

## **SUPPORTING INFORMATION**

**Title:** Cultural adaptations of obesity-related behavioural prevention interventions in early childhood: A systematic review

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**Table S1: PRISMA 2020 item checklist and abstracts checklist**

Section and Topic	Item #	Checklist item	Location where item is reported
<b>TITLE</b>			
Title	1	Identify the report as a systematic review.	Title
<b>ABSTRACT</b>			
Abstract	2	See the PRISMA 2020 for Abstracts checklist * (see below)	Abstract
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Introduction
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Last paragraph of introduction
<b>METHODS</b>			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Methods
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Methods
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Supporting file
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Methods
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Methods
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Methods
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Methods
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Methods
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Not applicable. No statistical constructs used to compare data.
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Methods
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Methods
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Methods
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Methods

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Section and Topic	Item #	Checklist item	Location where item is reported
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Not applicable
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Not applicable
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Methods. And considered in Limitations.
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Not applicable
<b>RESULTS</b>			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Results
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Results
Study characteristics	17	Cite each included study and present its characteristics.	Results + Supporting information
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Results + Supporting information
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Results + Supporting information
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Results
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Not applicable. No statistical synthesis conducted
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	No specific investigations
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Not applicable. No sensitivity analyses conducted
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	No method used. Considered in limitations.
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Not applicable
<b>DISCUSSION</b>			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Discussion
	23b	Discuss any limitations of the evidence included in the review.	Discussion
	23c	Discuss any limitations of the review processes used.	Discussion
	23d	Discuss implications of the results for practice, policy, and future research.	Discussion
<b>OTHER INFORMATION</b>			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Methods
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Methods
	24c	Describe and explain any amendments to information provided at registration	Methods

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Section and Topic	Item #	Checklist item	Location where item is reported
		or in the protocol.	
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Publication information
Competing interests	26	Declare any competing interests of review authors.	Publication information
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Supporting information - data extracted from included studies

**PRISMA 2020 for Abstracts checklist\***

Section and topic	Item #	Checklist item	Reported Yes/No
<b>Title</b>			
Title	1	Identify the report as a systematic review.	Yes
<b>Background</b>			
Objectives	2	Provide an explicit statement of the main objective(s) or question(s) the review addresses.	Yes
<b>Methods</b>			
Eligibility criteria	3	Specify the inclusion and exclusion criteria for the review.	Yes
Information sources	4	Specify the information sources (e.g. databases, registers) used to identify studies and the date when each was last searched.	Yes
Risk of bias	5	Specify the methods used to assess risk of bias in the included studies.	Yes
Synthesis of results	6	Specify the methods used to present and synthesise results.	Yes
<b>Results</b>			
Included studies	7	Give the total number of included studies and participants and summarise relevant characteristics of studies.	Yes
Synthesis of results	8	Present results for main outcomes, preferably indicating the number of included studies and participants for each. If meta-analysis was done, report the summary estimate and confidence/credible interval. If comparing groups, indicate the direction of the effect (i.e. which group is favoured).	Yes
<b>Discussion</b>			
Limitations of evidence	9	Provide a brief summary of the limitations of the evidence included in the review (e.g. study risk of bias, inconsistency and imprecision).	Yes
Interpretation	10	Provide a general interpretation of the results and important implications.	Yes
<b>Other</b>			
Funding	11	Specify the primary source of funding for the review.	Refer to publication information
Registration	12	Provide the register name and registration number.	Yes

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71

For more information, visit: <http://www.prisma-statement.org/>

**Table S2: Final search terms for database searches: Ovid (MEDLINE(R) and Epub Ahead of Print, Embase, ERIC, Global Health, PsycINFO)**

1	exp Infant,Newborn/ or Infant/ or Child, Preschool/ or Pediatrics/
2	(infant or child or p?ediatric or toddler or (baby or babies)).mp.
3	1 or 2
4	exp Clinical trial/ or Controlled clinical trial/ or Comparative study/ or Evaluation studies/ or Feasibility Studies/
5	(trial* or plan* or implement* or promot* or campaign* or program* or approach* or intervention* or initiative* or practice*).mp.
6	4 or 5
7	exp Culturally Competent Care/
8	((cultur* or ethnic* or (Multi-cultural or multi cultural) or (cross cultur* or cross-cultur*)) adj4 (competen* or modif* or sensitiv* or specific* or focus* or relevan* or innovat* or tailor* or adapt*)).mp.
9	7 or 8
10	exp Diet/ or Child Nutrition Sciences/ or Feeding Behavior/ or Infant Food/ or Weaning/ or Breast feeding/
11	(Diet* or Nutrition* or (health* adj2 eat*) or Feeding behavio?r or (introduc* adj2 (solid* or semi-solid* or soft)) or ((solid* or semi-solid* or soft) adj3 (food* or feed* or diet*)) or ((compl#mentary or supplementary) and (food* or feed* or nutrition*)) or breastfe* or (breast* adj1 (duration or exclusiv* or optimal*))).mp.
12	exp Exercise/ or Exercise therapy/ or Exercise Movement Techniques/ or Motor Activity/ or Physical Fitness/ or Leisure Activities/ or Sports/ or Dancing/
13	(physical inactivity or physical activity or tummy time or supine or movement skills or physical education or sedentary or sport or danc* or ((life style or life style) adj5 activ*)).mp.
14	exp Sleep/
15	(sleep and (quality or duration or time or latency or stages or onset)).mp.
16	exp Maternal Health/ or Child Health/ or Mother-Child Relations/ or Infant care/ or Family Therapy/ or Social Support/ or Counseling/
17	exp Health Promotion/ or Health education/
18	((parent* adj2 (education or training or information or knowledge)) or ((parent? or family) adj2 (based or focused or directed or cent?red or only or led))).mp.
19	3 and 6 and 9 and (or/10-17)
20	19
21	limit 20 to human

**Table S3: Final search terms for database searches: Ebscohost CINAHL**

Search Terms	Search Options	Actions
S47	S3 AND S10 AND S13 AND S45	Limiters - Human
S46	S3 AND S10 AND S13 AND S45	
S45	S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44	
S44	("parent?" or "family") N2 ("based" or "focused" or "directed" or "cent?red" or "only" or "led")	
S43	"parent*" N2 ("education" or "training" or "information" or "knowledge")	
S42	(MH "Health Education+")	
S41	(MH "Health Promotion+")	
S40	(MH "Counseling+")	
S39	(MH "Family Therapy")	
S38	(MH "Mother-Child Relations") OR (MH "Parent-Child Relations+") OR (MH "Father-Child Relations")	
S37	(MH "Infant Care+")	
S36	(MH "Maternal-Child Health") OR (MH "Maternal Health Services+")	
S35	"sleep" and ("quality" or "duration" or "time" or "latency" or "stages" or "onset")	
S34	(MH "Sleep+")	
S33	"physical inactivity" or "physical activity" or "tummy time" or "supine" or "movement skills" or "physical education" or "sedentary" or "sport" or "danc*" or (("life style" or "life style") N5 "activ*")	
S32	(MH "Dancing+") OR (MH "Aerobic Dancing")	
S31	(MH "Sports+")	
S30	(MH "Leisure Activities+")	
S29	(MH "Physical Fitness+")	
S28	(MH "Physical Activity") OR (MH "Pediatric Physical Therapy")	
S27	(MH "Motor Activity+")	
S26	(MH "Exercise+")	
S25	S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24	
S24	"Diet*" or "Nutrition*" or ("health*" N2 "eat*") or "Feeding behavio?r"	
S23	"breastfe*" or ("breast*" N1 ("duration" or "exclusiv*" or "optimal*")	
S22	("compl#mentary" or "supplementary") and ("food*" or "feed*" or "nutrition*")	
S21	("solid*" or "semi-solid*" or "soft") N3 ("food*" or "feed*" or "diet*")	
S20	"introduc*" N2 ("solid*" or "semi-solid*" or "soft")	
S19	(MH "Breast Feeding+") OR (MH "Breast Feeding Promotion")	
S18	(MH "Weaning")	
S17	(MH "Infant Food+")	

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S16	(MH "Eating Behavior+") OR (MH "Infant Feeding+")	
S15	(MH "Child Nutrition")	
S14	(MH "Diet+")	
S13	S11 OR S12	
S12	("cultur*" or "ethnic*" or "Multi-cultural" or "multi cultural" or "cross cultur*" or "cross-cultur*") N4 ("competen*" or "modif*" or "sensitiv*" or "specific*" or "focus*" or "relevan*" or "innovat*" or "tailor*" or "adapt*")	
S11	(MH "Cultural Competence")	
S10	S4 OR S5 OR S6 OR S7 OR S8 OR S9	
S9	"trial*" or "plan*" or "implement*" or "promot*" or "campaign*" or "program*" or "approach*" or "intervention*" or "initiative*" or "practice*"	
S8	(MH "Pilot Studies")	
S7	(MH "Evaluation Research+")	
S6	(MH "Comparative Studies")	
S5	(MH "Randomized Controlled Trials")	
S4	(MH "Clinical Trials+")	
S3	S1 OR S2	
S2	"infant" OR "child" or "p?ediatric" or "toddler" or "baby" or "babies"	
S1	(MH "Infant, Newborn+") OR (MH "Infant+") OR (MH "Child, Preschool+") OR (MH "Pediatrics+")	

**Table S4: Final search terms for database searches: Scopus**

8	1 AND 2 AND 3 AND (4 OR 5 OR 6 OR 7)
7	TITLE-ABS- KEY ( ( parent* W/2 ( education OR training OR information OR knowledge ) ) OR ( ( paren t? OR family ) W/2 ( based OR focused OR directed OR cent?red OR only OR led ) ) )
6	TITLE-ABS- KEY ( sleep AND ( quality OR duration OR time OR latency OR stages OR onset ) )
5	TITLE-ABS- KEY ( ( physical AND inactivity ) OR ( physical AND activity ) OR ( tummy AND time ) OR ( su pine ) OR ( movement AND skills ) OR ( physical AND education ) OR sedentary OR sport OR danc* )
4	TITLE-ABS- KEY ( diet* OR nutrition* OR ( health* W/2 eat* ) OR feeding AND behavio?r OR ( introdu c* W/2 ( solid* OR semi-solid* OR soft ) ) OR ( ( solid* OR semi-solid* OR soft ) W/3 ( food* OR feed* OR diet* ) ) OR ( ( compl?mentary OR supplement ary ) AND ( food* OR feed* OR nutrition* ) ) )
3	TITLE-ABS-KEY ( ( ( cultur* OR ethnic* OR ( multi-cultural OR multi AND cultural ) OR ( cross AND cultur* OR cross-cultur* ) ) W/4 ( competen* OR modif* OR sensitiv* OR specific* OR focus* OR relevan* OR innovat* OR tailor* OR adapt* ) ) )
2	TITLE-ABS- KEY ( ( trial* OR plan* OR implement* OR promot* OR campaign* OR program* OR appr oach* OR intervention* OR initiative* OR practice* ) )
1	TITLE-ABS-KEY ( infant OR child OR p?ediatric OR toddler OR baby OR babies )

**Table S5: Final search terms for database searches: Web of Science**

9	#8 AND #3 AND #2 AND #1	Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
8	#7 OR #6 OR #5 OR #4	Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
7	TOPIC:((( parent* NEAR/2 ( education OR training OR information OR knowledge )) OR (( parent? OR family ) NEAR/2 ( based OR focused OR directed OR cent\$red OR only OR le d )))	Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
6	TOPIC:(( sleep AND ( quality OR duration OR time OR latency OR stages OR onset )))	Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
5	TOPIC:((( physical AND inactivity ) OR ( physical AND activity ) OR ( tummy AND time ) OR ( supine ) OR ( movement AND skills ) OR ( physical AND education ) OR sedentary OR spo rt OR danc* ))	Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
4	TOPIC:((( diet* OR nutrition* OR ( health* NEAR/2 eat* ) OR feeding AND behavio\$ř OR ( introduc* NEAR/2 ( solid* OR semi-solid* OR soft ) ) OR (( solid* OR semi-solid* OR soft ) NEAR/3 ( food* OR feed* OR diet* ) ) OR (( compl?mentary OR supplement ary ) AND ( food* OR feed* OR nutrition* ) )))	Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
3	TOPIC:((( cultur* OR ethnic*) NEAR/4 (competen* OR modif* OR sensitiv* OR specific* O R focus* OR relevan* OR innovat* OR tailor* OR adapt* ))	Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
2	TOPIC:((( trial* OR plan* OR implement* OR promot* OR campaign* OR program* OR a pproach* OR intervention* OR initiative* OR practice* )))	Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years
1	TOPIC:(( infant OR child OR p?ediatric OR toddler OR baby OR babies ))	Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years



**Table S6: Summary characteristics of included interventions**

STUDY INFORMATION		POPULATION			INTERVENTION					
Primary Author, Year, Reference, Country	Design / study type	Target cultural/ population group, method of assessment	Target audience / age group	Original target population ( <i>prior to adaptation</i> )	Name and aim	Brief description	Setting, mode of delivery and provider	Target obesity-related behaviours	Theory of intervention design	
1	Akter et al. (2020) [1] (Bangladesh)	Adaptation description and pilot study; qualitative	Rural Bangladeshi population	Pregnant women and mothers of children under 6 months old	Other countries: Brazil, Zimbabwe, Pakistan	Cultural adaptation of three interventions (Reach Up, Thinking Healthy, and general nutrition advice) - primarily aiming to promote early child development, including nutrition content	Face-to-face group sessions (40–50 min) and combined individual sessions (20–30 min) and group follow-up sessions (15 min); delivered on a weekly basis for 2 months	Community health centres in two rural villages; face-to-face group and individual sessions led by a community health worker	Nutrition (parents and child)	Not described
2	Armstrong (2019) [2] (USA)	Protocol for a cluster randomized-control trial	Mid-Atlantic urban and semi-urban population	Pre-school children (3-5 years old) and their primary caregivers	Not specified	CHAMP (Creating Healthy Habits among Maryland Pre-schoolers) aims to prevent obesity among preschool children (age 3–5 years) in urban and semi-urban settings	A multi-component child-care-based intervention designed to improve both physical activity and healthy eating behaviours among pre-schoolers. Interactive lessons 2-4 days/week over 12-18-weeks	Early childhood education and care setting (Childcare centres); face-to-face interactive lessons delivered by child-care staff and web-based component for caregivers	Nutrition and physical activity (parents and child)	The curricula are based on social cognitive theory and the bioecological model and utilize social marketing strategies.
3	Broyles (2011) [3] (USA)	Adaptation description and pilot study; quantitative descriptive	Latino, Spanish-speaking urban, lower-income parents	Caregivers of children aged 2-4 years	Rural, low-income caregivers of toddlers 12-36 months old	Cultural Adaptation of a Nutrition Education Curriculum: Nutrition Education Aimed at Toddlers and Animal Trackers for children ages 2-4 (NEAT AT2) program, aimed at improving parent-toddler feeding practices, motor skills development and physical activity	10 weekly classes followed by 4 home visits at 1, 2, 3, and 6 months to enhance parent-toddler feeding practices and components of the Animal Trackers motor skills development and physical activity curriculum	Community health centres and homes; face to face interactive lessons and individual sessions delivered by bilingual, bicultural female parent educators	Nutrition and physical activity (parents and child)	Bandura's self-efficacy theory (source: NEAT intervention paper)
4	Fitzgibbon (2006) [4] (2005) [5] Protocol: Fitzgibbon (2002) [6] (USA)	Cluster randomized-control trial	African-American and Latino families	Preschool children (3–5 years old) and their primary caregivers	Minority preschool children (modelled after a program for African-American children)	Hip-Hop to Health Jr. is a diet/physical activity intervention designed to reduce gains in BMI (kilograms per meter squared) in preschool minority children	14 weeks (three times weekly) of a diet (20mins) & physical activity (20mins) curriculum delivered by trained early childhood educators in Spanish and English. In addition, an aligned parent component included newsletters and weekly tasks to complete with their child	Early childhood education and care setting (Head Start schools); face-to-face sessions delivered by childhood educators	Nutrition and physical activity (parents and child)	Social cognitive theory, with concepts from self-determination theory and the transtheoretical model that incorporates stages of change.
5	Hiratsuka (2018) [7] (USA)	Descriptive cultural adaptation case studies; qualitative	American Indian and Alaska Native (AI/AN) families	Pregnancy until child 2-3 years old.	General USA populations and tribal communities	Cultural adaptation of evidence-based Maternal, Infant, and Early Childhood home visitation models for use in tribal communities (includes four case studies)	Parents a Teachers (PAT): Case Studies 1 &4) parenting and relationship support to families from pregnancy to early years. Family Spirit (Case study 2): codesigned with teen mothers and their children at four reservation-based tribal communities. Nurse-Family Partnership (Case study 3): registered nurses to low-income, first-time mothers.	Parents a Teachers (PAT): Case Study 1 &4): face-to-face home visits by lay health-workers Family Spirit (Case study 2): face-to-face home visiting by registered nurses Nurse-Family Partnership (Case study 3): face-to-face home visiting by para-professionals.	Nutrition (parents and child)	Not described
6	Hon (2018) [8] Abstract: Reeves 2020 [9] (Malaysia)	Case-control pilot study; quantitative	Malaysian population	Preschool children (4–6 years old)	Multiple countries across Europe	Adaptation of the sedentary behaviour component of the Toy Box intervention (originally targeting multiple behaviours for obesity prevention)	A series of game-based activities/lessons to reduce sedentary behaviour among pre-schoolers, focussing on individual child behaviours and teachers implementing activities.	Early education and care setting (kindergartens); face-to-face group activities facilitated by kindergarten teachers	Sedentary behaviours (child)	Not described

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STUDY INFORMATION		POPULATION			INTERVENTION				
Primary Author, Year, Reference, Country	Design / study type	Target cultural/ population group, method of assessment	Target audience / age group	Original target population (prior to adaptation)	Name and aim	Brief description	Setting, mode of delivery and provider	Target obesity-related behaviours	Theory of intervention design
7 Linville (2020) [10]  (USA)	Randomised controlled trial: two pilot studies	Latino immigrant families  <i>Parent self-report</i>	Preschool children (3–5 years old) and their primary caregivers	General USA population, targeting adolescents	Culturally adapted version of the Healthy Balance lifestyle intervention for early childhood obesity prevention	8-session, 12-hour family-based group intervention. Adult caregivers and children participated in separate group sessions that occurred simultaneously. Half of the assessors and interventionists were bilingual, so the intervention was accessible for both Spanish and English-speaking families.	Healthcare facility (paediatric health clinic); face-to-face group sessions delivered by bilingual health workers (family therapy graduate students or community health care workers).	Nutrition, physical activity and sedentary behaviours (parents and child)	Cognitive dissonance theory, family systems theory and motivational interviewing.
8 Marshall (2021) [11]  (Australia)	Formative research and adaptation description; qualitative	Arabic and Chinese speaking migrants  <i>Parent self-report</i>	Mothers in their third trimester of pregnancy until infant age 6 months	General Australian population	Culturally adapted Healthy Beginnings program for the early prevention of childhood obesity targeting obesity-related early life behaviours	Delivered from the Local Health District Health Promotion Unit, staged sessions delivered to parents at timepoints - antenatal, 1, 3, and 5 months of age	Individual counselling sessions delivered by telephone with a bicultural child and family health nurse	Nutrition, physical activity, and sedentary behaviours (parents and child)	Social Learning Theory and the Health Belief Model
9 McEachan [12]  Intervention mapping: Taylor (2013) [13]  (UK)	Randomised controlled feasibility trial	South Asian-origin (predominantly Pakistani) populations  <i>Parent self-identified</i>	Pregnancy (second trimester) until infant 9 months old	White British	HAPPY (Healthy and Active Parenting Programme for Early Years) intervention, aiming to reduce infant obesity by addressing key modifiable risk factors and the role of parenting	12 group sessions (6 antenatal, 6 postnatal). It consists of a range of verbal and written advice and activities to target specific behaviours in the mother that if adopted might prevent obesity in their child, and also to promote positive parenting skills	Healthcare facility (hospital maternity clinic); face-to-face group sessions delivered by parenting facilitators	Nutrition and physical activity (parents and child)	Behavioural theory and targets key determinants of health behaviours identified by Michie et al., and uses standardised behaviour change techniques
10 Mendoza (2016) [14]  (USA)	Cluster Randomised Controlled Trial	Latino or Hispanic ethnicity  <i>Parent self-report</i>	Preschool children (3–5 years old) and their primary caregivers	Mostly non-Latino white sample of pre-schoolers	Culturally adapted Fit 5 Kids (F5K) program / curriculum aiming to reduce television viewing time and encourage alternative activities such as active playtime or reading.	Fit 5 Kids (F5K) was taught over 7–8 weeks and consisted of seven themes, each composed of five to six lesson plans of 15–30 minutes organized around the theme.	Early childhood education and care setting (Head Start schools); face-to-face interactive group lessons delivered by research staff member	Sedentary behaviours (child)	Social Cognitive Theory
11 Murtha (2020) [15]  (Australia)	Adaptation and implementation study; Mixed or multiple methods	Aboriginal and Torres Strait Islander communities in remote Far North Queensland  <i>Location-based cultural grouping</i>	Early education and care (ECEC) providers (reaching children aged under 5 years in ECEC services)	General population - ECEC settings in Queensland Australia	Cultural adaptation of LEAPS (Learning, Eating, Active Play and Sleep) professional development program to support early childhood education and care (ECEC) educators to promote healthy nutrition and physical activity in their services	ECEC educators to complete three training modules. Key topics delivered in LEAPS included breastfeeding promotion, safe use of infant formula, complementary feeding, healthy eating for young children, meal planning, food safety, physical activity, and active play	Childhood education and care settings (in remote Queensland); face-to-face group professional development sessions delivered by facilitators from an Aboriginal and/or Torres Strait Islander background or have experience working in the community	Nutrition and physical activity (child)	Not described
12 Nitsos (2017) [16]  (USA)	Single arm feasibility study; Mixed or multiple methods	Latino or Hispanic and Spanish as first language  <i>Parent self-identified</i>	Parents, expectant parents, or caregivers of infants (birth and six months of age).	General South Carolina population	Culturally adapted Tummy Time Project, a parent education intervention to improve infant tummy-time practices	Single face-to-face education session with parents and other caregivers aiming to an intervention aimed at promoting and informing about tummy time for strengthening and stretching an infant's neck and upper body muscles	Community venues (churches) and hospitals (obstetrics clinic); face-to-face group education sessions delivered by two trained bilingual and bicultural research assistants	Physical activity (parents and child)	Not described

**Table S7: Cultural adaptation data extracted for included interventions**

First Author, Year, Reference, Country	Theory of adaptation process	Description of process for cultural adaptation (HOW)	Description of adaptations made (WHAT)	Surface or deep structure adaptations ^	Who made the adaptations (WHO) Involvement of constituents	When were adaptations made? (WHEN)	On what basis were adaptations made? (WHY)
1 Akter et al. (2020) [1]  (Bangladesh)	Participatory research methodology; Goldstein et al. Guidelines for adapting manualized interventions for new target populations; Integrated Intervention mapping	1. Phase 1—Identify Core Components and Structure of Intervention. Following the situation analysis, we incorporated additional components into the child stimulation curriculum to address mental health and nutrition  2. Phase 2—Pilot Initial Revisions of Intervention.  3. Phase 3—Identify Feedback from Participants and Community Health Workers.	"The curriculum was culturally adapted for Bangladesh and was simplified later for fortnightly sessions" "This curriculum was originally developed for children aged 6–48 months, and we expanded the intervention contents to include pregnant women and mothers of children under 6 months old." "Following a situation analysis, we incorporated additional components into the child stimulation curriculum to address mental health and nutrition...To address nutrition and health care, we incorporated general nutritional advice and behavioural recommendations on prevention of complications for pregnant women and lactating mothers and their young children, which was obtained from the general nutritional curriculum endorsed by the Government of Bangladesh"	Surface and deep	Not specifically detailed.  Indications that the research team led changes.	Throughout the phases 1-3.	Not explicitly stated.  To reach a higher-risk population, and low-resource setting
2 Armstrong (2019) [2]  (USA)	None referenced	Alterations to the intervention were piloted in a local childcare centre the summer before the first cohort. CHAMP staff observed pilot lessons and gathered feedback from childcare staff on clarity and acceptability of the lessons and associated materials. Alterations to the intervention were guided by feedback from focus groups and interviews with childcare directors.	The CHAMP intervention modified Food Friends to make it culturally sensitive and appealing to a mid-Atlantic urban and semi-urban population by altering the vocabulary (i.e. replacing the term "junkie" with "enthusiast" and "sassy" with "friendly"), foods promoted (i.e., replacing, water chestnut for daikon radish, lychee for tangelo, hominy for temphe) and replacing a puzzle activity with a Montessori based sensory activity (i.e. smelling jars).	Surface	Not specifically detailed.  Indications that the research team led changes.	Before and after pilot testing.	Not explicitly stated.
3 Broyles (2011) [3]  (USA)	Resnicow et al. Cultural sensitivity as surface and deep structures [6] [7]	1. All aspects of the program reviewed by community partners who serve the Latino community; 2. Revisions and recommendations by community partners who serve the Latino community; 3. Revised program was presented to key informants and consensus reached; 4. Pilot with a small group of families; 5 Based on feedback from these families and consultants, minor final revisions were made and the program was fully implemented.	Surface and deep structure program components namely: (1) increase access to traditional food (2) promote the use of simple additions or affordable modifications (3) reinforce the Latino cultural practice of preparing meals at home and eating together as a family. Translation from English to Spanish. Instruments were administered orally, instead of written.	Surface and deep	1) The authors' 2) Community providers who work with Latino community 3) Nutrition professionals 4) key informants (including parent educators, school and community-based site directors, and in-house nutrition professionals)	After formative research and pilot test, before full trial	Not explicitly stated.
4 Fitzgibbon (2006) [4]  Fitzgibbon (2005) [5]  Protocol: Fitzgibbon (2002) [6]  (USA)	None referenced	1) A 3-week pilot was conducted exploring the feasibility and acceptability of the parental and child components of the intervention. 2) Refinements to the intervention based on learning from the parent and child pilots. 3) conducting a randomised controlled trial to assess effectiveness of the intervention.	The program is modelled after Hip-Hop to Health, a community-based cardiovascular risk reduction program that was conducted with 6- to 10-year-old African-American children and their families. The Hip-Hop to Health Jr. intervention was modelled after the traffic light diet and tailored to the developmental and cultural needs of minority preschool children. Culturally specific intervention included bilingual curriculum materials and bilingual teachers, and emphasised a) access to the program; b) identification between interventionists and participants; c) addressing cognitive and environmental barriers to exercise and diet; d) behavioural demonstrations; e) consideration for varied literacy.	Surface and deep	The researchers led the adaptations, with input and review from early childhood educators, nutritionists, exercise physiologists, community health promoters, and Head Start administrators.	Prior to the trial. After formative research and pilot testing.	Obesity prevalence most prominent in minority populations in the US, including among children, particularly among African-American and Latino children. Rationale presented for early prevention efforts.

## Supporting Information - Marshall et al. Cultural adaptations of obesity-related behavioural prevention interventions in early childhood: A systematic review

	First Author, Year, Reference, Country	Theory of adaptation process	Description of process for cultural adaptation (HOW)	Description of adaptations made (WHAT)	Surface or deep structure adaptations ^	Who made the adaptations (WHO) Involvement of constituents	When were adaptations made? (WHEN)	On what basis were adaptations made? (WHY)
5	Hiratsuka (2018) [7]  (USA)	Castro et al. Content and form of cultural adaptations; Resnicow et al. Cultural sensitivity as surface and deep structures; participatory design approach	The case study sites that were included used a community-based participatory research process to assess community needs and complete an analysis of community readiness for implementation of a home-visiting program. Case study sites then used iterative, qualitative analyses to support cultural adaptation to enhance an evidenced-based model to meet the needs and capacities identified in the targeted AI/AN community.	Surface and deep level program changes. Presented for each case study in detailed tables, in the published article. Modifications included Surface Level–Program Name and American Indian/Alaska Native (AI/AN) Imagery; Deep Structure–Curriculum Content, Program Relationships, Group Activities Content, Structural Inequities Addressed, staff training.	Surface and deep	Not explicitly stated. From information presented, it is likely that researchers undertook adaptations.  "Adaptations occurred in consultation with model developers and using the conceptual rationale for the program"	Needs assessments prior and cyclical process of consultation with all participants.	Strong formative research from multiple viewpoints and via multiple data types (e.g., qualitative data - focus groups, provider surveys, key informant interviews with tribal members, stakeholders, key service providers; community-level statistics, and unwritten tribal narratives).
6	Hon (2018) [8]  Abstract: Reeves 2020 [9]  (Malaysia)	None referenced	Not described.  (Information presented suggests that there was feedback from teachers at some stage prior to the intervention being trialled.)	The design of the intervention was modified (two focus levels rather than four: children and teachers implementing intervention. No changes to environment and engagement of parents in the adapted intervention). a) Changes to activities and language to suit cultural norms and the local physical environment. E.g., 1. teachers and pre-schoolers were not comfortable to perform the activities (belly drawing in the air, painting in the air), which require standing upright in the classroom; 2. puppet game not culturally suitable; 3. steps to explain some tasks were too difficult for pre-schoolers and these activities were excluded. b) Changes to story-telling: Lastly, the kangaroo storytelling activity has varied cultural values in Malaysia compared to that in the European countries. Pre-schoolers preferred local stories and fairy tales during storytelling.	Surface	Not explicitly stated.  From information presented, it is likely that researchers undertook adaptations.	Prior to trial	Researchers determining the need to reduce sedentary behaviour in Malaysia via the ToyBox intervention
7	Linville (2020) [10]  (USA)	none referenced	The Healthy Balance intervention was developed and piloted in 2 phases:  1. first phase of development and feasibility testing, the researchers focused primarily on a linguistic adaptation to ensure the program was accessible for both Spanish- and English-speaking families.  2. expanded beyond just a language adaptation, tailoring the intervention to respond to the unique strengths and needs of rural Latinx immigrant families residing in the United States.	Linguistic adaptation: primarily on a linguistic adaptation to ensure the program was accessible for both Spanish- and English-speaking families. Embedding sociocultural norms and traditions within the intervention; all study materials were offered in English and Spanish; at least half of the interventionists were bilingual. Further tailoring to the strengths and needs of Latinx immigrant families (not further specified).  In addition, the researchers used qualitative methods to explore caregiver and provider feedback regarding the original intervention and integrated the lessons that were learned when developing the second intervention.	Surface and deep	Led by the research team with input from representatives from the community. And later input from community members who participated in the intervention.  A Latina immigrant community health worker served as a key stakeholder and liaison helping to culturally refine the intervention prior to implementation.	Prior to the intervention trial, and after	"Latinx immigrant families in the United States experience elevated obesity-related preventable diseases. Yet, few studies have evaluated family-based obesity interventions that have been culturally adapted and/or developed specifically for Latinx families despite researchers pointing to important differences in parenting style and health behaviours among Latinx families
8	Marshall (2021) [11]  (Australia)	Barrera et al. Stages of Cultural Adaptation; Kreuter et al. Strategies for enhancing cultural appropriateness	Stages of cultural adaptation presented: Stage 1: initial considerations (consider program theories, logic model, behaviour change techniques and underpinning worldviews and determine the core components likely to influence effectiveness) Stage 2: information gathering (collect current and local information from literature and stakeholders to determine the	Based on the literature and local study findings, cultural adaptations were made to recruitment approaches, staffing (bi-cultural nurses and project staff) and program content (modified call scripts and culturally adapted written health promotion materials).  Detailed description of the cultural adaptations is presented in Tables within the published article.	Surface and deep	Led by the Health Promotion Unit, Sydney Local Health District with input from bi-cultural staff from local health districts and cultural community organisations. The project team comprised senior researchers and highly qualified staff, including Arabic and Chinese	Prior to the intervention trial, and after (planned)	"Our justifications for cultural adaptations were guided by a) ineffective engagement and nonsignificant outcomes for Arabic and Chinese speaking cultural groups; b) programmatic mismatches; and c) unique factors related to obesity-related early life behaviours"

## Supporting Information - Marshall et al. Cultural adaptations of obesity-related behavioural prevention interventions in early childhood: A systematic review

First Author, Year, Reference, Country	Theory of adaptation process	Description of process for cultural adaptation (HOW)	Description of adaptations made (WHAT)	Surface or deep structure adaptations ^	Who made the adaptations (WHO) Involvement of constituents	When were adaptations made? (WHEN)	On what basis were adaptations made? (WHY)
		preliminary adaptations, including interviews with target cultural group) Stage 3: preliminary adaptations			bicultural workers and research leadership.		
9 McEachan [12] Intervention mapping: Taylor (2013) [13] (United Kingdom)	Netto et al. Five principles for adapting health promotion interventions for minority ethnic communities; Liu et al. Cross-cultural typology of adaptation approaches;	The stepwise approach included: 1) The use of community resources to develop and publicise the intervention, 2) Identifying and addressing barriers to access and participation, 3) Developing communication strategies which were sensitive to language and information requirements, 4) Consideration of cultural/religious values that promote or hinder behavioural change, 5) Recognising degrees of ethnic identification	Adjusted language, interactive activities resources and content according to information needs, consideration of cultural/religious values that promote or hinder behavioural change. The training programme for practitioners included having a clear understanding and consistent approach to delivery including cultural adaptation.  Detailed consideration for cultural adaptation and cultural adaptation typology are presented in their published supplementary files: Additional file 3: Cultural adaptation table.	Surface & deep	Research team. Additionally local practitioners (e.g., dieticians, infant feeding advisors, parenting practitioners, community health workers) with in experience working with a range of ethnic groups	Prior to implementation.	Authors previous research infants of Pakistani origin, although on average lighter at birth, have more rapid growth in early infancy, which can be a risk factor for poor health in later child and adulthood.
10 Mendoza (2016) [14] (USA)	None referenced	The cultural adaptation process consisted of three phases: 1. Qualitative interviews with parents to inform the curriculum; 2. Forward- and back-translation of FSK to increase cultural sensitivity; 3. A “practice” trial of the curriculum in two Latino Head Start classrooms	Forward and back translation, with decentering, in which the source text itself could be modified if there were problematic phrases or to increase cultural sensitivity  The culturally adapted curriculum included culturally adapted lesson plans (shorter lessons; content substitution).	Surface	"Investigators and staff, with input from Head Start teachers, then modified lesson plans informed by the process"	Prior to and after pilot test.	Not stated
11 Murtha (2020) [15] (Australia)	None referenced	A state-wide Aboriginal and Torres Strait Islander Reference Group to meet face-to-face over 2 days to provide advice to the project team about the appropriateness of the existing program for Aboriginal and Torres Strait Islander ECEC settings.  Based on the advice of the Reference Group, the program was adapted for use in Cape York and was evaluated using the RE-AIM framework and a combination of data sources.	Adaptations made to the original LEAPS professional development program in terms of program content, activities, resources, format, engagement of communities/educators, facilitation of the professional development and evaluation methods and tools.  Recommendations for adaptation summarised in a Table in the published article. Includes modifying content to suit, strengths-based approach, constituent involving facilitators, group discussion focus.	Surface and deep	An Aboriginal and Torres Strait Islander Reference Group was commissioned to provide advice about the appropriateness of the existing program for Aboriginal and Torres Strait Islander ECEC settings. The Reference Group went through a process of professional conversations and came to a consensus regarding the changes to the program	Prior to implementation	Due to complex cultural, historical, social factors, Aboriginal and Torres Strait Islander children face additional challenges to optimal health, particularly in remote areas of Australia.
12 Nitsos (2017) [16] (USA)	None referenced	1. Review or original by a certified paediatric nurse practitioner; 2. Spanish-language intervention team adapted and translated into Spanish an English; 3. Back-translated and checked for accuracy; 4. Intervention delivery by Spanish speaking nurse.	Brochure content adapted. Included as figures in the published article. Not explicitly stated in this article	Surface	Original was adapted with current and previous project team: including Spanish-language intervention team: bilingual (English-Spanish) and bicultural (Mexico-US) research assistants, and certified paediatric nurse	Prior to pilot test	Population at potential risk for not implementing Tummy Time effectively with their infants due to language barriers, cultural beliefs, poverty, challenges navigating the US healthcare system, and visa status

**Table S8: Effectiveness of culturally adapted intervention quantitative trials**

<b>Trial intervention name &amp; first author [ref]</b>	<b>Study design</b>	<b>Sample size</b>	<b>Statistically powered to assess effectiveness</b>	<b>Key child behavioural outcomes</b>	<b>Child weight outcomes</b>
<b>CHAMP Armstrong [2]</b>	RCT: cluster (protocol)	Not yet available	Yes, planned	Not yet available	Not yet available
<b>Hip-Hop to Health Jr. Fitzgibbon [4] [5]</b>	RCT: cluster	Latino target population – 401 children aged 3-5 years	Yes	No significant differences for primary or secondary outcomes (including dietary intake, physical activity, TV viewing) at post-intervention, Year 1, or Year 2 follow-up.	Child BMIz not significantly different at all timepoints.
		African-American target population – 409 children aged 3-5 years	Yes	Significant decreases in saturated fat intake versus control at 1-year follow-up, but not post intervention or 2-year follow-up. No other statistically significant behavioural outcomes.	Child BMIz significantly lower among intervention group at 1- and 2-year follow-up.
<b>ToyBox Hon [8]</b>	Case-control	281 children aged 4-6 years	No	Significantly reduced sedentary behaviour for children aged 5 and 6 years, but not significant for children aged 4 years.	Not measured
<b>Healthy Balance Linville [10]</b>	RCT: pilot trials	131 family members (66 adults and 65 children aged 3-5 years).	No	Study 1: no significant outcomes effects Study 2: significant improvements in parent BMI, neck circumference, and blood pressure	Child BMIz not significantly different
<b>HAPPY McEachan [12]</b>	RCT: feasibility	120 women and 120 babies from birth until aged 9 months	No	No significant outcome measurements (diet and physical activity)	Infant weight and length not significantly different
<b>Fit 5 Kids Mendoza [14]</b>	RCT: cluster	120 children aged 3-5 years	Yes	Significantly reduced children's TV viewing by more than 25 minutes/day	Not measured

RCT: Randomised Controlled Trial

BMI=Body Mass Index, kg/m<sup>2</sup>

**Table S9: Final Mixed Method Appraisal Tool (MMAT)\* scoring for included interventions**

Study design (5 categories) & Methodological quality criteria		AKTER	ARMSTRONG	BROYLES	FITZGIBBON	HIRATSUKA	HON	LINVILLE	MARSHALL#	McEACHAN	MENDOZA	MURTHA	NITSOS
Screening (for all categories of study design)													
S1	Are there clear research questions?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
S2	Do the collected data allow to address the research questions?	Yes	Yes (planned)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1. Qualitative													
1.1	Is the qualitative approach appropriate to answer the RQs?	Yes				Yes			Yes			Yes	Yes
1.2	Are the qualitative data collection methods adequate to address the RQs?	Yes				Yes			Yes			Yes	No
1.3	Are the findings adequately derived from the data?	Yes				Yes			Yes			Yes	Can't tell
1.4	Is the interpretation of results sufficiently substantiated by data?	Yes				Can't tell			Yes			Yes	Can't tell
1.5	Is there coherence between qualitative data sources, collection, analysis and interpretation?	Yes				Yes			Yes			Yes	Yes
2. Quantitative, randomised controlled trials													
2.1	Is randomisation appropriately performed?		Yes		Can't tell			No		Yes	Yes		
2.2	Are the groups comparable at baseline?		Can't tell		Yes			Yes		Yes	Yes		
2.3	Are there complete outcome data?		No		Yes			No		Yes	Yes		
2.4	Are outcome assessors blinded to the intervention provided?		Can't tell		Can't tell			Yes		Yes	Yes		
2.5	Did the participants adhere to the assigned intervention?		Can't tell		Yes			No		Yes	Can't tell		
3. Quantitative non-randomised													
3.1	Are the participants representative of the target population?			Can't tell			Yes					Yes	Can't tell
3.2	Are measurements appropriate regarding both the outcome and intervention (or exposure)?			Yes			Can't tell					Yes	Yes
3.3	Are there complete outcome data?			No			Can't tell					Can't tell	Can't tell
3.4	Are the confounders accounted for in the design?			Can't tell			Can't tell					Can't tell	No
3.5	During the study period, is the intervention administered (or exposure occurred) as intended?			Can't tell			Can't tell					No	Can't tell
4. Quantitative descriptive													
4.1	Is the sampling strategy relevant to address the RQs?												
4.2	Is the sample representative of the target population?												
4.3	Are measurements appropriate?												
4.4	Is the risk of nonresponse bias low?												
4.5	Is the statistical analysis appropriate to answer the research question?												
5. Mixed methods													
5.1	Is there an adequate rationale for using a mixed methods design to address the RQs?											Yes	No
5.2	Are the different components of the study effectively integrated to answer the RQ?											Yes	Yes
5.3	Are the outputs of the integration of qualitative and quantitative components adequately interpreted?											Yes	Can't tell
5.4	Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?											Yes	Can't tell
5.5	Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?											No	No

\*From: Hong QN, Gonzalez-Reyes A, Pluye P. Improving the usefulness of a tool for appraising the quality of qualitative, quantitative, and mixed methods studies, the Mixed Methods Appraisal Tool (MMAT). J Eval Clin Pract. 2018;24(3).

# MMAT scores for Marshall et al. were conducted by two assessors independently (not authors of this review). See the Methods section within the published article.

## References (Tables S6-S9)

1. Akter F, Rahman M, Pitchik HO, et al. Adaptation and Integration of Psychosocial Stimulation, Maternal Mental Health and Nutritional Interventions for Pregnant and Lactating Women in Rural Bangladesh. *Int J Environ Res Public Health*. 2020;17(17):6233. Published 2020 Aug 27. doi:10.3390/ijerph17176233
2. Armstrong B, Trude ACB, Johnson C, et al. CHAMP: A cluster randomized-control trial to prevent obesity in child care centers. *Contemp Clin Trials*. 2019;86:105849. doi:10.1016/j.cct.2019.105849
3. Broyles SL, Brennan JJ, Burke KH, Kozo J, Taras HL. Cultural adaptation of a nutrition education curriculum for Latino families to promote acceptance. *J Nutr Educ Behav*. 2011;43(4 Suppl 2):S158-S161. doi:10.1016/j.jneb.2011.02.014
4. Fitzgibbon ML, Stolley MR, Schiffer L, Van Horn L, KauferChristoffel K, Dyer A. Hip-Hop to Health Jr. for Latino preschool children. *Obesity (Silver Spring)*. 2006;14(9):1616-1625. doi:10.1038/oby.2006.186
5. Fitzgibbon ML, Stolley MR, Dyer AR, VanHorn L, KauferChristoffel K. A community-based obesity prevention program for minority children: rationale and study design for Hip-Hop to Health Jr. *Prev Med*. 2002;34(2):289-297. doi:10.1006/pmed.2001.0977
6. Fitzgibbon ML, Stolley MR, Schiffer L, Van Horn L, KauferChristoffel K, Dyer A. Two-year follow-up results for Hip-Hop to Health Jr.: a randomized controlled trial for overweight prevention in preschool minority children. *J Pediatr*. 2005;146(5):618-625. doi:10.1016/j.jpeds.2004.12.019
7. Hiratsuka VY, Parker ME, Sanchez J, et al. Cultural adaptations of evidence-based home-visitation models in tribal communities. *Infant Ment Health J*. 2018;39(3):265-275. doi:10.1002/imhj.21708
8. Hon KY, Chua BS, Hashmi SI. Effectiveness of ToyBox intervention to reduce sedentary behaviour among pre-school children: A case in Malaysia. *Pertanika J Soc Sci Humanit*. 2018;26(1). Available at <http://www.pertanika.upm.edu.my/pjssh/browse/regular-issue?article=JSSH-1975-2016>. Accessed 06 August 2021.
9. Reeves S, Poh BK, Cheah WL, et al. ToyBox Study Malaysia: a feasibility study to improve healthy energy balance and obesity-related behaviour. *Proceedings of the Nutrition Society*. 2020;79(OCE2):E313. doi:10.1017/S002966512000261X
10. Linville D, Mintz B, Martinez C, Gau JM, Shune S, Stice E. Preliminary Effects of Tailoring an Obesity Prevention Intervention Program for Latino Immigrant Families. *Fam Community Health*. 2020;43(2):118-130. doi:10.1097/FCH.0000000000000252
11. Marshall S, Taki S, Love P, et al. The process of culturally adapting the Healthy Beginnings early obesity prevention program for Arabic and Chinese mothers in Australia. *BMC Public Health*. 2021;21(1):284. Published 2021 Feb 4. doi:10.1186/s12889-021-10270-5
12. McEachan RRC, Santorelli G, Bryant M, et al. The HAPPY (Healthy and Active Parenting Programme for early Years) feasibility randomised control trial: acceptability and feasibility of an intervention to reduce infant obesity. *BMC Public Health*. 2016;16:211. Published 2016 Mar 1. doi:10.1186/s12889-016-2861-z
13. Taylor NJ, Sahota P, Sargent J, et al. Using intervention mapping to develop a culturally appropriate intervention to prevent childhood obesity: the HAPPY (Healthy and Active Parenting Programme for Early Years) study. *Int J Behav Nutr Phys Act*. 2013;10:142. Published 2013 Dec 28. doi:10.1186/1479-5868-10-142
14. Mendoza JA, Baranowski T, Jaramillo S, et al. Fit 5 Kids TV Reduction Program for Latino Preschoolers: A Cluster Randomized Controlled Trial. *Am J Prev Med*. 2016;50(5):584-592. doi:10.1016/j.amepre.2015.09.017
15. Murtha K, Thompson K, Cleland P, Gallegos D. Adaptation and evaluation of a nutrition and physical activity program for early childhood education settings in Aboriginal and Torres Strait Islander communities in remote Far North Queensland. *Health Promot J Austr*. 2021;32(2):163-171. doi:10.1002/hpja.352
16. Nitsos A, Estrada RD, Messias DKH. Tummy Time for Latinos With Limited English Proficiency: Evaluating the Feasibility of a Cultural and Linguistically Adapted Parent Education Intervention. *J Pediatr Nurs*. 2017;36:31-36. doi:10.1016/j.pedn.2017.04.004