

Title Page

Title: Barriers and facilitators to physical activity among ethnic Chinese children: a systematic review protocol

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1 **Title**

2 Barriers and facilitators to physical activity among ethnic Chinese children: a systematic review
3 protocol

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5 **Review objective**

6 The purpose of this systematic review is to summarize the barriers and facilitators to physical
7 activity among ethnic Chinese children.

8
9 **Introduction**

10 *Physical activity in childhood*

11 Health benefits of physical activity can be found in all age groups.^{1,2} In children, physical
12 activity promotes overall health, fitness and well-being.³ It enhances their body composition
13 and skeletal health and contributes to the prevention and delay of chronic diseases (e.g.
14 obesity, type 2 diabetes, hypertension and cardiovascular diseases).⁴⁻⁶ It improves their
15 psychological health, including self-esteem, and promotes social contacts and friendships.³ In
16 terms of learning, it improves their concentration power, and ability to set priorities and goals.⁷
17 It can improve their intellectual development and academic and physical performance.⁸⁻¹⁰ In
18 terms of economic benefits, it contributes to lower healthcare utilization and costs associated
19 with physical inactivity-related diseases.^{5,10,11} In children with disabilities, it contributes to their
20 overall development, quality of life, sense of self, social well-being and future health.^{7,8}

21 Overall, physical inactivity increases the risk of many adverse health conditions, especially
22 chronic diseases. For example, it contributes around 6% to the burden of coronary heart
23 disease, 7% to type 2 diabetes, 10% to breast cancer and colon cancer.⁵ Physical activity can
24 add around one year of life expectancy.⁵ According to the World Health Organization (WHO),
25 physical inactivity is the fourth leading risk factor of global mortality and is responsible for
26 around 6% of all deaths worldwide. Annually, it causes around 0.7, 1.6 and 1 million deaths in
27 high, middle and low income countries, respectively.¹²

28 An individual's childhood has been recognized as the most crucial period to promote the
29 uptake and adherence to physical activity.¹³⁻¹⁵ This period is recognized as the most physically
30 active period in a person's life.¹⁵ This period is an important transition point where the physical

activity level starts to decline.¹⁶ The 2013/2014 Health Behavior in School-Aged Children (HBSC) survey, conducted in 33 countries, reported a 9% and 10% decrease in moderate-to-vigorous physical activity (MVPA) among boys and girls from 11 to 15 years of age, respectively.¹⁷ According to the WHO's physical activity guideline, children should engage in at least 60 minutes of MVPA/day and reduce their sedentary time.¹⁸ However, globally, the physical activity level remains low among children. The data from 34 countries shows that only 24% and 15% of school-aged boys and girls are physically active, respectively.¹⁹

Physical activity among ethnic Chinese children

In China, the situation is even worse, and evidence suggests that the physical activity level among children has not improved over the past two decades.^{20,21} In 2014, only 9% of children were physically active, much lesser compared to many high-income countries. Around 25% of physically active children did not achieve the required intensity (MVPA).²² Usually, Chinese schools are evaluated in terms of their academic performances. Therefore, schools prefer to allocate their resources (including time) more on academic curriculums compared to physical activity.²³ In schools, health (physical) education and structured exercise programs do exist for these children. Health education sessions are delivered orally and/or in written format. Structured exercise sessions are run to achieve the recommended intensity and duration of physical activity. However, the development process of these programs remains questionable and most of these programs are not based on behavior change theories.²⁴⁻²⁶

Similarly, in many high-income countries, ethnic Chinese children are less physically active compared to children of other ethnic origins.^{4,27,28} For example, a study reported that around 45% of Chinese American children were not actively playing outdoor games and sports.²⁸ In these countries, ethnic Asian sub-groups are often aggregated as a homogenous group and the same generic physical activity promotion intervention is provided to all.^{4,27} The intervention that works in children of other ethnicities may not have the same positive impact on ethnic Chinese children.

There are socio-cultural issues which hinder physical activity among ethnic Chinese children. Generally, parents of ethnic Chinese children are more concerned about their child's safety

and academic achievements, which in turn promotes sedentary behavior and impedes physical activity.²⁹ After school hours and on weekends, these children spend more time on academic studies than on physical activity.²³ In addition, ethnic Chinese girls are less likely to engage in physical activity. In many conservative Chinese societies, there is a huge socio-cultural pressure on girls to avoid physical activity. The image of Chinese women does not fit well with being physically active.⁴ Thus, there is a need for a socio-culturally appropriate intervention for ethnic Chinese children, addressing their specific barriers to physical activity.

The rationale for the systematic review

Several qualitative studies and cross-sectional surveys have been conducted to determine the barriers and facilitators to physical activity among ethnic Chinese children.^{4,28-36} Until now, no systematic review on this topic has been published in English. A few systematic reviews on the same topic are available in Chinese, but they are extremely brief and limited in scope, and their quality remains questionable. They searched only a few Chinese databases with a limited search strategy and included only cross-sectional surveys.³⁷⁻⁴⁰ Overall, the findings from these studies can be grouped into four broad themes: (1) personal (e.g. unhealthy physical activity related behavior of children), (2) socio-cultural (e.g. parental pressure to perform well in academics and less on doing physical activity), (3) environmental (e.g. poor availability of and access to physical activity facilities, unsafe neighborhood for doing physical activity), and (4) policy- and program-related (e.g. inappropriate content and structure of physical activity programs, and those delivering these programs).

A child's residence can have an impact on their views, experiences, attitudes, understandings, perceptions and perspectives regarding barriers and facilitators to physical activity.⁴¹ Thus, in order to uncover any associated differences or similarities in their views, experiences, attitudes, understandings, perceptions and perspectives, our systematic review will separately analyse data from studies conducted in Chinese and non-Chinese territories. The aim of our systematic review is to summarize the personal, social, environmental and policy- and program-related barriers and facilitators to physical activity among ethnic Chinese children. In other words, the findings will be grouped into four broad themes, namely, (1) personal (relating to physical or psychological factors of children), (2) socio-cultural (relating to people the child would come in

contact with), (3) environmental (structural elements such as facilities and transport), and (4) policy- and program-related (relating to programs, organizations and staff).³ We will follow the Joanna Briggs Institute (JBI) systematic review process to ensure its quality.⁴² Both English and Chinese databases will be searched with a comprehensive search strategy. The review will include both qualitative studies and cross-sectional surveys and will be written in English for a wider dissemination among international readers.

Keywords

Physical activity, Chinese, Children

The systematic review process will adhere to the preferred reporting items for systematic reviews and meta-analyses (PRISMA) and JBI systematic reviews guidelines.^{42,43}

Inclusion and exclusion criteria

Types of participants

This review will include studies conducted among ethnic Chinese children (between 6 and 17 years of age) residing in either Chinese or non-Chinese territories or among people who have responsibility for them (such as their parents, guardians, teachers). The study will be excluded if the group mean age of ethnic Chinese children is <6 years or ≥18 years, or if it includes children of other ethnicities and not ethnic Chinese children. If it includes both ethnic Chinese children and children of other ethnicities, only the barriers and facilitators to physical activity among ethnic Chinese children will be extracted. The study will be excluded if it is not possible to extract these findings (i.e. not possible to distinguish between ethnic Chinese children and children of other ethnicities).

Phenomena of interest

This review will include studies that focus on the views, experiences, attitudes, understandings, perceptions and perspectives regarding the barriers and facilitators to physical activity.

Context

Any study setting will be included such as home, community and school, either in Chinese or non-Chinese territories.

Types of studies

The review will include studies that focus on qualitative data, including, but not limited to, designs such as phenomenology, ethnography, grounded theory and action research. Qualitative studies provide an in-depth understanding of the barriers and facilitators to physical activity among children, including identification and exploration of areas unknown to researchers.⁴⁴ We will also include cross-sectional surveys where free-text relating to the review question is reported within the paper.

Methods

Search strategy

An initial limited search was carried out in MEDLINE and China National Knowledge Infrastructure (CNKI) databases using the initial keywords, and these keywords were physical activity, barriers, facilitators, Chinese and children. The titles and abstracts of the studies were screened for keywords, and the index terms used to describe the article were also identified. The search results were inspected to ensure that the relevant articles were identified. We aim to search a wide range of sources, to find both published and unpublished studies. The following databases will be searched for published studies: MEDLINE (1946-present), EMBASE (1947-present), CINAHL (1937-present), PsycINFO (1806-present), BNI (1993-present), AMED (1985-present), Web of Science (1900-present), Scopus (1788-present), CNKI (1979-present), Wanfang (1995-present) and VIP (1989-present). The search strategy, to be used in MEDLINE, is detailed in Appendix 1. This search strategy will be adopted for other databases (including Chinese databases), in consultation with an information specialist/librarian. The search for unpublished studies will include EthOS, OpenGrey, ProQuest Dissertations and Theses, CNKI and Wanfang. The reference list of all the identified reviews and studies selected for inclusion in the review will be screened for additional studies. No language restrictions will be applied, and translations will be sought where necessary.

Screening and full-text reading

Following the search, all identified citations will be collated and uploaded into EndNote X8.2,⁴⁵ a reference management software. Subsequently, all the duplicate citations will be removed. Titles and abstracts will be screened for eligibility using the inclusion criteria by two reviewers independently (HW and KC/HB). Studies identified as potentially eligible or those without an abstract will have their full-text retrieved and their details will be imported into the JBI premier software for systematic review of the literature, system for the unified management, assessment and review of information (JBI SUMARI).⁴⁶ Full-text of the studies will be assessed against the inclusion criteria by two reviewers independently (HW and KC/HB). Full-text studies that do not meet the inclusion criteria will be excluded, and the reasons for exclusion will be reported. Any disagreements that arise between the two reviewers will be resolved through discussion. If consensus is not reached, then a third reviewer (KC/HB) will be involved.

Assessment of methodological quality

All studies, selected for inclusion, will be critically assessed, by two reviewers (HW and KC/HB) using the standardized critical appraisal tools incorporated within JBI SUMARI (one for qualitative studies and one for cross-sectional studies).^{42,47} These tools use a series of criteria that can be scored as being met (yes), not met (no) or unclear or where appropriate, not applicable (n/a) to that particular study. The two reviewers will independently go through each criterion as well as comment on it. Any disagreements that arise between the reviewers will be resolved through discussion. If consensus is not reached, then a third reviewer (KC/HB) will be involved. The results of critical appraisal for all questions will be presented in a table and narrated.

All studies, regardless of the results of their methodological quality, will undergo data extraction and synthesis, where possible. As recommended by JBI, a cut-off score will not be used to include/exclude studies as many studies are likely to be of poor quality.⁴² Apart from high-quality studies, poor quality studies can also generate potentially valuable insights. Together, they can lead to a richer understanding of the research phenomenon.⁴⁸

181

182 *Data extraction*

183 Data will be extracted from papers included in the review using the standardized data
184 extraction tool incorporated within JBI SUMARI,^{42,46} independently by two reviewers (HW and
185 KC/HB). Any disagreements that arise between the two reviewers will be resolved through
186 discussion. If consensus is not reached, then a third reviewer (KC/HB) will be involved. For
187 clarification or additional data, where necessary, the corresponding author of the included
188 paper will be contacted by email (two times per author). In the first phase of data extraction,
189 study characteristics will be extracted - study period, design, location (territory
190 (Chinese/non-Chinese) and country), phenomena of interest, context (such as home,
191 community and school), participant characteristics (such as age and gender), inclusion and
192 exclusion criteria, sample size, recruitment method, data collection procedure and tool, data
193 analysis technique and authors' conclusion. In the second phase of data extraction, specific
194 study findings will be extracted - barriers and facilitators to physical activity among ethnic
195 Chinese children. In addition, where possible, illustrations from the text that support these
196 findings will be extracted (one illustration per finding). The findings and illustrations will be the
197 actual verbatim words of the authors. The credibility of each finding will be assessed using the
198 following criteria:⁴²

- 199 ● Unequivocal: the finding is accompanied by an illustration that is beyond a reasonable
200 doubt and is not open to challenge.
- 201 ● Credible: the finding is accompanied by an illustration that is lacking a clear association
202 with it and is open to challenge.
- 203 ● Not supported: when neither unequivocal nor credible can be applied and when the most
204 notable findings are not supported by the data.

205

206 *Data synthesis*

207 In order to uncover any associated differences or similarities in the views, experiences,
208 attitudes, understandings, perceptions and perspectives regarding barriers and facilitators to
209 physical activity, the data from Chinese and non-Chinese territories will be analysed separately.

Study findings from all study designs will, where possible, be pooled using JBI SUMARI with the meta-aggregation approach.^{46,49} This will involve the aggregation or synthesis of findings to generate a set of statements that represent that aggregation, through assembling the findings and categorizing these findings on the basis of similarity in meaning. These categories will then be subjected to a synthesis in order to produce a single comprehensive set of synthesized findings. Where textual pooling is not possible, the findings will be presented in narrative form.

Assessing certainty in the findings

The final synthesized findings will be graded according to the ConQual approach for establishing confidence in the output of research synthesis and presented in a summary of findings table.⁵⁰ The table will include the major elements of the review and details how the ConQual score is developed. The table will include the title, population, phenomena of interest and context for the specific review. Each synthesized finding from the review will then be presented along with the type of research informing it, a score for dependability, credibility and the overall ConQual score.

Conflict of interest

The authors declare no conflict of interest.

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References

1. Concannon LG, Grierson MJ, Harrast MA. Exercise in the older adult: from the sedentary elderly to the masters athlete. *PM&R*. 2012; 4(11):833-9.
2. Biddle SJ, Asare M. Physical activity and mental health in children and adolescents: a review of reviews. *Br J Sports Med*. 2011; 45(11):886.
3. Shields N, Synnot AJ, Barr M. Perceived barriers and facilitators to physical activity for children with disability: a systematic review. *Br J Sports Med*. 2012; 46(14):989-97.
4. Diep CS, Leung R, Thompson D, Gor BJ, Baranowski T. Physical activity behaviors and Influences among Chinese–American children aged 9–13 Years: a qualitative study. *J Immigr Minor Health*. 2017; 19(2):358-66.
5. Lee IM, Shiroma EJ, Lobelo F, Puska P, Blair SN, Katzmarzyk PT. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *Lancet*. 2012; 380(9838):219-29.
6. Wu XY, Han LH, Zhang JH, Luo S, Hu JW, Sun K. The influence of physical activity, sedentary behavior on health-related quality of life among the general population of children and adolescents: a systematic review. *PLoS One*. 2017; 12(11):e0187668.
7. Anderson DM, Bedini LA, Moreland L. Getting all girls into the game: physically active recreation for girls with disabilities. *J Park Recreat Admi*. 2005; 23(4):78-104.
8. te Velde SJ, Lankhorst K, Zwinkels M, Verschuren O, Takken T, de Groot J, et al. Associations of sport participation with self-perception, exercise self-efficacy and quality of life among children and adolescents with a physical disability or chronic disease: a cross-sectional study. *Sports Med Open*. 2018; 4(1):38-48.
9. Pellicer-Chenoll M, Garcia-Massó X, Morales J, Serra-Añó P, Solana-Tramunt M, González L-M, et al. Physical activity, physical fitness and academic achievement in adolescents: a self-organizing maps approach. *Health Educ Res*. 2015; 30(3):436-48.
10. Black N, Hughes R, Jones AM. The health care costs of childhood obesity in Australia: an instrumental variables approach. *Econ Hum Biol*. 2018; 31:1-13.
11. Idler N, Teuner CM, Hunger M, Holle R, Ortlieb S, Schulz H, et al. The association between physical activity and healthcare costs in children—results from the GINIplus and LISApplus cohort studies. *BMC Public Health*. 2015; 15(1):437-49.

- 263 12. WHO. Global health risks-mortality and burden of disease attributable to selected major
264 risks. WHO. 2009. 10 p.
- 265 13. Telama R. Tracking of physical activity from childhood to adulthood: a review. *Obes Facts*.
266 2009; 2(3):187-95.
- 267 14. Direito A, Jiang Y, Whittaker R, Maddison R. Apps for improving fitness and increasing
268 physical activity among young people: the AImFIT pragmatic randomized controlled trial.
269 *J Med Internet Res*. 2015; 17(8):e210.
- 270 15. Gordon-Larsen P, Nelson MC, Popkin BM. Longitudinal physical activity and sedentary
271 behavior trends: adolescence to adulthood. *Am J Prev Med*. 2004; 27(4):277-83.
- 272 16. Hardman AE, Stensel DJ. Physical activity and health the evidence explained. 2nd ed.
273 Stensel DJ, editor. London: Routledge. 2009. 207 p.
- 274 17. WHO. Health Behavior in School-aged Children (HBSC) study: international report from
275 the 2013/2014 survey. WHO. 2016. 140 p.
- 276 18. WHO. Global recommendations on physical activity for health. WHO. 2010. 19 p.
- 277 19. Guthold R, Cowan MJ, Autenrieth CS, Kann L, Riley LM. Physical activity and sedentary
278 behavior among school children: a 34-country comparison. *J Pediatr*. 2010; 157(1):43-9.
- 279 20. Song Y, Zhang R, Yang TB, Zhang B, Dong B, Ma J. Current situation and cause analysis
280 of physical activity in Chinese primary and middle school students in 2010. *Journal of*
281 *Peking University (Health Science)*. 2012; 44(03):347-54.(In Chinese with English
282 abstract).
- 283 21. He LL, Lin L. The tendency of the physical activity level among school-aged urban
284 children in China. *Chinese Journal of School Health*. 2016; 37(04):636-40.(In Chinese).
- 285 22. Li PH, Wang M, Wang-Fu BH. Comparison of physical activity levels between Chinese
286 children and youth and global AHKC reports. *Chinese Journal of Health Education*. 2017;
287 33(02):99-102+19.(In Chinese with English abstract).
- 288 23. Ma JS, Wu JN. Why is the academic burden reduction policy hard to achieve? On the
289 nature and mechanism of time allocation of academic burden. *Journal of Beijing Normal*
290 *University (Social Sciences)*. 2014; (2):5-14(In Chinese).
- 291 24. Li M, Li S, Baur LA, Huxley RR. A systematic review of school-based intervention studies

for the prevention or reduction of excess weight among Chinese children and adolescents.
Oxford, UK2008. p. 548-59.

25. Gao Y, Griffiths S, Chan EYY. Community-based interventions to reduce overweight and obesity in China: a systematic review of the Chinese and English literature. *Journal of Public Health*. 2008;30(4):436-48.

26. Lin F, Wei DM, Lin ST, Maddison R, Mhurchu CN, Jiang YN, et al. Systematic review and meta-analysis of school-based obesity interventions in mainland China. *PLoS One*. 2017; 12(9):e0184704.

27. Kao D, Gulati AC, Lee RE. Physical activity among Asian American adults in Houston, Texas: data from the health of Houston survey 2010. *J Immigr Minor Health*. 2016; 18(6):1470-81.

28. Chomitz VR, Brown A, Lee V, Must A, Chui KKH. Healthy living behaviors among Chinese–American preschool-aged children: results of a parent survey. *J Immigr Minor Health*. 2018; 20(4):926-35.

29. Suen Y-n, Cerin E, Wu S-l. Parental practices encouraging and discouraging physical activity in Hong Kong Chinese preschoolers. *J Phys Act Health*. 2015; 12(3):361-9.

30. He G, Cerin E, Huang WY, Wong SH. Understanding neighborhood environment related to Hong Kong children's physical activity: a qualitative study using nominal group technique. *PLoS One*. 2014; 9(9):e106578.

31. Li B, Lin R, Liu W, Chen J, Liu W, Cheng K, et al. Differences in perceived causes of childhood obesity between migrant and local communities in China: a qualitative study. *PLoS One*. 2016;12(5):e0177505.

32. Li X, Zhou X, Hesketh T. Experiences and perspectives of children attending a weight loss camp in China: a qualitative study. *Child Care Health Dev*. 2016; 42(5):644-51.

33. Zhang R, Li HF. Associated factors of physical exercise participation among primary and middle school students in Jinagsu. *Chinese Journal of School Health*. 2017; 38(12):1793-5.(In Chinese with English abstract).

34. Chen LH, Zou YL, Song Y, Liu ZY. Physical activities of primary and middle school students and its influential factors in Jiangsu province. *Journal of Sports Adult Education*. 2011; (04):92-4.(In Chinese with English abstract).

- 322 35. Guan Y. The physical activity of teenagers and influence factors in big cities in China.
323 Journal of Tianjin University of Sport. 2005; 20(03):28-31.(In Chinese with English
324 abstract).
- 325 36. Cheng KY, Cheng PG, Mak KT, Wong SH. Relationships of perceived benefits and
326 barriers to physical activity, physical activity participation and physical fitness in Hong
327 Kong female adolescents. J Sports Med Phys Fitness. 2003; 43(4):523-9.
- 328 37. He Q. Analysis of influential factors to the formation of exercise habits among primary and
329 middle school students. Contemporary Sports Technology. 2015; 5(11):252-3.(In
330 Chinese).
- 331 38. Liu F, Xie CL. The review of the extracurricular exercise participation among middle
332 school students. Modern Communication. 2011 May; (05):117-8.(In Chinese).
- 333 39. Qian JL, Ma D. The review of the exercise and sports among middle school students.
334 Sports World (Scholarly). 2014 August; (08):60-2.(In Chinese).
- 335 40. Yuan AG, Lei Y. Discussion on the influencing factors and countermeasure of physical
336 health in elementary school students. Journal of Shaoyang University (Natural Science
337 Edition). 2017; (6):77-83.(In Chinese with English abstract).
- 338 41. Masoumi HE. Associations of built environment and children's physical activity: a
339 narrative review. Rev Environ Health. 2017;32(4):315-31.
- 340 42. Lockwood C, Porritt K, Munn Z, Rittenmeyer L, Salmond S, Bjerrum M, et al. Chapter 2:
341 systematic reviews of qualitative evidence. In: Aromataris E, Munn Z, editors. Joanna
342 Briggs Institute Reviewer's Manual [Internet]. Adelaide (AU): The Joanna Briggs Institute.
343 2017 [cited 2018 Apr 24. Available from <https://reviewersmanual.joannabriggs.org/>
- 344 43. Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gøtzsche PC, Ioannidis JP, et al. The
345 PRISMA statement for reporting systematic reviews and meta-analyses of studies that
346 evaluate health care interventions: explanation and elaboration. PLoS Med. 2009;
347 6(7):e1000100.
- 348 44. Hesketh K, Lakshman R, Sluijs E. Barriers and facilitators to young children's physical
349 activity and sedentary behavior: a systematic review and synthesis of qualitative literature.
350 Obes Rev. 2017; 18(9):987-1017.
- 351 45. Endnote X8.2. Clarivate Analytics, PA, USA [Internet]. Endnote. 2017 [cited 2018 Apr 24].

352 Available from: <http://endnote.com>.

353 46. Joanna Briggs Institute. The System for the Unified Management, Assessment and
354 Review of Information (SUMARI). 2017 [cited 2018 Apr 24]. Available from:
355 <https://www.jbisumari.org/>.

356 47. Munn Z, Moola S, Lisy K, Riitano D, Tufanaru C. Chapter 5: systematic reviews of
357 prevalence and incidence. In: Aromataris E, Munn Z, editors. Joanna Briggs Institute
358 Reviewer's Manual [Internet]. Adelaide (AU): The Joanna Briggs Institute. 2017 [cited
359 2018 Apr 24]. Available from <https://reviewersmanual.joannabriggs.org/>.

360 48. Dixon-Woods M, Booth A, Sutton AJ. Synthesizing qualitative research: a review of
361 published reports. *Qualitative Research*. 2007; 7(3):375-422.

362 49. Lockwood C, Munn Z, Porritt K. Qualitative research synthesis: methodological guidance
363 for systematic reviewers utilizing meta-aggregation. *Int J Evid Based Healthc*. 2015;
364 13(3):179-87

365 50. Munn Z, Porritt K, Lockwood C, Aromataris E, Pearson A. Establishing confidence in the
366 output of qualitative research synthesis: the ConQual approach. *BMC Med Res Methodol*.
367 2014; 14(1):108-14.

368 **Appendix 1**

369 **Search strategy**

370 **1.** exp physical fitness/

371 **2.** exp physical education and training/

372 **3.** exp exercise/

373 **4.** exp sports/

374 **5.** exp sedentary lifestyle/

375 **6.** (physical adj (fitness OR education OR training OR activit* OR inactivit*)).mp.

376 **7.** (exercise* OR sport* OR sedentariness).mp.

377 **8.** (sedentary adj (lifestyle OR behavio\$r)).mp.

378 **9.** 1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8

379 **10.** (barrier* OR imped* OR challenge* OR hinder* OR hindrance* OR obstacle*

380 OR obstruct* OR deter* OR facilitat*).mp.

381 **11.** exp qualitative research/

382 **12.** exp interview/

383 **13.** exp focus groups/

384 **14.** exp cross-sectional studies/

385 **15.** exp surveys and questionnaires/

386 **16.** (qualitative OR interview* OR focus group* OR cross-sectional OR cross sectional OR

387 survey*).mp.

388 **17.** 11 OR 12 OR 13 OR 14 OR 15 OR 16

389 **18.** 10 OR 17

390 **19.** exp child/

391 **20.** exp adolescent/

392 **21.** exp students/

393 **22.** exp minors/

394 **23.** (child* OR adolescen* OR student* OR minor* OR kid* OR teen* OR youth* OR young OR

395 juvenile*).mp.

396 **24.** 19 OR 20 OR 21 OR 22 OR 23

397 **25.** exp Asian Continental Ancestry Group/

398 **26.** exp China/

399 **27.** (Chinese OR China).mp

400 **28.** 25 OR 26 OR 27

401 **29.** 9 AND 18 AND 24 AND 28

402