institutions implementing similar interventions
9.	This institution has a structure that is at least as good as the structure of other top organizations/institutions, implementing similar interventions
10.	Issues related to national or regional public health policies were adequately addressed
11.	Healthy lifestyle recommendations and guidelines, which are relevant in the country/state, were adequately addressed
12.	External financial support for the implementation of the intervention was adequate

	Adequacy of addressing barriers and facilitators arising in the inner setting domain
1.	The institution implementing the intervention provided adequate support for education and training for the implementers and the support team
2.	The institution secured that the implementers selected to deliver the intervention were of adequate age
3.	The institution secured that the implementers selected to deliver the intervention were adequately emotionally mature
4.	The architectural design/physical environment in the institution was adequate for the implementation
5.	Coordinating and support teams were experienced in facilitating the implementation of the intervention
6.	The institution ensured that the implementers selected to deliver the intervention were adequately coping with various difficulties, including conflicts
7.	Coordinating and support teams were adequately coping with various difficulties, including conflicts
8.	The facilities in the buildings where the implementation took place were adequate for the delivery of the intervention
9.	The ways the institution has functioned and its operations required multiple adjustments before the implementation of the intervention could begin. (Reverse)
10.	Besides the training sessions, the contacts with other implementers and coordinating or supporting teams were very limited. (Reverse)
11.	Besides the initial training, the coordinators, support team and other implementers were helpful and often in touch with me regarding tasks and various issues related to the implementation
12.	Besides training and delivery-related meetings, the coordinators and the support team cared about good and cooperating relationships with implementers
13.	Besides initial training, other meetings were adequately designed to aid successful implementation
14	The frequency of the meetings with the person leading the whole project and with the coordinating team was adequate.
15	Training meetings with the coordinating and administrating teams were adequately adjusted to the implementation process
16.	Institutional climate and the culture in the coordinating and supporting teams was positive and distinguishing this institution from other institutions
17.	The values and beliefs shared by the staff from this institution were positively contributing to the success of the intervention
18.	There were enough opportunities to present or propose own ideas/suggest innovations referring to the implementation
19.	There was a considerable need and the time was ripe to implement this intervention in the selected target group
20.	The implemented intervention adequately filled the gap that wasn't addressed by other programs or interventions offered by the institution to potential participants
21.	The implementation of the intervention fitted my (and the other implementers') norms and values
22.	The implementation of the intervention adequately reflected norms and values important for the institution

23.	The number of major problems hindering the implementation of the intervention was mounting (Reverse)
24.	Difficulties and problems related to the implementation of the interventions affected the implementation of other programs/interventions available to the participants
25.	Comparing this intervention to other initiatives and programs taking place in this institution, implementing this intervention became an institution's priority
26.	Comparing this intervention to other initiatives and programs taking place in this institution, implementing this intervention felt like a superfluous task (Reverse)
27.	The implementation of this intervention was aided by the implementation of other programs already operating at this institution
28.	I and other implementers were strongly motivated to implement and deliver the intervention adequately and to secure its effectiveness
29.	The supervising team and the intervention leaders adequately acknowledged implementers' role and their contribution to the implementation process
30.	The coordinating team adequately defined the goals of the implementation of the intervention
31.	The quality of communication between the coordinating team and the implementers was high
32.	The coordinating team adequately monitored the delivery and the degree to which the implementation goals were achieved
33.	The coordinating team provided adequate feedback about the work done and progress toward goals
34.	The frequency of provision of feedback by the coordinating team was adequate
35.	The form of feedback provided by the coordinating team was adequate
36.	The coordinating team was adequately engaged in delivering the goals of a respective stage of the implementation process
37.	You and other implementers were strongly committed toward reaching the implementation goals
38.	The available resources, essential to manage tasks at hand and to implement the intervention, were adequate
39.	The initial training adequately prepared the implementers to deliver this intervention
40.	The availability of the leader of the team was adequate (they were available when needed).
41.	The availability of the coordinating team was adequate (they were available when needed)
Implementer self-efficacy (barriers and facilitators referring to the individual's characteristics)	
1.	Before the initiation of the implementation process, I was confident that the intervention delivered by me would be effective
2.	I was confident that I am able to implement the intervention well
3.	I was convinced that I had all the necessary skills that were essential to implement the intervention

Note: Response scale: 1 – strongly disagree, 2 - disagree, 3 - agree, 4 – strongly agree