

1. Mottola MF, Davenport MH, Ruchat SM, et al. 2019 Canadian guideline for physical activity throughout pregnancy. *Br J Sports Med.* 2018;52:1339–46.
2. ACNM - American College of Nurse-Midwives. Exercise in pregnancy. *J Midwif Women's Health.* 4–59:473;2014 .
3. ACOG - American College of Obstetricians and Gynecologists. ACOG Committee Opinion No. 804: Physical activity and exercise during pregnancy and the postpartum period. *Obstet Gynecol.* 2020;135(4):e178–e88.
4. SMA - Sport Medicine Australia. SMA statement the benefits and risks of exercise during pregnancy. Sydney Olympic Park, NSW: SMA; 2016. <http://sma.org.au/publications-media/sma-position-statements/>. Accessed 31 Dec 2017.
5. ACSM - American College of Sports Medicine. ACSM's guidelines for exercise testing and prescription. 11th ed. Baltimore, MD: Wolters Kluwer; 2021.
6. Cramer MS. Aerobic exercise for women during pregnancy. *Cochrane Database Syst Rev.* 2;2002 :CD000180.
7. Brown W. The benefits of physical activity during pregnancy. *J Sci Med Sport.* 2002;5(1):37–45.
8. Downs DS, Chasan-Taber L, Evenson KR, Leiferman J, Yeo S. Physical activity and pregnancy: past and present evidence and future recommendations. *Res Q Exerc Sport.* 2012;83(4):485–502.
9. Kader M, Naim-Shuchana S. Physical activity and exercise during pregnancy. *Eur J Physiother.* 2014;16(129):
10. Perales M, Santos-Lozano A, Ruiz JR, Lucia A, Barakat R. Benefits of aerobic or resistance training during pregnancy on maternal health and perinatal outcomes: a systematic review. *Early Hum Dev.* 2016;94:43–8.
11. Díaz-Burruero JR, Cano-Ibáñez N, Martín-Peláez S, Khan KS, Amezcua-Prieto C. Effects on the maternal-fetal health outcomes of various physical activity types in healthy pregnant women. A systematic review and meta-analysis. *Eur J Obstet Gynecol Reprod Biol.* 2021;262:203–15.
12. Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Rep.* 1985;100(2):126–31.
13. Boome T. Regular exercise and disease prevention. ASEP's exercise medicine text for exercise physiologists. Sharjah: Bentham Science Publishers; 2016. p. 3–31. Chapter 1.
14. ACSM - American College of Sports Medicine. ACSM's resources for the exercise physiologist. 2nd ed. Alphen aan den Rijn: Wolters Kluwer; 2018.
15. Bull FC, Al-Ansari SS, Biddle S, Borodulin K, Buman MP, Cardon G, et al. World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *Br J Sports Med.* 2020;54(24):1451–62.
16. Kohl HW III, Craig CL, Lambert EV, Inoue S, Alkandari JR, Leetongin G, Kahlmeier S, Lancet Physical Activity Series Working Group. The pandemic of physical inactivity: global action for public health. *Lancet.* 2012;380(9838):294–305.
17. Blair SN. Physical inactivity: the biggest public health problem of the 21st century. *Br J Sports Med.* 2009;43:1–2.
18. Kohl HW III, Murray TD. Foundations of physical activity and public health. Champaign, IL: Human Kinetics; 2012.
19. Davies M, Macdowall W, editors. Health promotion theory. London: Open University Press; 2006.
20. da Saúde DG. Programa nacional para a vigilância da gravidez de baixo risco (National program for low-risk pregnancy vigilance). Lisboa: DGS; 2015. [Portuguese].
21. Tones K, Tilford S. Health education. Effectiveness, efficiency and equity. 2nd ed. London: Chapman & Hall; 1994.
22. Canário R. Educação de adultos: Um campo e uma problemática (adult education: a field and a problematic). Lisboa: Educa; 1999. [Portuguese].
23. Quintas H. Educação de adultos: vida no currículo e currículo na vida. Perspectivas e reflexões [Adult education: life in a curriculum and curriculum in life]. 1st ed. Lisboa: Agência Nacional para a Qualificação, I.P; 2008. [Portuguese].
24. Barradas A, et al. Livro de bolso: Enfermeiras especialistas em saúde materna e obstétrica/parteiras (pocket book: Midwives). Lisboa: Ordem dos Enfermeiros; 2015. [Portuguese]. http://www.ordemenfermeiros.pt/publicacoes/Documents/LivroBolso_EESMO.pdf. Accessed 30 Dec 2017.
25. Bowden J, Manning V. Health promotion in midwifery: principles and practice. 3rd ed. Boca Raton, FL: CRC Press; 2016.
26. Whitworth M, Dowswell T. Routine pre-pregnancy health promotion for improving pregnancy outcomes. *Cochrane Database Syst Rev.* 2009;7(4):CD007536.
27. dos Enfermeiros O. Regulamento dos padrões de qualidade dos cuidados especializados em enfermagem de saúde materna, obstétrica e ginecológica (Regulation on quality pattern of nurse care in obstetrics and gynecologic woman health). Lisboa: Ordem dos Enfermeiros; 2011. [Portuguese]. https://membros.ordemenfermeiros.pt/AssembleiasGerais/Documents/AG2011/Ponto10_Reg%20PQCEE%20SMOG.pdf. Accessed Oct 2017.
27. dos Enfermeiros O. Recomendação nº 2/2012: Recomendações para a preparação para o nascimento [Recommendations for birth preparation]. Lisboa: Ordem dos Enfermeiros; 2012. [Portuguese]. http://www.ordemenfermeiros.pt/colegios/Documents/Recomendacao_2-2012.pdf. Accessed Oct 2017.
29. Liguori G, Gallé F, Valeriani F, Romano Spica V. The role of the hygienist in prevention and health promotion through physical activity: the contribute of the Working Group "Movement Sciences for Health" of the Italian Society of Hygiene. *Ann Ig.* 2015;27(1):11–5.
30. Nascimento SL, Surita FG, Godoy AC, Kasawara KT, Morais SS. Physical activity patterns and factors related to exercise during pregnancy: a cross sectional study. *PLoS One.* 2015;10(6):e0128953.
31. Meah VL, Davies GA, Davenport MH. Why can't I exercise during pregnancy? Time to revisit medical 'absolute' and 'relative' contraindications: systematic review of evidence of harm and a call to action. *Br J Sports Med.* 2020;54(23):1395–404.
32. Gaston A, Vamos CA. Leisure-time physical activity patterns and correlates among pregnant women in Ontario, Canada. *Matern Child Health J.* 2013;17(3):477–84.
33. McParlin C, Bell R, Robson SC, Muirhead C, Araújo-Soares V. What helps or hinders midwives to implement physical activity guidelines for obese pregnant women? A questionnaire survey using the Theoretical Domains Framework. *Midwifery.* 2017;49:110–6.
34. Whitaker KM, Baruth M, Schlaff RA, Talbot H, Connolly CP, Liu J, Wilcox S. Provider advice on physical activity and nutrition in twin pregnancies: a cross-sectional electronic survey. *BMC Pregnant Childb.* 2019;19(1):418.
35. Krans EE, Gearhart JG, Dubbert PM, Klar PM, Miller AL, Replogle WH. Pregnant women's beliefs and influences regarding exercise during pregnancy. *J Miss State Med Assoc.* 2005;46(3):67–73.
36. Pivarnik JM, Chambliss H, Clapp J III, et al. Impact of physical activity during pregnancy and postpartum on chronic disease risk. *Med Sci Sports Exerc.* 2006;38(5):989–1006.
37. Gilmore LA, Klempel-Donchenko M, Redman LM. Pregnancy as a window to future health: excessive gestational weight gain and obesity. *Semin Perinatol.* 2015;39(4):296–303.
38. Institute of Medicine. Weight Gain During pregnancy: reexamining the guidelines. Washington, DC: The National Academies Press; 2009.
39. Goldstein RF, Abell SK, Ranasinha S, Misso M, Boyle JA, Black MH, Li N, Hu G, Corrado F, Rode L, Kim YJ, Haugen M, Song WO, Kim MH, Bogaerts A, Devlieger R, Chung JH, Teede HJ. Association of Gestational Weight Gain With Maternal and Infant Outcomes: a systematic review and meta-analysis. *JAMA.* 2017;317(21):2207–25.
40. Lau EY, Liu J, Archer E, McDonald SM, Liu J. Maternal weight gain in pregnancy and risk of obesity among offspring: a systematic review. *J Obes.* 2014;2014:524939.
41. Elliott-Sale KJ, Barnett CT, Sale C. Exercise interventions for weight management during pregnancy and up to 1 year postpartum among normal weight, overweight and obese women: a systematic review and meta-analysis. *Br J Sports Med.* 2015;49(20):1336–42.
42. Muktabant B, Lawrie TA, Lumbiganon P, Laopaiboon M. Diet or exercise, or both, for preventing excessive weight gain in pregnancy. *Cochrane Database Syst Rev.* 2015;15(6):CD007145.
43. da Silva SG, Ricardo LI, Evenson KR, Hallal PC. Leisure-time physical activity in pregnancy and maternal-child health: a systematic review and meta-analysis of randomized controlled trials and cohort studies. *Sports Med.* 2017;47(2):295–317.
44. Nehring I, Schmolz S, Beyerlein A, Hauner H, von Kries R. Gestational weight gain and longterm postpartum weight retention: a meta-analysis. *Am J Clin Nutr.* 2011;94(5):1225–31.
45. Fraser A, Tilling K, Macdonald-Wallis C, Hughes R, Sattar N, Nelson SM, et al. Associations of gestational weight gain with maternal body mass index, waist circumference, and blood pressure measured 16 y after pregnancy: the Avon Longitudinal Study of Parents and Children (ALSPAC). *Am J Clin Nutr.* 2011;93:1285–92.
46. Ronnberg A, Hanson U, Östlund I, Nilsson K. Effects on postpartum weight retention after antenatal lifestyle intervention - a secondary analysis of a randomized controlled trial. *Acta Obstet Gynecol Scand.* 2016;95(9):999–1007.
47. Phelan S, Phipps MG, Abrams B, Darroch F, Grantham K, Schaffner A, et al. Does behavioral intervention in pregnancy reduce postpartum weight

- retention? Twelve-month outcomes of the Fit for Delivery randomized trial. *Am J Clin Nutr.* 2014;99:302–11.
48. Althuisen E, van der Wijden CL, van Mechelen W, Seidell JC, van Poppel MN. The effect of a counselling intervention on weight changes during and after pregnancy: a randomised trial. *BJOG.* 2013;120(1):92–9.
 49. Rauh K, Günther J, Kunath J, Stecher J, Hauner H. Lifestyle intervention to prevent excessive maternal weight gain: mother and infant follow-up at 12 months postpartum. *BMC Pregnant Childb.* 2015;15:265.
 50. Dalrymple KV, Flynn AC, Relph SA, O’Keeffe M, Poston L. Lifestyle Interventions in overweight and obese pregnant or postpartum women for postpartum weight management: a systematic review of the literature. *Nutrients.* 2018;10:1704.
 51. Perales M, Nagpal TS, Barakat R. Physiological changes during pregnancy. Main adaptations and discomforts and implications for physical activity and exercise. In: Santos-Rocha R, editor. *Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines.* 2nd ed. Cham: Springer International Publishing; 2022. Chapter 3.
 52. Catalano PM, Tyzbir ED, Roman NM, Amini SB, Sims EA. Longitudinal changes in insulin release and insulin resistance in nonobese pregnant women. *Am J Obstet Gynecol.* 1991;165:1667–72.
 53. Bellamy L, Casas JP, Hingorani AD, Williams D. Type 2 diabetes mellitus after gestational diabetes: a systematic review and meta-analysis. *Lancet.* 2009;373:1773–9.
 54. Sanabria-Martínez G, García-Hermoso A, Poyatos-León R, Álvarez-Bueno C, Sánchez-López M, Martínez-Vizcaino V. Effectiveness of physical activity interventions on preventing gestational diabetes mellitus and excessive maternal weight gain: a meta-analysis. *BJOG.* 2015;122(9):1167–74.
 55. Song C, Li J, Leng J, Ma RC, Yang X. Lifestyle intervention can reduce the risk of gestational diabetes: a meta-analysis of randomized controlled trials. *Obes Rev.* 2016;17(10):960–9.
 56. Guo J, Chen JL, Whitemore R, Whitaker E. Postpartum lifestyle interventions to prevent type 2 diabetes among women with history of gestational diabetes: a systematic review of randomized clinical trials. *J Women’s Health (Larchmt).* 2016;25(1):38–49.
 57. Lo JO, Mission JF, Caughey AB. Hypertensive disease of pregnancy and maternal mortality. *Curr Opin Obstet Gynecol.* 2013;25(2):124–32.
 58. Brown MC, Best KE, Pearce MS, Waugh J, Robson SC, Bell R. Cardiovascular disease risk in women with pre-eclampsia: systematic review and meta-analysis. *Eur J Epidemiol.* 2013;28(1):1–19.
 59. Magro-Malosso ER, Saccone G, Di Tommaso M, Roman A, Berghella V. Exercise during pregnancy and risk of gestational hypertensive disorders: a systematic review and meta-analysis. *Acta Obstet Gynecol Scand.* 2017;96(8):921–31.
 60. Aune D, Saugstad OD, Henriksen T, Tonstad S. Physical activity and the risk of preeclampsia: a systematic review and meta-analysis. *Epidemiology.* 2014;25(3):331–43.
 61. Haakstad LA, Bø K. Effect of regular exercise on prevention of excessive weight gain in pregnancy: a randomised controlled trial. *Eur J Contracept Reprod Healthc.* 2011;16:116–25.
 62. Vallim AL, Osis MJ, Cecatti JG, et al. Water exercises and quality of life during pregnancy. *Reprod Health.* 2011;8:14.
 63. Montoya Arizabaleta AV, Orozco Buitrago L, Aguilar de Plata AC, et al. Aerobic exercise during pregnancy improves health-related quality of life: a randomised trial. *J Physiother.* 2010;56:253–8.
 64. Barakat R, Pelaez M, Montejo R, et al. Exercise during pregnancy improves maternal health perception: a randomized controlled trial. *Am J Obstet Gynecol.* 2011;204:402.e1–7, 19.
 65. Bolton CE, Bush A, Hurst JR, Kotecha S, McGarvey L. Lung consequences in adults born prematurely. *Postgrad Med J.* 2015;91(1082):712–8.
 66. Pyhälä R, Wolford E, Kautiainen H, Andersson S, Bartmann P, Baumann N, Brubakk AM, Evensen KAI, Hovi P, Kajantie E, Lahti M, Van Lieshout RJ, Saigal S, Schmidt LA, Indredavik MS, Wolke D, Räikkönen K. Self-reported mental health problems among adults born preterm: a meta-analysis. *Pediatrics.* 2017;139(4):e20162690.
 67. Hammami M, Walters JC, Hockman EM, et al. Disproportionate alterations in body composition of large for gestational age neonates. *J Pediatr.* 2001;138:817–21.
 68. Rogers IS, Ness AR, Steer CD, et al. Associations of birth size and dual-energy X-ray absorptiometry measures of lean and fat mass at 9 to 10 y of age. *Am J Clin Nutr.* 2006;84:739–47.
 69. Simpson J, Smith AD, Fraser A, et al. Programming of adiposity in childhood and adolescence: associations with birth weight and cord blood adipokines. *J Clin Endocrinol Metab.* 2017;102:499–506.
 70. Magro-Malosso ER, Saccone G, Di Mascio D, Di Tommaso M, Berghella V. Exercise during pregnancy and risk of preterm birth in overweight and obese women: a systematic review and meta-analysis of randomized controlled trials. *Acta Obstet Gynecol Scand.* 2017;96(3):263–73.
 71. Vamos CA, Flory S, Sun H, DeBate R, Bleck J, Thompson E, Merrell L. Do physical activity patterns across the lifecourse impact birth outcomes? *Matern Child Health J.* 2015;19(8):1775–82.
 72. Di Mascio D, Magro-Malosso ER, Saccone G, Marhefka GD, Berghella V. Exercise during pregnancy in normal-weight women and risk of preterm birth: a systematic review and metaanalysis of randomized controlled trials. *Am J Obstet Gynecol.* 2016;215(5):561–71.
 73. Bisson M, Lavoie-Guénette J, Tremblay A, Marc I. Physical activity volumes during pregnancy: a systematic review and meta-analysis of observational studies assessing the association with infant’s birth weight. *AJP Rep.* 2016;6(2):e170–97.
 74. Wiebe HW, Boulé NG, Chari R, Davenport MH. The effect of supervised prenatal exercise on fetal growth: a meta-analysis. *Obstet Gynecol.* 2015;125(5):1185–94.
 75. Clapp JF III, Capeless EL. Neonatal morphometrics after endurance exercise during pregnancy. *Am J Obstet Gynecol.* 1990;163(6 Pt 1):1805–11.
 76. Clapp JF III. Morphometric and neurodevelopmental outcome at age five years of the offspring of women who continued to exercise regularly throughout pregnancy. *J Pediatr.* 1996;129:856–63.
 77. Harrod CS, Chasan-Taber L, Reynolds RM, et al. Physical activity in pregnancy and neonatal body composition: the Healthy Start study. *Obstet Gynecol.* 2014;124(2 Pt 1):257–64.
 78. Bisson M, Tremblay F, St-Onge O, Robitaille J, Pronovost E, Simonyan D, Marc I. Influence of maternal physical activity on infant’s body composition. *Pediatr Obes.* 2017;12(Suppl 1):38–46.
 79. Hopkins SA, Baldi JC, Cutfeld WS, McCowan L, Hofman Hopkins PL. Exercise training in pregnancy reduces offspring size without changes in maternal insulin sensitivity. *J Clin Endocrinol Metab.* 2010;95:2080–8.
 80. Baroni NF, Baldoni NR, Alves GCS, Crivellenti LC, Braga GC, Sartorelli DS. Do lifestyle interventions in pregnant women with overweight or obesity have an effect on neonatal adiposity? A systematic review with meta-analysis. *Nutrients.* 2021;13(6):1903.
 81. Mourtakos SP, Tambalis KD, Panagiotakos DB, Antonogeorgos G, Arnaoutis G, Karteroliotis K, Sidossis LS. Maternal lifestyle characteristics during pregnancy, and the risk of obesity in the offspring: a study of 5,125 children. *BMC Pregnant Childb.* 2015;15:66.
 82. Mudd LM, Pivarnik J, Holzman CB, Paneth N, Pfeiffer K, Chung H. Leisure-time physical activity in pregnancy and the birth weight distribution: where is the effect? *J Phys Act Health.* 2012;9(8):1168–77.
 83. Evenson KR, Barakat R, Brown WJ, Dargent-Molina P, Haruna M, Mikkelsen EM, Mottola MF, Owe KM, Rousham EK, Yeo S. Guidelines for physical activity during pregnancy: comparisons from around the world. *Am J Lifestyle Med.* 2014;8(2):102–21.
 84. Evenson KR, Savitz DA, Huston SL. Leisure-time physical activity among pregnant women in the US. *Paediatr Perinat Epidemiol.* 2004;18:400–7.
 85. Rousham EK, Clarke PE, Gross H. Significant changes in physical activity among pregnant women in the UK as assessed by accelerometry and self-reported activity. *Eur J Clin Nutr.* 2006;60(3):393–400.
 86. Borodulin KM, Evenson KR, Wen F, Herring AH, Benson AM. Physical activity patterns during pregnancy. *Med Sci Sports Exerc.* 2008;40(11):1901–8.
 87. Bauman AE, Reis RS, Sallis JF, Wells JC, Loos RJ, Martin BW. Correlates of physical activity: why are some people physically active and others not? *Lancet.* 2012;380(9838):258–71.
 88. Bauman AE, Sallis JF, Dzawaltowski DA, Owen N. Toward a better understanding of the influences on physical activity: the role of determinants, correlates, causal variables, mediators, moderators, and confounders. *Am J Prev Med.* 2002;23(2 Suppl):5–14.
 89. Gaston A, Cramp A. Exercise during pregnancy: a review of patterns and determinants. *J Sci Med Sport.* 2011;14:299–305.
 90. Chasan-Taber L, Schmidt MD, Pekow P, Sternfeld B, Manson J, Markenson G. Correlates of physical activity in pregnancy among Latina women. *Matern Child Health J.* 2007;11(4):353–63.
 91. Haakstad LA, Voldner N, Henriksen T, Bø K. Why do pregnant women stop exercising in the third trimester? *Acta Obstet Gynecol Scand.* 2009;88(11):1267–75.
 92. Owe KM, Nystad W, Bø K. Correlates of regular exercise during pregnancy: the Norwegian mother and child cohort study. *Scand J Med Sci Sports.*

2009;19(5):637–45.

93. Zhang Y, Dong S, Zuo J, Hu X, Zhang H, Zhao Y. Physical activity level of urban pregnant women in Tianjin, China: a cross-sectional study. *PLoS One*. 2014;9(10):e109624.
94. Broberg L, Ersboll AS, Backhausen MG, Damm P, Tabor A, Hegaard HK. Compliance with national recommendations for exercise during early pregnancy in a Danish cohort. *BMC Pregnanc Childb*. 2015;15:317.
95. Petersen AM, Leet TL, Brownson RC. Correlates of physical activity among pregnant women in the United States. *Med Sci Sports Exerc*. 2005;37(10):1748–53.
96. Schmidt MD, Pekow P, Freedson PS, Markenson G, Chasan-Taber L. Physical activity patterns during pregnancy in a diverse population of women. *J Women's Health*. 2006;15(8):909–18.
97. Juhl M, Madsen M, Andersen AM, Andersen PK, Olsen J. Distribution and predictors of exercise habits among pregnant women in the Danish National Birth Cohort. *Scand J Med Sci Sports*. 2012;22(1):128–38.
98. Jukic AMZ, Evenson KR, Herring AH, Wilcox AJ, Hartmann KE, Daniels JL. Correlates of physical activity at two time points during pregnancy. *J Phys Act Health*. 2012;9(3):325–35.
99. Gjesåland K, Bø K, Owe KM, Eberhard-Gran M. Do pregnant women follow exercise guidelines? Prevalence data among 3482 women, and prediction of low-back pain, pelvic girdle pain and depression. *Br J Sports Med*. 2013;47(8):515–20.100. Hinton PS, Olson CM. Predictors of pregnancy-associated change in physical activity in a rural white population. *Matern Child Health J*. 2001;5(1):7–14.
101. Liu J, Blair SN, Teng Y, Ness AR, Lawlor DA, Riddoch C. Physical activity during pregnancy in a prospective cohort of British women: results from the Avon longitudinal study of parents and children. *Eur J Epidemiol*. 2011;26(3):237–47.
102. Evenson KR, Wen F. Prevalence and correlates of objectively measured physical activity and sedentary behavior among US pregnant women. *Prev Med*. 2011;53(1–2):39–43.
103. Jones MA, Whitaker K, Wallace M, Barone Gibbs B. Demographic, socioeconomic, and health-related predictors of objectively measured sedentary time and physical activity during pregnancy. *J Phys Act Health*. 2021;18:1–8.
104. Szumilewicz A, Worska A, Santos-Rocha R, Oviedo-Caro MA. Evidence-based and practiceoriented guidelines for exercising during pregnancy. In: Santos-Rocha R, editor. *Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines*. 2nd ed. Cham: Springer International Publishing; 2022. Chapter 7.
105. Santos-Rocha R, Corrales-Gutierrez I, Szumilewicz A, Pajaujene S. Exercise testing and prescription during pregnancy. In: Santos-Rocha R, editor. *Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines*. 2nd ed. Cham: Springer International Publishing; 2022. Chapter 8.
106. Szumilewicz A, Santos-Rocha R. Exercise selection during pregnancy. In: Santos-Rocha R, editor. *Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines*. 2nd ed. Cham: Springer International Publishing; 2022. Chapter 9.
107. Zhang J, Savitz DA. Exercise during pregnancy among US women. *Ann Epidemiol*. 1996;6(1):53–9.
108. Symons Downs D, Hausenblas HA. Women's exercise beliefs and behaviors during their pregnancy and postpartum. *J Midwif Womens Health*. 2004;49(2):138–44.
109. Clarke PE, Rousham EK, Gross H, Halligan AW, Bosio P. Activity patterns and time allocation during pregnancy: a longitudinal study of British women. *Ann Hum Biol*. 2005;32(3):247–58.
110. Poudevigne MS, O'Connor PJ. A review of physical activity patterns in pregnant women and their relationship to psychological health. *Sports Med*. 2006;36(1):19–38.
111. Domingues MR, Barros AJD. Leisure-time physical activity during pregnancy in the 2004 Pelotas Birth Cohort Study. *Rev Saude Publica*. 2007;41(2):173–80.
112. Tendais I, Figueiredo B, Mota J. Actividade física e qualidade de vida na gravidez. *Aná Psicológica*. 2007;25(3):489–501. [Portuguese].
113. Gouveia R, Martins S, Sandes AR, Nascimento C, Figueira J, Valente S, Correia S, Rocha E, Silva LJ. Gravidez e exercício – mitos, evidências e recomendações. *Acta Medica Port*. 2007;20:209–14. [Portuguese].
114. Hegaard HK, Damm P, Hedegaard M, Henriksen TB, Ottesen B, Dykes A, Kjaergaard H. Sports and leisure time physical activity during pregnancy in nulliparous women. *Matern Child Health J*. 2011;15:806–13.
115. Ribeiro CP, Milanez H. Knowledge, attitude and practice of women in Campinas, São Paulo, Brazil with respect to physical exercise in pregnancy: a descriptive study. *Reprod Health*. 2011;8:31.
116. Walsh JM, McGowan C, Byrne J, McAuliffe FM. Prevalence of physical activity among healthy pregnant women in Ireland. *Int J Gynaecol Obstet*. 2011;114(2):154–5.
117. Nascimento SL, Surita FG, Cecatti JG. Physical exercise during pregnancy: a systematic review. *Curr Opin Obstet Gynecol*. 2012;24(6):387–94.
118. Tavares JS, Melo ASO, Amorim MMR, Barros VO, Takito MY, Benício MHD, Cardoso MAA. Padrão de atividade física entre gestantes atendidas pela estratégia saúde da família de Campina Grande–PB. *Rev Bras Epidemiol*. 2009;12(1):10–9. [Portuguese].
119. Lynch KE, Landsbaugh JR, Whitcomb BW, Pekow P, Markenson G, Chasan-Taber L. Physical activity of pregnant hispanic women. *Am J Prev Med*. 2012;43(4):434–9.
120. Davenport MH, Meah VL, Ruchat S-M, Davies GA, Skow RJ, Barrowman N, et al. Impact of prenatal exercise on neonatal and childhood outcomes: a systematic review and metaanalysis. *Br J Sports Med*. 2018;52(21):1386–96.
121. Davenport MH, McCurdy AP, Mottola MF, Skow RJ, Meah VL, Poitras VJ, et al. Impact of prenatal exercise on both prenatal and postnatal anxiety and depressive symptoms: a systematic review and meta-analysis. *Br J Sports Med*. 2018;52:1376–85.
122. Fazzi C, Saunders DH, Linton K, Norman JE, Reynolds RM. Sedentary behaviours during pregnancy: a systematic review. *Int J Behav Nutr Phys Act*. 2017;14(1):32.
123. van Poppel MNM, Simmons D, Devlieger R, van Assche FA, Jans G, Galjaard S, et al. A reduction in sedentary behaviour in obese women during pregnancy reduces neonatal adiposity: the DALI randomised controlled trial. *Diabetologia*. 2019;62(6):915–25.
124. Dieberger AM, Desoye G, Stolz E, Hill DJ, Corcoy R, Simmons D, et al. Less sedentary time is associated with a more favourable glucose-insulin axis in obese pregnant women—a secondary analysis of the DALI study. *Int J Obes*. 2021;45(2):296–307.
125. Xiang M, Zhang Z, Liang H. Sedentary behavior relates to mental distress of pregnant women differently across trimesters: an observational study in China. *J Affect Disord*. 2020;260:187–93.
126. Whitaker KM, Zhang D, Kline CE, Catov J, Barone Gibbs B. Associations of Sleep with sedentary behavior and physical activity patterns across pregnancy trimesters. *Womens Health Issues*. 2021;31:366.
127. Ross R, Chaput J-P, Giangregorio LM, Janssen I, Saunders TJ, Kho ME, et al. Canadian 24-hour movement guidelines for adults aged 18–64 years and adults aged 65 years or older: an integration of physical activity, sedentary behaviour, and sleep. *Appl Physiol Nutr Metab*. 2020;45(10 Suppl. 2):S57–102.
128. Tuleya L. Thesaurus of psychological index terms, 11 Washington, DC: American Psychological Association; 2007. xxvi, 463.
129. Di Fabio DR, Blomme CK, Smith KM, Welk GJ, Campbell CG. Adherence to physical activity guidelines in mid-pregnancy does not reduce sedentary time: an observational study. *Int J Behav Nutr Phys Act*. 2015;12:27.
130. Dumuid D, Pedišić Ž, Stanford TE, Martín-Fernández JA, Hron K, Maher CA, et al. The compositional isotemporal substitution model: a method for estimating changes in a health outcome for reallocation of time between sleep, physical activity and sedentary behaviour. *Stat Methods Med Res*. 2017;28:346.
131. Smith KM, Lanningham-Foster LM, Welk GJ, Campbell CG. Validity of the SenseWear armband to predict energy expenditure in pregnant women. *Med Sci Sports Exerc*. 2012;44(10):2001–8.
132. Ehrlich SF, Caesteel AJ, Crouter SE, Hibbing PR, Hedderson MM, Brown SD, et al. Alternative wear-time estimation methods compared to traditional diary logs for wrist-Worn ActiGraph accelerometers in pregnant women. *J Measur Phys Behav*. 2020;3(2):110–7.
133. Barone Gibbs B, Paley JL, Jones MA, Whitaker KM, Connolly CP, Catov JM. Validity of self-reported and objectively measured sedentary behavior in pregnancy. *BMC Pregnanc Childb*. 2020;20(1):99.
134. Chasan-Taber L, Schmidt MD, Roberts DE, Hosmer D, Markenson G, Freedson PS. Development and validation of a pregnancy physical activity questionnaire. *Med Sci Sports Exerc*. 2004;36(10):1750–60.
135. Oviedo-Caro MA, Bueno-Antequera J, Munguía-Izquierdo D. Measuring sedentary behavior during pregnancy: comparison between self-reported and objective measures. *Matern Child Health J*. 2018;22(7):968–77.

136. Herring SJ, Foster GD, Pien GW, Massa K, Nelson DB, Gehrman PR, et al. Do pregnant women accurately report sleep time? A comparison between self-reported and objective measures of sleep duration in pregnancy among a sample of urban mothers. *Sleep Breath*. 2013;17(4):1323–7.
137. Migueles JH, Aadland E, Andersen LB, Brønd JC, Chastin SF, Hansen BH, et al. GRANADA consensus on analytical approaches to assess associations with accelerometer-determined physical behaviours (physical activity, sedentary behaviour and sleep) in epidemiological studies. *Br J Sports Med*. 2021;56:376.
138. Chastin SFM, Palarea-Albaladejo J, Dontje ML, Skelton DA. Combined effects of time spent in physical activity, sedentary behaviors and sleep on obesity and cardio-metabolic health markers: a novel compositional data analysis approach. *PLoS One*. 2015;10(10):e0139984.
139. Oviedo-Caro MA, Bueno-Antequera J, Munguia-Izquierdo D. Associations of 24-hours activity composition with adiposity and cardiorespiratory fitness: the PregnActive project. *Scand J Med Sci Sports*. 2020;30(2):295–302.
140. Aadland E, Andersen LB, Migueles JH, Ortega FB, Kvalheim OM. Interpretation of associations between the accelerometry physical activity spectrum and cardiometabolic health and locomotor skills in two cohorts of children using raw, normalized, log-transformed, or compositional data. *J Sports Sci*. 2020;38(23):2708–19.

منابع

1. Bailey L. Refracted selves? A study of changes in self-identity in the transition to motherhood. *Sociology*. 1999;33(2):335–52. <https://doi.org/10.1177/S0038038599000206>.
2. Hodgkinson EL, Smith DM, Wittkowski A. Women's experiences of their pregnancy and postpartum body image: a systematic review and meta-synthesis. *BMC Pregnanc Childb*. 2014;14(1):330. <https://doi.org/10.1186/1471-2393-14-330>.
3. Smith JA. Identity development during the transition to motherhood: an interpretative phenomenological analysis. *J Reproduct Infant Psychol*. 1999;17(3):281–99. <https://doi.org/10.1080/02646839908404595>.
4. Olander EK, Atkinson L, Edmunds JK, French DP. The views of pre- and post-natal women and health professionals regarding gestational weight gain: an exploratory study. *Sex Reprod Healthc*. 2011;2(1):43–8. <https://doi.org/10.1016/j.srhc.2010.10.004>.
5. Atkinson L, Shaw RL, French DP. Is pregnancy a teachable moment for diet and physical activity behaviour change? An interpretative phenomenological analysis of the experiences of women during their first pregnancy. *Br J Health Psychol*. 2016;21(4):842–58. <https://doi.org/10.1111/bjhp.12200>.
6. Clissold TL, Hopkins WG, Seddon RJ. Lifestyle behaviours during pregnancy. *N Z Med J*. 1991;104(908):111–2.
7. Ogle JP, Tyner KE, Schofield-Tomschin S. Watching over baby: expectant parenthood and the duty to be well. *Sociol Inq*. 2011;81(3):285–309. <https://doi.org/10.1111/j.1475-682X.2011.00377.x>.
8. Connelly M, Brown H, van der Pligt P, Teychenne M. Modifiable barriers to leisure-time physical activity during pregnancy: a qualitative study investigating first time mother's views and experiences. *BMC Pregnanc Childb*. 2015;15(1):100. <https://doi.org/10.1186/s12884-015-0529-9>.
9. Carter SK. Beyond control: body and self in women's childbearing narratives. *Sociol Health Ill*. 2010;32(7):993–1009. <https://doi.org/10.1111/j.1467-9566.2010.01261.x>.
10. Neiterman E, Fox B. Controlling the unruly maternal body: losing and gaining control over the body during pregnancy and the postpartum period. *Soc Sci Med*. 2017;174:142–8. <https://doi.org/10.1016/j.socscimed.2016.12.029>.
11. Clark A, Skouteris H, Wertheim EH, Paxton SJ, Milgrom J. My baby body: a qualitative insight into women's body-related experiences and mood during pregnancy and the postpartum. *J Reproduct Infant Psychol*. 2009;27(4):330–45. <https://doi.org/10.1080/02646830903190904>.
12. Nash M. Weighty matters: negotiating 'fatness' and 'in-betweenness' in early pregnancy. *Fem Psychol*. 2012;22(3):307–23. <https://doi.org/10.1177/0959353512445361>.
13. Henry JD, Rendell PG. A review of the impact of pregnancy on memory function. *J Clin Exp Neuropsychol*. 2007;29(8):793–803. <https://doi.org/10.1080/13803390701612209>.
14. Christensen H, Leach LS, Mackinnon A. Cognition in pregnancy and motherhood: prospective cohort study. *Br J Psychiatry*. 2010;196(2):126–32. <https://doi.org/10.1192/bjp.bp.109.068635>.
15. Beckham AJ, Urrutia RP, Sahadeo L, Corbie-Smith G, Nicholson W. "We know but we don't really know": diet, physical activity and cardiovascular disease prevention knowledge and beliefs among underserved pregnant women. *Matern Child Health J*. 2015;19(8):1791–801. <https://doi.org/10.1007/s10995-015-1693-2>.
16. Atkinson L, Jackson B, Hodges K. Results of an online survey of UK women's views and experiences of physical activity information sources during pregnancy - final report. Coventry: Tommys; 2014.
17. Bauman AE. Updating the evidence that physical activity is good for health: an epidemiological review 2000–2003. *J Sci Med Sport*. 2004;7(1 Suppl):6–19.
18. Teychenne M, Ball K, Salmon J. Physical activity and likelihood of depression in adults: a review. *Prev Med*. 2008;46(5):397–411. <https://doi.org/10.1016/j.ypmed.2008.01.009>.
19. Schuch FB, Vancampfort D, Richards J, Rosenbaum S, Ward PB, Stubbs B. Exercise as a treatment for depression: a meta-analysis adjusting for publication bias. *J Psychiatr Res*. 2016;77:42–51. <https://doi.org/10.1016/j.jpsychires.2016.02.023>.
20. Strohle A. Physical activity, exercise, depression and anxiety disorders. *J Neural Transm (Vienna)*. 2009;116(6):777–84. <https://doi.org/10.1007/s00702-008-0092-x>.
21. Youngstedt SD. Effects of exercise on sleep. *Clin Sports Med*. 2005;24(2):355–65. <https://doi.org/10.1016/j.csm.2004.12.003>.
22. Da Costa D, Rippen N, Drišta M, Ring A. Self-reported leisure-time physical activity during pregnancy and relationship to psychological well-being. *J Psychosom Obstet Gynecol*. 2003;24:111–9.
23. Marcus SM. Depression during pregnancy: rates, risks and consequences. *Can J Clin Pharmacol*. 2009;16(1):15–22.
24. Bonari L, Pinto N, Ahn E, Einarson A, Steiner M, Koren G. Perinatal risks of untreated depression during pregnancy. *Can J Psychiatr*. 2004;49(11):726–35.
25. Einarson A, Choi J, Einarson TR, Koren G. Adverse effects of antidepressant use in pregnancy: an evaluation of fetal growth and preterm birth. *Depress Anxiety*. 2010;27(1):35–8. <https://doi.org/10.1002/da.20598>.
26. Daley AJ, Foster L, Long G, Palmer C, Robinson O, Walmsley H, Ward R. The effectiveness of exercise for the prevention and treatment of antenatal depression: systematic review with meta-analysis. *BJOG*. 2015;122(1):57–62. <https://doi.org/10.1111/1471-0528.12909>.
27. Davenport MH, McCurdy AP, Mottola MF, Skow RJ, Meah VL, Poitras VJ, Jaramillo Garcia A, Gray CE, Barrowman N, Riske L, Sobierajski F, James M, Nagpal T, Marchand AA, Nuspl M, Slater LG, Barakat R, Adamo KB, Davies GA, Ruchat SM. Impact of prenatal exercise on both prenatal and postnatal anxiety and depressive symptoms: a systematic review and meta-analysis. *Br J Sports Med*. 2018;52(21):1376–85. <https://doi.org/10.1136/bjsports-2018-099697>.
28. Shivakumar G, Brandon AR, Snell PG, Santiago-Munoz P, Johnson NL, Trivedi MH, Freeman MP. Antenatal depression: a rationale for studying exercise. *Depress Anxiety*. 2011;28(3):234–42. <https://doi.org/10.1002/da.20777>.
29. Teychenne M, York R. Physical activity, sedentary behavior, and postnatal depressive symptoms: a review. *Am J Prev Med*. 2013;45(2):217–27. <https://doi.org/10.1016/j.amepre.2013.04.004>.
30. Ross LE, McLean LM. Anxiety disorders during pregnancy and the postpartum period: a systematic review. *J Clin Psychiatry*. 2006;67(8):1285–98.
31. Schetter CD, Tanner L. Anxiety, depression and stress in pregnancy: implications for mothers, children, research, and practice. *Curr Opin Psychiatry*. 2012;25(2):141.
32. Paluska SA, Schwenk TL. Physical activity and mental health: current concepts. *Sports Med*. 2000;29(3):167–80.
33. Lee KA. Alterations in sleep during pregnancy and postpartum: a review of 30 years of research. *Sleep Med Rev*. 1998;2(4):231–42.
34. Sahota PK, Jain SS, Dhand R. Sleep disorders in pregnancy. *Curr Opin Pulm Med*. 2003;9(6):477–83.
35. Fox KR. The influence of physical activity on mental well-being. *Public Health Nutr*. 1999;2(3a):411–8.
36. Quan SF, O'Connor GT, Quan JS, Redline S, Resnick HE, Shahar E, Siscovick D, Sherrill DL. Association of physical activity with sleep-disordered breathing. *Sleep Breath*. 2007;11(3):149–57. <https://doi.org/10.1007/s11325-006-0095-5>.
37. Sherrill DL, Kotchou K, Quan SF. Association of physical activity and human sleep disorders. *Arch Intern Med*. 1998;158(17):1894–8. <https://doi.org/10.1001/archinte.158.17.1894>.

org/10.1001/archinte.158.17.1894.

38. Borodulin K, Evenson KR, Monda K, Wen F, Herring AH, Dole N. Physical activity and sleep among pregnant women. *Paediatr Perinat Epidemiol*. 2010;24(1):45–52.
39. Loprinzi PD, Loprinzi KL, Cardinal BJ. The relationship between physical activity and sleep among pregnant women. *Ment Health Phys Act*. 2012;5(1):22–7. <https://doi.org/10.1016/j.mhpa.2011.12.002>.
40. Baker JH, Rothenberger SD, Kline CE, Okun ML. Exercise during early pregnancy is associated with greater sleep continuity. *Behav Sleep Med*. 2016;16:1–14. <https://doi.org/10.1080/15402002.2016.1228649>.
41. Tella B, Sokunbi O, Akinlami O, Afolabi B. Effects of aerobic exercises on the level of insomnia and fatigue in pregnant women. *Int J Gynecol Obstet*. 2011;15(1):1.
42. Beddoe AE, Lee KA, Weiss SJ, Powell Kennedy H, Yang C-PP. Effects of mindful yoga on sleep in pregnant women: a pilot study. *Biol Res Nurs*. 2010;11(4):363–70.
43. Yang SY, Lan SJ, Yen YY, Hsieh YP, Kung PT, Lan SH. Effects of exercise on sleep quality in pregnant women: a systematic review and meta-analysis of randomized controlled trials. *Asian Nurs Res*. 2020;14(1):1–10. <https://doi.org/10.1016/j.anr.2020.01.003>.
44. Sallis JF, Owen N, Fisher EB. Ecological models of health behavior. In: *Health behavior and health education: theory, research, and practice*, vol. 4. San Francisco, CA: Jossey-Bass; 2008. p. 465–86.
45. Evenson KR, Moos M-K, Carrier K, Siega-Riz AM. Perceived barriers to physical activity among pregnant women. *Matern Child Health J*. 2009;13(3):364.
46. Downs DS, Chasan-Taber L, Evenson KR, Leiferman J, Yeo S. Physical activity and pregnancy. *Res Q Exerc Sport*. 2012;83(4):485–502. <https://doi.org/10.1080/02701367.2012.10599138>.
47. Foxcroft KF, Rowlands IJ, Byrne NM, McIntyre HD, Callaway LK. Exercise in obese pregnant women: the role of social factors, lifestyle and pregnancy symptoms. *BMC Pregnan Childb*. 2011;11(1):4.
48. Harrison AL, Taylor NF, Shields N, Frawley HC. Attitudes, barriers and enablers to physical activity in pregnant women: a systematic review. *J Physiother*. 2018;64(1):24–32. <https://doi.org/10.1016/j.jphys.2017.11.012>.
49. Aubry RH, Pennington JC. Identification and evaluation of high-risk pregnancy: the perinatal concept. *Clin Obstet Gynecol*. 1973;16(1):3–27.
50. Weir Z, Bush J, Robson SC, McParlin C, Rankin J, Bell R. Physical activity in pregnancy: a qualitative study of the beliefs of overweight and obese pregnant women. *BMC Pregnan Childb*. 2010;10:18. <https://doi.org/10.1186/1471-2393-10-18>.
51. Cioff J, Schmied V, Dahlen H, Mills A, Thornton C, Duff M, Cummings J, Kolt GS. Physical activity in pregnancy: women's perceptions, practices, and influencing factors. *J Midwif Women's Health*. 2010;55(5):455–61.
52. Leiferman J, Swibas T, Koiness K, Marshall JA, Dunn AL. My baby, my move: examination of perceived barriers and motivating factors related to antenatal physical activity. *J Midwif Women's Health*. 2011;56(1):33–40. <https://doi.org/10.1111/j.1542-2011.2010.00004.x>.
53. Watson ED, Oddie B, Constantinou D. Exercise during pregnancy: knowledge and beliefs of medical practitioners in South Africa: a survey study. *BMC Pregnan Childb*. 2015;15(1):245.
54. van der Pligt P, Campbell K, Willcox J, Opie J, Denney-Wilson E. Opportunities for primary and secondary prevention of excess gestational weight gain: general practitioners' perspectives. *BMC Fam Pract*. 2011;12(1):124.
55. Coll CV, Domingues MR, Gonçalves H, Bertoldi AD. Perceived barriers to leisure-time physical activity during pregnancy: a literature review of quantitative and qualitative evidence. *J Sci Med Sport*. 2017;20(1):17–25. <https://doi.org/10.1016/j.jsams.2016.06.007>.
56. Leppänen M, Aittasalo M, Raitanen J, Kinnunen TI, Kujala UM, Luoto R. Physical activity during pregnancy: predictors of change, perceived support and barriers among women at increased risk of gestational diabetes. *Matern Child Health J*. 2014;18(9):2158–66. <https://doi.org/10.1007/s10995-014-1464-5>.
57. Reichert F, Barros AJD, Domingues M, Hallal P. The role of perceived personal barriers to engagement in leisure-time physical activity. *Am J Public Health*. 2007;97:515. <https://doi.org/10.2105/AJPH.2005.070144>.
58. Currie S, Sinclair M, Murphy MH, Madden E, Dunwoody L, Liddle D. Reducing the decline in physical activity during pregnancy: a systematic review of behaviour change interventions. *PLoS One*. 2013;8(6):e0066385. <https://doi.org/10.1371/journal.pone.0066385>.
59. James P, Morgant R, Merviel P, Saraux A, Giroux-Metges MA, Guillo Y, Dupré PF, Muller M. How to promote physical activity during pregnancy: a systematic review. *J Gynecol Obstet Hum Reprod*. 2020;49(9):101864. <https://doi.org/10.1016/j.jogoh.2020.101864>.
60. Flannery C, Fredrix M, Olander EK, McAuliffe FM, Byrne M, Kearney PM. Effectiveness of physical activity interventions for overweight and obesity during pregnancy: a systematic review of the content of behaviour change interventions. *Int J Behav Nutr Phys Act*. 2019;16(1):97. <https://doi.org/10.1186/s12966-019-0859-5>.
61. Taniguchi C, Sato C. Home-based walking during pregnancy affects mood and birth outcomes among sedentary women: a randomized controlled trial. *Int J Nurs Pract*. 2016;22(5):420–6. <https://doi.org/10.1111/ijn.12453>.
62. Zarezaadeh T, Nemati N. Effects of 8 week regular walking on the neonate in nulliparous women. *Koomesh*. 2016;17(2):403–10.
63. Yeo S, Davidge S, Ronis DL, Antonakos CL, Hayashi R, O'Leary S. A comparison of walking versus stretching exercises to reduce the incidence of preeclampsia: a randomized clinical trial. *Hypertens Pregnan*. 2008;27(2):113–30. <https://doi.org/10.1080/10641950701826778>.
64. Kong KL, Campbell CG, Foster RC, Peterson AD, Lanningham-Foster L. A pilot walking program promotes moderate-intensity physical activity during pregnancy. *Med Sci Sports Exerc*. 2014;46(3):462–71. <https://doi.org/10.1249/MSS.0000000000000141>.
65. De Oliveria Melo AS, Silva JLP, Tavares JS, Barros VO, Leite DFB, Amorim MMR. Effect of a physical exercise program during pregnancy on uteroplacental and fetal blood flow and fetal growth: a randomized controlled trial. *Obstet Gynecol*. 2012;120(2 Part 1):302–10. <https://doi.org/10.1097/AOG.0b013e31825de592>.
66. Stafne SN, Salvesen KÅ, Romundstad PR, Torjusen IH, Mørkved S. Does regular exercise including pelvic floor muscle training prevent urinary and anal incontinence during pregnancy? A randomised controlled trial. *BJOG*. 2012;119(10):1270–9. <https://doi.org/10.1111/j.1471-0528.2012.03426.x>.
67. Hui A, Back L, Ludwig S, Gardiner P, Sevenhuysen G, Dean H, Sellers E, McGavock J, Morris M, Bruce S, Murray R, Shen GX. Lifestyle intervention on diet and exercise reduced excessive gestational weight gain in pregnant women under a randomised controlled trial. *BJOG*. 2012;119(1):70–7. <https://doi.org/10.1111/j.1471-0528.2011.03184.x>.
68. Sagedal LR, Sanda B, Overby NC, Bere E, Torstveit MK, Lohne-Seiler H, Hillesund ER, Pripp AH, Henriksen T, Vistad I. The effect of prenatal lifestyle intervention on weight retention 12 months postpartum: results of the Norwegian Fit for Delivery randomised controlled trial. *BJOG*. 2017;124(1):111–21. <https://doi.org/10.1111/1471-0528.13863>.
69. Wang C, Wei Y, Zhang X, Zhang Y, Xu Q, Sun Y, Su S, Zhang L, Liu C, Feng Y, Shou C, Guelf KJ, Newnam JP, Yang H. A randomized clinical trial of exercise during pregnancy to prevent gestational diabetes mellitus and improve pregnancy outcome in overweight and obese pregnant women. *Am J Obstet Gynecol*. 2017;216(4):340–51. <https://doi.org/10.1016/j.ajog.2017.01.037>.
70. Symons Downs D, DiNallo JM, Birch LL, Paul IM, Ulbrecht JS. Randomized Face-to-face vs. Home exercise interventions in pregnant women with gestational diabetes. *Psychol Sport Exerc*. 2017;30:73–81. <https://doi.org/10.1016/j.psychsport.2017.02.003>.
71. Jackson RA, Stotland NE, Caughey AB, Gerbert B. Improving diet and exercise in pregnancy with Video Doctor counseling: a randomized trial. *Patient Educ Couns*. 2011;83(2):203–9. <https://doi.org/10.1016/j.pec.2010.05.019>.
72. Smith K, Lanningham-Foster L, Welch A, Campbell C. Web-based behavioral intervention increases maternal exercise but does not prevent excessive gestational weight gain in previously sedentary women. *J Phys Act Health*. 2016;13(6):587–93. <https://doi.org/10.1123/jpah.2015-0219>.
73. Albert B. Social foundations of thought and action: a social cognitive theory. New York, NY: Prentice-Hall; 1986.
74. Gaston A, Prapavessis H. Maternal-fetal disease information as a source of exercise motivation during pregnancy. *Health Psychol*. 2009;28(6):726–33. <https://doi.org/10.1037/a0016702>.
75. Gaston A, Prapavessis H. Using a combined protection motivation theory and health action process approach intervention to promote exercise during pregnancy. *J Behav Med*. 2014;37(2):173–84. <https://doi.org/10.1007/s10865-012-9477-2>.
76. Dodd JM, Cramp C, Zhixian S, Yelland LN, Deussen AR, Grivell RM, Moran LJ, Crowther CA, Turnbull D, McPhee AJ, Wittert G, Owens JA, Robinson JS, For the LRTG. The effects of antenatal dietary and lifestyle advice for women who are overweight or obese on maternal diet and physical activity: the LIMIT randomised trial. *BMC Med*. 2014;12(1):161–79. <https://doi.org/10.1186/s12916-014-0161-y>.

77. Poſton L, Briley AL, Barr S, Bell R, Croker H, Coxon K, Essex HN, Hunt C, Hayes L, Howard LM, Khazaezadeh N, Kinnunen T, Nelson SM, Oteng-Ntim E, Robson SC, Sattar N, Seed PT, Wardle J, Sanders TAB, Sandall J. Developing a complex intervention for diet and activity behaviour change in obese pregnant women (the UPBEAT trial); Assessment of behavioural change and process evaluation in a pilot randomised controlled trial. *BMC Pregnant Childb.* 2013;13:148. <https://doi.org/10.1186/1471-2393-13-148>.
78. Hayes L, Bell R, Robson S, Poſton L. Association between physical activity in obese pregnant women and pregnancy outcomes: the UPBEAT pilot study. *Ann Nutr Metab.* 2014;64(3–4):239–46. <https://doi.org/10.1159/000365027>.
79. Ko CW, Napolitano PG, Lee SP, Schulte SD, Ciol MA, Beresford SA. Physical activity, maternal metabolic measures, and the incidence of gallbladder sludge or stones during pregnancy: a randomized trial. *Am J Perinatol.* 2014;31(1):39–48. <https://doi.org/10.1055/s-0033-1334455>.
80. Simmons D, Devlieger R, Van Assche A, Jans G, Galjaard S, Corcoy R, Adelantado JM, Dunne F, Desoye G, Harreiter J, Kautzky-Willer A, Damm P, Mathiesen ER, Jensen DM, Andersen L, Lapolla A, Dalfra MG, Bertolotto A, Wender-Ozegowska E, Zawiejska A, Hill D, Snoek FJ, Jelsma JGM, Van Poppel MNM. Effect of physical activity and/or healthy eating on GDM risk: the DALI lifestyle study. *J Clin Endocrinol Metab.* 2017;102(3):903–13. <https://doi.org/10.1210/jc.2016-3455>.
81. Vinter CA, Jensen DM, Ovesen P, Beck-Nielsen H, Jørgensen JS. The LiP (Lifestyle in Pregnancy) study: a randomized controlled trial of lifestyle intervention in 360 obese pregnant women. *Diabetes Care.* 2011;34:2502. <https://doi.org/10.2337/dc11-1150>.
82. Michie S, van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implement Sci.* 2011;6:42. <https://doi.org/10.1186/1748-5908-6-42>.
83. Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implement Sci.* 2012;7(1):37.

منابع

1. Ezcurdia GM. Ejercicio físico y deportes durante el embarazo. In: Fabre Gonzalez E, editor. Manual de asistencia al embarazo normal. Madrid: Grupo de trabajo sobre asistencia al embarazo normal. Sección de Medicina Perinatal. Sociedad Española de Ginecología y Obstetricia; 2001. Chapter 11.
2. Melchiorre K, Sharma R, Thilaganathan B. Cardiac structure and function in normal pregnancy. *Curr Opin Obstet Gynecol.* 2012;24(6):413–21.
3. Duvekot JJ, Cheriex EC, Pieters FA, Menheere PP, Peeters LH. Early pregnancy changes in hemodynamics and volume homeostasis are consecutive adjustments triggered by a primary fall in systemic vascular tone. *Am J Obstet Gynecol.* 1993;169(6):1382–92.
4. Klapp JF III, Capeless E. Cardiovascular function before, during, and after the first and subsequent pregnancies. *Am J Cardiol.* 1997;80(11):1469–73.
5. Kametas NA, McAuliffe F, Cook B, Nicolaides KH, Chambers J. Maternal left ventricular transverse and long-axis systolic function during pregnancy. *Ultrasound Obstet Gynecol.* 2001;18(5):467–74.
6. Geva T, Mauer MB, Striker L, Kirshon B, Pivarnik JM. Effects of physiologic load of pregnancy on left ventricular contractility and remodeling. *Am Heart J.* 1997;133(1):53–9.
7. Thornburg KL, Jacobson SL, Giraud GD, Morton MJ. Hemodynamic changes in pregnancy. *Semin Perinatol.* 2000;24(1):11–4.
8. Hytten F. Blood volume changes in normal pregnancy. *Clin Haematol.* 1985;14(3):601–12.
9. Gilson GJ, Samaan S, Crawford MH, Qualls CR, Curet LB. Changes in hemodynamics, ventricular remodeling, and ventricular contractility during normal pregnancy: a longitudinal study. *Obstet Gynecol.* 1997;89(6):957–62.
10. Atkins AF, Watt JM, Milan P, Davies P, Crawford JS. A longitudinal study of cardiovascular dynamic changes throughout pregnancy. *Eur J Obstet Gynecol Reprod Biol.* 1981;12(4):215–24.
11. Mesa A, Jessurun C, Hernandez A, et al. Left ventricular diastolic function in normal human pregnancy. *Circulation.* 1999;99(4):511–7.
12. Mabie WC, DiSessa TG, Crocker LG, Sibai BM, Arheart KL. A longitudinal study of cardiac output in normal human pregnancy. *Am J Obstet Gynecol.* 1994;170(3):849–56.
13. Mashini IS, Albazzaz SJ, Fadel HE, et al. Serial noninvasive evaluation of cardiovascular hemodynamics during pregnancy. *Am J Obstet Gynecol.* 1987;156(5):1208–13.
14. Robson SC, Hunter S, Boys RJ, Dunlop W. Serial study of factors influencing changes in cardiac output during human pregnancy. *Am J Phys.* 1989;256(4 Pt 2):H1060–5.
15. Valensise H, Novelli GP, Vasapollo B, et al. Maternal cardiac systolic and diastolic function: relationship with uteroplacental resistances. A Doppler and echocardiographic longitudinal study. *Ultrasound Obstet Gynecol.* 2000;15(6):487–97.
16. Turan OM, De Paco C, Kametas N, Khaw A, Nicolaides KH. Effect of parity on maternal cardiac function during the first trimester of pregnancy. *Ultrasound Obstet Gynecol.* 2008;32(7):849–54.
17. Dagher FJ, Lyons JH, Finlayson DC, Shamsai J, Moore FD. Blood volume measurement: a critical study prediction of normal values: controlled measurement of sequential changes: choice of a bedside method. *Adv Surg.* 1965;1:69–109.
18. Sociedad Europea de cardiología (ESC). Guía de práctica clínica de la ESC para el tratamiento de las enfermedades cardiovasculares durante el embarazo. *Rev Esp Cardiol.* 2012;65(2):171.e1–e44.
19. Savu O, Jurec R, Giusca S, et al. Morphological and functional adaptation of the maternal heart during pregnancy. *Circ Cardiovasc Imaging.* 2012;5(3):289–97.
20. Novelli GP, Valensise H, Vasapollo B, et al. Left ventricular concentric geometry as a risk factor in gestational hypertension. *Hypertension.* 2003;41(3):469–75.
21. Hall ME, George EM, Granger JP. The heart during pregnancy. *Rev Esp Cardiol.* 2011;64(11):1045–50.
22. Schanwell CM, Zimmermann T, Schneppenheim M, Plehn G, Marx R, Strauer BE. Left ventricular hypertrophy and diastolic dysfunction in healthy pregnant women. *Cardiology.* 2002;97(2):73–8.
23. Roos-Hessellink JW, Duvekot JJ, Thorne SA. Pregnancy in high risk cardiac conditions. *Heart.* 2009;95(8):680–6.
24. Wolfe LA, Weissgerber TL. Clinical physiology of exercise in pregnancy: a literature review. *J Obstet Gynaecol Can.* 2003;25(6):473–83.
25. Sohnchen N, Melzer K, Tejada BM, et al. Maternal heart rate changes during labour. *Eur J Obstet Gynecol Reprod Biol.* 2011;158(2):173–8.
26. Artal R, Platt LD, Sperling M, Kammula RK, Jilek J, Nakamura R. I. Maternal cardiovascular and metabolic responses in normal pregnancy. *Am J Obstet Gynecol.* 1981;140(2):123–7.
27. Pivarnik JM. Cardiovascular responses to aerobic exercise during pregnancy and postpartum. *Semin Perinatol.* 1996;20(4):242–9.
28. Soultanakis HN, Artal R, Wiswell RA. Prolonged exercise in pregnancy: glucose homeostasis, ventilatory and cardiovascular responses. *Semin Perinatol.* 1996;20(4):315–27.
29. Wolfe LA, Mottola MF. Aerobic exercise in pregnancy: an update. *Can J Appl Physiol.* 1993;18(2):119–47.
30. Borg GA. Psychophysical bases of perceived exertion. *Med Sci Sports Exerc.* 1982;14(5):377–81.
31. Lee SW, Khaw KS, Ngan Kee WD, Leung TY, Critchley LA. Haemodynamic effects from aortocaval compression at different angles of lateral tilt in non-labouring term pregnant women. *Br J Anaesth.* 2012;109(6):950–6.
32. Wolfe LA, Preston RJ, Burggraf GW, McGrath MJ. Effects of pregnancy and chronic exercise on maternal cardiac structure and function. *Can J Physiol Pharmacol.* 1999;77(11):909–17.
33. Perales M, Santos-Lozano A, Sanchis-Gomar F, Luaces M, Pareja-Galeano H, Garatachea N, Barakat R, Lucia A. Maternal cardiac adaptation to a physical exercise program during pregnancy. *Med Sci Sports Exerc.* 2016;48(5):896–906.
34. Barakat R. El ejercicio físico durante el embarazo. Madrid: Pearson Alhambra; 2006.
35. Artal R, Wiswell R, Drinkwater B. Exercise in pregnancy. 2nd ed. Baltimore, MD: Williams and Wilkins; 1991.
36. Fernandez V, Rodriguez Melcon Y, Baron V. Modificaciones de la sangre en el embarazo. Cambios circulatorios y respiratorios. Alteraciones de los sistemas digestivos y urinarios. Sistema óseo y dientes. Cambios en la piel. Otras modificaciones. In: Tratado de Ginecología, Obstetricia y Medicina de la Reproducción, vol. 1. Madrid: Sociedad Española de Ginecología y Obstetricia. Panamericana; 2003.

37. Cunningham FG, Leveno KJ, Bloom SL, Hauth JC, Rouse DJ, Spong CY. Hematological changes. In: Cunningham FG, Leveno KJ, Bloom SL, Hauth JC, Rouse DJ, Spong CY, editors. *Williams obstetrics*. 23rd ed. New York, NY: McGraw-Hill; 2010. p. 114.
38. Alaily AB, Carrol KB. Pulmonary ventilation in pregnancy. *Br J Obstet Gynecol*. 1978;85:518–24.
39. Cunningham FG, Leveno KJ, Bloom SL, Hauth JC, Rouse DJ, Spong CY. Respiratory tract. In: Cunningham FG, Leveno KJ, Bloom SL, Hauth JC, Rouse DJ, Spong CY, editors. *Williams obstetrics*. 23rd ed. New York, NY: McGraw-Hill; 2010. p. 121.
40. De Migue LJ, Sánchez M. Cambios fisiológicos y adaptación materna durante el embarazo. In: Fabre Gonzalez E, editor. *Manual de asistencia al embarazo normal*. 2nd ed. Grupo de trabajo sobre asistencia al embarazo normal. Sección de Medicina Perinatal. Sociedad Española de Ginecología y Obstetricia Madrid; 2001. Chapter 4.
41. Barakat R, Perales M, Garatachea N, Ruiz JR, Lucia A. Exercise during pregnancy. A narrative review asking: what do we know? *Br J Sports Med*. 2015;49(21):1377–81.
42. Rasmussen KM, Yaktine AL, Institute of Medicine (Committee to Reexamine IOM Pregnancy Weight Guidelines, Food and Nutrition Board and Board on Children, Youth, and Families). *Weight gain during pregnancy: reexamining the guidelines*. Washington, DC: National Academic Press; 2009. Provides new guidelines for weight gain during pregnancy that are based on minimizing the risks of inadequate or excessive gains to mothers as well as their infants.
43. Cerqueira M. Metabolismo en el embarazo. Modificaciones endocrinas. Modificaciones psíquicas. In: *Tratado de Ginecología, Obstetricia y Medicina de la Reproducción*, vol. 1. Madrid: Sociedad Española de Ginecología y Obstetricia. Ed. Panamericana; 2003.
44. Barakat R, Perales M. Resistance exercise in pregnancy and outcome. *Clin Obstet Gynecol*. 2016;59(3):591–9.
45. Cunningham FG, Leveno KJ, Bloom SL, Hauth JC, Rouse DJ, Spong CY. Other system. musculoskeletal system. In: Cunningham FG, Leveno KJ, Bloom SL, Hauth JC, Rouse DJ, Spong CY, editors. *Williams obstetrics*. 23rd ed. New York, NY: McGraw-Hill; 2010. p. 129.
46. Nuriel-Ohayon M, Neuman H, Koren O. Microbial changes during pregnancy, birth, and infancy. *Front Microbiol*. 2016;7:1031.
47. Koren O, Goodrich JK, Cullender TC, Spor A, Laitinen K, Bäckhed HK, Gonzalez A, Werner JJ, Angenent LT, Knight R, Bäckhed F, Isolauri E, Salminen S, Ley RE. Host remodeling of the gut microbiome and metabolic changes during pregnancy. *Cell*. 2012;150(3):470–80.
48. Mueller NT, Shin H, Pizoni A, Werlang IC, Matte U, Goldani MZ, Goldani HA, DominguezBello MG. Birth mode-dependent association between pre-pregnancy maternal weight status and the neonatal intestinal microbiome. *Sci Rep*. 2016;6:23133.
49. Santacruz A, Collado MC, García-Valdés L, Segura MT, Martín-Lagos JA, Anjos T, MartíRomero M, Lopez RM, Florido J, Campoy C, Sanz Y. Gut microbiota composition is associated with body weight, weight gain and biochemical parameters in pregnant women. *Br J Nutr*. 2010;104(1):83–92.
50. Soderborg TK, Borengasser SJ, Barbour LA, Friedman JE. Microbial transmission from mothers with obesity or diabetes to infants: an innovative opportunity to interrupt a vicious cycle. *Diabetologia*. 2016;59(5):895–906.
51. O’Sullivan O, Cronin O, Clarke SF, Murphy EF, Molloy MG, Shanahan F, Cotter PD. Exerc Microbiota Gut Microb. 2015;6(2):131–6

1. CDC. Physical activity and health: a report of the surgeon general. Atlanta, GA: Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion; 1996.
2. ACSM. ACSM's guidelines for exercise testing and prescription. 10th ed. Philadelphia, PA: Wolters Kluwer; 2017. 480 p. Revised.
3. Vernini JM, Moreli JB, Costa RAA, Negrato CA, Rudge MVC, Calderon IMP. Maternal adipokines and insulin as biomarkers of pregnancies complicated by overweight and obesity. *Diabetol Metab Syndr*. 2016;8(1):68. <http://dmsjournal.biomedcentral.com/articles/10.1186/s13098-016-0184-y>. Accessed 25 Oct 2017.
4. Mitancher D, Jacqueminet S, Nizard J, Tanguy M-L, Ciangura C, Lacorte J-M, et al. Effect of maternal obesity on birthweight and neonatal fat mass: a prospective clinical trial. *PLoS One*. 2017;12(7):e0181307.
5. Schmitt NM, Nicholson WK, Schmitt J. The association of pregnancy and the development of obesity—results of a systematic review and meta-analysis on the natural history of postpartum weight retention. *Int J Obes*. 2007;31(11):1642–51.
6. Cedergren MI. Maternal morbid obesity and the risk of adverse pregnancy outcome. *Obstet Gynecol*. 2004;103(2):219–24.
7. Rooney BL, Schauburger CW. Excess pregnancy weight gain and long-term obesity: one decade later. *Obstet Gynecol*. 2002;100(2):245–52.
8. McCarthy EA, Strauss BJ, Walker SP, Permezel M. Determination of maternal body composition in pregnancy and its relevance to perinatal outcomes. *Obstet Gynecol Surv*. 2004;59(10):731–42.
9. Wang Z-M, Pierson RN, Heymsfeld SB. The five-level model: a new approach to organizing body-composition research. *Am J Clin Nutr*. 1992;56(1):19–28.
10. Shen W, St-Onge M, Wang Z, Heymsfeld S. Study of body composition: an overview. In: Heymsfeld S, Lohman TG, Wang Z, Going S, editors. *Human body composition*. 2nd ed. Champaign, IL: Human Kinetics; 2005. p. 3–16.
11. Lederman SA. Pregnancy. In: Heymsfeld SB, Lohman TG, Wang Z, Going SB, editors. *Human body composition*. 2nd ed. Champaign, IL: Human Kinetics; 2005. p. 299–312.
12. Shen W, Wang Z, Punyanita M, Lei J, Sinav A, Kral JG, et al. Adipose tissue quantification by imaging methods: a proposed classification. *Obes Res*. 2003;11(1):5–16.
13. Kissebah AH, Krakower GR. Regional adiposity and morbidity. *Physiol Rev*. 1994;74(4):761–811.
14. Bray G. Overweight, mortality, and morbidity. In: Bouchard C, editor. *Physical activity and obesity*. Champaign, IL: Human Kinetics; 2000. p. 31–54.
15. Vague J. [Importance of the measurement of fat distribution in pathology]. *Bull Mem Soc Med Hop Paris* 1950;66(31–32):1572–4.
16. Vague J. The degree of masculine differentiation of obesities: a factor determining predisposition to diabetes, atherosclerosis, gout, and uric calculous disease. *Am J Clin Nutr*. 1956;4(1):20–34.
17. Canoy D, Boekholdt SM, Wareham N, Luben R, Welch A, Bingham S, et al. Body fat distribution and risk of coronary heart disease in men and women in the European Prospective Investigation Into Cancer and Nutrition in Norfolk cohort: a population-based prospective study. *Circulation*. 2007;116(25):2933–43.
18. Nishida C, Ko GT, Kumanyika S. Body fat distribution and noncommunicable diseases in populations: overview of the 2008 WHO Expert Consultation on Waist Circumference and Waist-Hip Ratio. *Eur J Clin Nutr*. 2010;64(1):2–5.
19. Zhang S, Folsom AR, Flack JM, Liu K. Body fat distribution before pregnancy and gestational diabetes: findings from coronary artery risk development in young adults (CARDIA) study. *BMJ*. 1995;311(7013):1139.
20. Stevens-Simons C, Thureen P, Barret J, Stamm E. Regional body fat distribution and insulin resistance during adolescent pregnancy. *J Am Diet Assoc*. 2002;102(4):563–5.
21. Landon MB, Osei K, Platt M, O'dorisio T, Samuels P, Gabbe SG. The differential effects of body fat distribution on insulin and glucose metabolism during pregnancy. *Am J Obstet Gynecol*. 1994;171(4):875–84.
22. Ozias MK, Li S, Hull HR, Brooks WM, Petroff MG, Carlson SE. Abdominal visceral adiposity influences CD4+ T cell cytokine production in pregnancy. *Cytokine*. 2015;71(2):405–8.
23. Rossner S, Bo WJ, Hiltbrandt E, Hinson W, Karstaedt N, Santiago P, et al. Adipose tissue determinations in cadavers—a comparison between cross-sectional planimetry and computed tomography. *Int J Obes*. 1990;14(10):893–902.
24. Abate N, Burns D, Peshok RM, Garg A, Grundy SM. Estimation of adipose tissue mass by magnetic resonance imaging: validation against dissection in human cadavers. *J Lipid Res*. 1994;35(8):1490–6.
25. Widén EM, Gallagher D. Body composition changes in pregnancy: measurement, predictors and outcomes. *Eur J Clin Nutr*. 2014;68(6):643–52.
26. Mazaki-Tovi S, Vaisbuch E, Tarca AL, Kusanovic JP, Than NG, Chaiworapongsa T, et al. Characterization of visceral and subcutaneous adipose tissue transcriptome and biological pathways in pregnant and non-pregnant women: evidence for pregnancy-related regional-specific differences in adipose tissue. Sanchez-Margalet V, editor. *PLoS One*. 2015;10(12):e0143779.
27. Tchernof A, Despres JP. Pathophysiology of human visceral obesity: an update. *Physiol Rev*. 2013;93(1):359–404.
28. Goodpaster BH. Measuring body fat distribution and content in humans. *Curr Opin Clin Nutr Metab Care*. 2002;5(5):481–7.
29. Sardinha LB, Teixeira PJ. Measuring adiposity and fat distribution in relation to health. In: Heymsfeld SB, Lohman TG, Wang Z, Going SB, editors. *Human body composition*. 2nd ed. Champaign, IL: Human Kinetics; 2005. p. 177–202.
30. Despres JP. Abdominal obesity and cardiovascular disease: is inflammation the missing link? *Can J Cardiol*. 2012;28(6):642–52.
31. Ghezzi F, Franchi M, Balestreri D, Lischetti B, Mele MC, Alberico S, et al. Bioelectrical impedance analysis during pregnancy and neonatal birth weight. *Eur J Obstet Gynecol*. 2001;98(2):171–6.
32. Forbes GB. *Human body composition - growth, aging, nutrition, and activity*. Berlin: Springer; 1987. www.springer.com/cn/book/9781461291008. Accessed 9 Nov 2017.
33. Kopp-Hoolihan LE, Van Loan MD, Wong WW, King JC. Fat mass deposition during pregnancy using a four-component model. *J Appl Physiol*. 1999;87(1):196–202.
34. Ikenoue S, Waffarn F, Sumiyoshi K, Ohashi M, Ikenoue C, Buss C, et al. Association of ultrasound-based measures of fetal body composition with newborn adiposity: fetal body composition and newborn adiposity. *Pediatr Obes*. 2017;12:86–93.
35. Frankenfeld DC, Rowe WA, Cooney RN, Smith JS, Becker D. Limits of body mass index to detect obesity and predict body composition. *Nutrition*. 2001;17(1):26–30.
36. WHO. Measuring obesity-classification and description of anthropometric data. Report on a WHO consultation on the epidemiology of obesity. Warsaw: WHO Regional Office for Europe; 1987.
37. WHO. Obesity: preventing and managing the global epidemic - report of a WHO consultation on obesity. Executive summary. Geneva: World Health Organization; 1997.
38. NIH. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults—the evidence report. National Institutes of Health. *Obes Res*. 1998;6(Suppl 2):S1S–209S.
39. CSEP. Canadian Society for Exercise Physiology-Physical Activity Training for Health (CSEP-PATH). 2nd ed. Ottawa, ON: Canadian Society for Exercise Physiology; 2019.
40. IOM (Institute of Medicine). Weight gain during pregnancy: reexamining the guidelines. Washington, DC: The National Academies Press; 2009. <http://www.nap.edu/catalog/12584>. Accessed 18 Dec 2017.
41. Rasmussen KM, Abrams B, Bodnar LM, Butte NF, Catalano PM, Maria Siega-Riz A. Recommendations for weight gain during pregnancy in the context of the obesity epidemic. *Obstet Gynecol*. 2010;116(5):1191–5.
42. Forsum E, Henriksson P, Löf M. The Two-component model for calculating total body fat from body density: an evaluation in healthy women before, during and after pregnancy. *Nutrients*. 2014;6(12):5888–99.
43. Gaillard R. Maternal obesity during pregnancy and cardiovascular development and disease in the offspring. *Eur J Epidemiol*. 2015;30(11):1141–52.

44. Athukorala C, Rumbold AR, Willson KJ, Crowther CA. The risk of adverse pregnancy outcomes in women who are overweight or obese. *BMC Pregn Childb*. 2010;10(1):56.
45. Höhn N, Junge S. [The relationship of maternal obesity, excessive weight gain in pregnancy and pre-eclampsia]. *Geburtshilfe Frauenheilkd* 1979;39(12):1079–82.
46. Kosus A, Eser A, Kosus N, Usluogullari B, Hizli D. Hyperemesis gravidarum and its relation with maternal body fat composition. *J Obstet Gynaecol*. 2016;36(6):822–6.
47. Aune D, Saugstad OD, Henriksen T, Tonstad S. Maternal body mass index and the risk of fetal death, stillbirth, and infant death: a systematic review and meta-analysis. *JAMA*. 2014;311(15):1536.
48. Chu SY, Kim SY, Lau J, Schmid CH, Dietz PM, Callaghan WM, et al. Maternal obesity and risk of stillbirth: a metaanalysis. *Am J Obstet Gynecol*. 2007;197(3):223–8.
49. Yao R, Ananth CV, Park BY, Pereira L, Plante LA. Obesity and the risk of stillbirth: a population-based cohort study. *Am J Obstet Gynecol*. 2014;210(5):457.e1–9.
50. Lee H-J, Ha J-E, Bae K-H. Synergistic effect of maternal obesity and periodontitis on preterm birth in women with pre-eclampsia: a prospective study. *J Clin Periodontol*. 2016;43(8):646–51.
51. Rasmussen S, Irgens L, Espinoza J. Maternal obesity and excess of fetal growth in preeclampsia. *BJOG Int J Obstet Gynaecol*. 2014;121(11):1351–8.
52. Leonard SA, Rasmussen KM, King JC, Abrams B. Trajectories of maternal weight from before pregnancy through postpartum and associations with childhood obesity. *Am J Clin Nutr*. 2017;106:1295.
53. Cai G, Sun X, Zhang L, Hong Q. Association between maternal body mass index and congenital heart defects in offspring: a systematic review. *Am J Obstet Gynecol*. 2014;211(2):91–117.
54. Lawlor DA. The Society for Social Medicine John Pemberton Lecture 2011. Developmental overnutrition—an old hypothesis with new importance?*. *Int J Epidemiol*. 2013;42(1):7–29.
55. Lindell N, Carlsson A, Josefsson A, Samuelsson U. Maternal obesity as a risk factor for early childhood type 1 diabetes: a nationwide, prospective, population-based case-control study. *Diabetologia*. 2018;61(1):130–7.
56. Boden G. Role of fatty acids in the pathogenesis of insulin resistance and NIDDM. *Diabetes*. 1997;46(1):3–10.
57. Koska J, Stefan N, Permana PA, Weyer C, Sonoda M, Bogardus C, et al. Increased fat accumulation in liver may link insulin resistance with subcutaneous abdominal adipocyte enlargement, visceral adiposity, and hypoalbuminemia in obese individuals. *Am J Clin Nutr*. 2008;87(2):295–302.
58. Tanaka S, Togashi K, Rankinen T, Perusse L, Leon AS, Rao DC, et al. Is adiposity at normal body weight relevant for cardiovascular disease risk? *Int J Obes Relat Metab Disord*. 2002;26(2):176–83.
59. IOM (Institute of Medicine). Nutrition during pregnancy: Part I: Weight gain, Part II: Nutrient Supplements. Washington, DC: National Academies Press; 1990. <http://www.nap.edu/catalog/1451>. Accessed 18 Dec 2017.
60. Lederman SA, Paxton A, Heymsfeld SB, Wang J, Thornton J, Pierson RN. Body fat and water changes during pregnancy in women with different body weight and weight gain. *Obstet Gynecol*. 1997;90(4 Pt 1):483–8.
61. Gunderson EP, Abrams B, Selvin S. Does the pattern of postpartum weight change differ according to pregravid body size? *Int J Obes*. 2001;25(6):853.
62. Butte NF, Ellis KJ, Wong WW, Hopkinson JM, Smith EO. Composition of gestational weight gain impacts maternal fat retention and infant birth weight. *Am J Obstet Gynecol*. 2003;189(5):1423–32.
63. Bodnar LM, Pugh SJ, Abrams B, Himes KP, Hutcheon JA. Gestational weight gain in twin pregnancies and maternal and child health: a systematic review. *J Perinatol*. 2014;34(4):252–63.
64. Mohammadbeigi A, Farhadifar F, Zadeh NS, Mohammadsalehi N, Rezaiee M, Aghaei M. Fetal macrosomia: risk factors, maternal, and perinatal outcome. *Ann Med Health Sci Res*. 2013;3(4):546.
65. Han Z, Lutsiv O, Mulla S, Rosen A, Beyene J, McDonald SD, et al. Low gestational weight gain and the risk of preterm birth and low birthweight: a systematic review and meta-analyses: low gestational weight gain and PTB/LBW. *Acta Obstet Gynecol Scand*. 2011;90(9):935–54.
66. Huang A, Ji Z, Zhao W, Hu H, Yang Q, Chen D. Rate of gestational weight gain and preterm birth in relation to prepregnancy body mass indices and trimester: a follow-up study in China. *Reprod Health*. 2016;13:93. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4983027/>. Accessed 12 Aug 2016.
67. Jayabalan N, Nair S, Nuzhat Z, Rice GE, Zúñiga FA, Sobrevia L, et al. Cross talk between adipose tissue and placenta in obese and gestational diabetes mellitus pregnancies via exosomes. *Front Endocrinol*. 2017;8:239. <http://www.frontiersin.org.https://sci-hub.hk/articles/10.3389/fendo.2017.00239/full#B126>. Accessed 26 Dec 2017.
68. Barbour LA, Shao J, Qiao L, Pulawa LK, Jensen DR, Bartke A, et al. Human placental growth hormone causes severe insulin resistance in transgenic mice. *Am J Obstet Gynecol*. 2002;186(3):512–7.
69. Ruhstaller K, Bastek J, Thomas A, McElrath T, Parry S, Durnwald C. The effect of early excessive weight gain on the development of hypertension in pregnancy. *Am J Perinatol*. 2016;33(12):1205–10.
70. Friedmann I, Balayla J. Gestational weight gain and the risk of infant mortality amongst women with normal prepregnancy BMI: the Friedmann-Balayla model. *J Matern Fetal Neonatal Med*. 2018;31(3):325–32.
71. Sharma AJ, Vesco KK, Bulkley J, Callaghan WM, Bruce FC, Staab J, et al. Associations of Gestational Weight Gain with preterm birth among underweight and normal weight women. *Matern Child Health J*. 2015;19(9):2066–73.
72. Widén EM, Factor-Litvak PR, Gallagher D, Paxton A, Pierson RN, Heymsfeld SB, et al. The pattern of gestational weight gain is associated with changes in maternal body composition and neonatal size. *Matern Child Health J*. 2015;19(10):2286–94.
73. Wang Y, Mao J, Wang W, Qiou J, Yang L, Chen S. Maternal fat free mass during pregnancy is associated with birth weight. *Reprod Health*. 2017;14(1):47. <http://reproductive-healthjournal.biomedcentral.com/articles/10.1186/s12978-017-0308-3>. Accessed 9 Nov 2017.
74. Kovacs CS, Kronenberg HM. Maternal-fetal calcium and bone metabolism during pregnancy, puerperium, and lactation. *Endocr Rev*. 1997;18(6):832–72.
75. O'Sullivan SM, Grey AB, Singh R, Reid IR. Bisphosphonates in pregnancy and lactation-associated osteoporosis. *Osteoporos Int*. 2006;17(7):1008–12.
76. Kovacs CS, Ralston SH. Presentation and management of osteoporosis presenting in association with pregnancy or lactation. *Osteoporos Int*. 2015;26(9):2223–41.
77. Medicine AC of S. Exercise testing and prescription for population with other chronic diseases and health conditions. In: ACSM's guidelines for exercise testing and prescription. 10th ed. Philadelphia, PA: Lippincott Williams and Wilkins; 2017. p. 297–376. Revised.
78. Berggren EK, Groh-Wargo S, Presley L, Hauguel-de Mouzon S, Catalano PM. Maternal fat, but not lean, mass is increased among overweight/obese women with excess gestational weight gain. *Am J Obstet Gynecol*. 2016;214(6):745.e1–5.
79. Gunderson EP, Abrams B. Epidemiology of gestational weight gain and body weight changes after pregnancy. *Epidemiol Rev*. 1999;21(2):261–75.
80. Bogaerts A, De Baetselier E, Ameye L, Dilles T, Van Rompaey B, Devlieger R. Postpartum weight trajectories in overweight and lean women. *Midwifery*. 2017;49:134–41.
81. Sobhonslidsuk A, Jongjirasiri S, Thakkinstant A, Wisedopas N, Bunnag P, Puavilai G. Visceral fat and insulin resistance as predictors of non-alcoholic steatohepatitis. *World J Gastroenterol*. 2007;13(26):3614–8.
82. Brunzell JD, Hokanson JE. Dyslipidemia of central obesity and insulin resistance. *Diabetes Care*. 1999;22(Suppl 3):C10–3.
83. Goodpaster B, Kelley DE. Obesity and diabetes: body composition determinants of insulin resistance. In: Heymsfeld SB, Lohman TG, Wang Z, Going SB, editors. Human body composition. 2nd ed. Champaign, IL: Human Kinetics; 2005. p. 356–76.
84. Akagiri S, Naito Y, Ichikawa H, Mizushima K, Takagi T, Handa O, et al. A mouse model of metabolic syndrome; increase in visceral adipose tissue precedes the development of fatty liver and insulin resistance in high-fat diet-fed male KK/Ta mice. *J Clin Biochem Nutr*. 2008;42(2):150–7.
85. Sonagra AD. Normal pregnancy- a state of insulin resistance. *J Clin Diagn Res*. 2014;8:CC01. http://jcd.r.net/article_fulltext.asp?issn=0973-709x&

- year=2014&volume=8&issue=11&page=CC01&issn=0973-709x&id=5081. Accessed 3 Jan 2018.
86. Díaz P, Powell TL, Jansson T. The role of placental nutrient sensing in maternal-fetal resource allocation. *Biol Reprod*. 2014;91(4):82. <https://academic.oup.com/biolreprod/article-lookup/doi/10.1093/biolreprod.114.121798>. Accessed 3 Jan 2018.
 87. Coppack SW. Adipose tissue changes in obesity. *Biochem Soc Trans*. 2005;33(5):1049–52.
 88. Poulos SP, Hausman DB, Hausman GJ. The development and endocrine functions of adipose tissue. *Mol Cell Endocrinol*. 2010;323(1):20–34.
 89. Challier JC, Basu S, Bintein T, Minium J, Hotmire K, Catalano PM, et al. Obesity in pregnancy stimulates macrophage accumulation and inflammation in the placenta. *Placenta*. 2008;29(3):274–81.
 90. Aleksandrova K, Mozaffarian D, Pischon T. Addressing the perfect storm: biomarkers in obesity and pathophysiology of cardiometabolic risk. *Clin Chem*. 2018;64(1):142–53.
 91. Bakhai A. Adipokines--targeting a root cause of cardiometabolic risk. *QJM*. 2008;101(10):767–76.
 92. Amash A, Holcberg G, Sapir O, Huleihel M. Placental secretion of interleukin-1 and interleukin-1 receptor antagonist in preeclampsia: effect of magnesium sulfate. *J Interf Cytokine Res*. 2012;32(9):432–41.
 93. Leme Galvão LP, Menezes FE, Mendonça C, Barreto I, Alvim-Pereira C, Alvim-Pereira F, et al. Analysis of association of clinical aspects and IL1B tagSNPs with severe preeclampsia. *Hypertens Pregn*. 2016;35(1):112–22.
 94. Kalinderis M, Papanikolaou A, Kalinderi K, Ioannidou E, Giannoulis C, Karagiannis V, et al. Elevated serum levels of interleukin-6, interleukin-1β and human chorionic gonadotropin in pre-eclampsia: IL-6, IL-1β and HCG in pre-eclampsia. *Am J Reprod Immunol*. 2011;66(6):468–75.
 95. Phillips J, McBride CA, Morris E, Crocker AM, Bernstein I. Adiposity, but not obesity, is associated with arterial stiffness in young nulliparous women. *Reprod Sci*. 2018;25:909.
 96. Huda SS, Jordan F, Bray J, Love G, Payne R, Sattar N, et al. Visceral adipose tissue activated macrophage content and inflammatory adipokine secretion is higher in pre-eclampsia than in healthy pregnancies. *Clin Sci*. 2017;131(13):1529–40.
 97. D'anna R, Baviera G, Corrado F, Giordano D, Di Benedetto A, Jasonni VM. Plasma adiponectin concentration in early pregnancy and subsequent risk of hypertensive disorders. *Obstet Gynecol*. 2005;106(2):340–4.
 98. Rosso P, Donoso E, Braun S, Espinoza R, Fernández C, Salas SP. Maternal hemodynamic adjustments in idiopathic fetal growth retardation. *Gynecol Obstet Investig*. 1993;35:162–5.
 99. Piuri G, Ferrazzi E, Bulfoni C, Masticci L, Di Martino D, Speciani AF. Longitudinal changes and correlations of bioimpedance and anthropometric measurements in pregnancy: simple possible bedside tools to assess pregnancy evolution. *J Matern Fetal Neonatal Med*. 2017;30(23):2824–30.
 100. Toro-Ramos T, Paley C, Pi-Sunyer FX, Gallagher D. Body composition during fetal development and infancy through the age of 5 years. *Eur J Clin Nutr*. 2015;69(12):1279–89.
 101. Chang S, Lodico L, Williams Z. Nutritional composition and heavy metal content of the human placenta. *Placenta*. 2017;60:100–2.
 102. Pratt JP, Kaucher M, Richards AJ, Williams HH, Macy IC. Composition of the human placenta: I. Proximate composition. *Am J Obstet Gynecol*. 1946;52(3):402–8.
 103. Paxton A, Lederman SA, Heymsfeld SB, Wang J, Thornton JC, Pierson RN. Anthropometric equations for studying body fat in pregnant women. *Am J Clin Nutr*. 1998;67(1):104–10.
 104. Denne SC, Patel D, Kalhan SC. Total body water measurement in normal and diabetic pregnancy: evidence for maternal and amniotic fluid equilibrium. *Neonatology*. 1990;57(5):284–91.
 105. Wong WW, Lee LS, Klein PD. Deuterium and oxygen-18 measurements on microliter samples of urine, plasma, saliva, and human milk. *Am J Clin Nutr*. 1987;45(5):905–13.
 106. Larciprete G, Valensise H, Vasapollo B, Altomare F, Sorge R, Casalino B, et al. Body composition during normal pregnancy: reference ranges. *Acta Diabetol*. 2003;40(S1):s225–32.
 107. Lof M, Forsum E. Evaluation of bioimpedance spectroscopy for measurements of body water distribution in healthy women before, during, and after pregnancy. *J Appl Physiol*. 2004;96(3):967–73.
 108. Anderson EC, Schuch RL, Fisher WR, Langham W. Radioactivity of people and foods. *Science*. 1957;125(3261):1273–8.
 109. Smith T, Cronquist A. A versatile and economic whole-body counter based on liquid scintillation detector modules. *Br J Radiol*. 1977;50:332–9.
 110. Ellis KJ. Whole-body counting and neutron activation analysis. In: Human body composition. 2nd ed. Champaign, IL: Human Kinetics Publishers; 2005. p. 51–62. Revised.
 111. Pipe NGJ, Smith T, Halliday D, Edmonds CJ, Williams C, Coltart TM. Changes in fat, fat-free mass and body water in human normal pregnancy. *BJOG Int J Obstet Gynaecol*. 1979;86(12):929–40.
 112. Gilmore LA, Butte NF, Ravussin E, Han H, Burton JH, Redman LM. Energy intake and energy expenditure for determining excess weight gain in pregnant women. *Obstet Gynecol*. 2016;127(5):884–92.
 113. Fuller NJ, Jebb SA, Laskey MA, Coward WA, Elia M. Four-component model for the assessment of body composition in humans: comparison with alternative methods, and evaluation of the density and hydration of fat-free mass. *Clin Sci*. 1992;82(6):687–93.
 114. Marshall NE, Murphy EJ, King JC, Haas EK, Lim JY, Wiedrick J, et al. Comparison of multiple methods to measure maternal fat mass in late gestation. *Am J Clin Nutr*. 2016;103(4):1055–63.
 115. Hopkinson JM, Butte NF, Ellis KJ, Wong WW, Puyau MR, Smith EO. Body fat estimation in late pregnancy and early postpartum: comparison of two-, three-, and four-component models. *Am J Clin Nutr*. 1997;65(2):432–8.
 116. Van Raaij JM, Peek ME, Vermaat-Miedema SH, Schonk CM, Hautvast JG. New equations for estimating body fat mass in pregnancy from body density or total body water. *Am J Clin Nutr*. 1988;48(1):24–9.
 117. De Lorenzo A, Andreoli A, Matthie J, Withers P. Predicting body cell mass with bioimpedance by using theoretical methods: a technological review. *J Appl Physiol*. 1997;82(5):1542–58.
 118. To WWK, Wong MWN. Changes in bone mineral density of the os calcis as measured by quantitative ultrasound during pregnancy and 24 months after delivery: bone mineral density changes after pregnancy. *Aust N Z J Obstet Gynaecol*. 2011;51(2):166–71.
 119. Kennedy N, Peek M, Quinton A, Lanzarone V, Martin A, Benzie R, et al. Maternal abdominal subcutaneous fat thickness as a predictor for adverse pregnancy outcome: a longitudinal cohort study. *BJOG Int J Obstet Gynaecol*. 2016;123(2):225–32.
 120. Bartha JL, Marín-Segura P, González-González NL, Wagner F, Aguilar-Diosdado M, Hervias-Vivancos B. Ultrasound evaluation of visceral fat and metabolic risk factors during early pregnancy. *Obesity*. 2007;15(9):2233–9.
 121. Tocchio S, Kline-Fath B, Kanal E, Schmithorst VJ, Panigrahy A. MRI evaluation and safety in the developing brain. *Semin Perinatol*. 2015;39(2):73–104.
 122. Norgan NG. Maternal body composition: methods for measuring short-term changes. *J Biosoc Sci*. 1992;24(3):367–77.
 123. Keys A, Fidanza F, Karvonen MJ, Kimura N, Taylor HL. Indices of relative weight and obesity. *J Chronic Dis*. 1972;25(6):329–43.
 124. Craig P, Samaras K, Freund J, Culton N, Halavatau V, Campbell L. BMI inaccurately reflects total body and abdominal fat in Tongans. *Acta Diabetol*. 2003;40(Suppl 1):S282–5.
 125. Sewell MF, Huston-Presley L, Amini SB, Catalano PM. Body mass index: a true indicator of body fat in obese gravidas. *J Reprod Med*. 2007;52(10):907–11.
 126. Lindsay CA, Huston L, Amini SB, Catalano PM. Longitudinal changes in the relationship between body mass index and percent body fat in pregnancy. *Obstet Gynecol*. 1997;89(3):377–82.
 127. Gernand AD, Christian P, Schulze KJ, Shaikh S, Labrique AB, Shamim AA, et al. Maternal nutritional status in early pregnancy is associated with body water and plasma volume changes in a pregnancy cohort in rural Bangladesh. *J Nutr*. 2012;142(6):1109–15.

128. Contreras Campos ME, Rodríguez-Cervantes N, Reza-López S, Ávila-Esparza M, ChávezCorral DV, Levorio-Carrillo M. Body composition and newborn birthweight in pregnancies of adolescent and mature women: body composition in pregnant adolescents. *Matern Child Nutr.* 2015;11(2):164–72.
129. Dittmar M, Reber H. Validation of different bioimpedance analyzers for predicting cell mass against whole-body counting of potassium (40K) as a reference method. *Am J Hum Biol.* 2004;16(6):697–703.
130. Berlitz S, Tuschy B, Stojakowits M, Weiss C, Leweling H, Suetterlin M, et al. Bioelectrical impedance analysis in pregnancy: reference ranges. *In Vivo.* 2013;27(6):851–4.
131. Lukaski HC, Siders WA, Nielsen EJ, Hall CB. Total body water in pregnancy: assessment by using bioelectrical impedance. *Am J Clin Nutr.* 1994;59(3):578–85.
132. Obuchowska A, Standylo A, Kimber-Trojnar Z, Leszczyńska-Gorzela B. The possibility of using bioelectrical impedance analysis in pregnant and postpartum women. *Diagnostics.* 2021;11(8):1370.
133. Kyle UG, Bosaeus I, De Lorenzo AD, Deurenberg P, Elia M, Manuel Gómez J, et al. Bioelectrical impedance analysis—part II: utilization in clinical practice. *Clin Nutr.* 2004;23(6):1430–53.
134. Trindade CR, Torloni MR, Mattar R, Sun SY. Good performance of bioimpedance in early pregnancy to predict preeclampsia. *Pregnan Hypertens.* 2021;26:24–30.
135. Liu Y, Liu J, Gao Y, Zheng D, Pan W, Nie M, et al. The body composition in early pregnancy is associated with the risk of development of gestational diabetes mellitus late during the second trimester. *Diabetes Metab Syndr Obes Targets Ther.* 2020;13:2367–74.
136. Bijlholt M, Maslin K, Ameye L, Shawe J, Bogaerts A, Devlieger R. Phase angle and bioimpedance values during the first year after delivery in women with previous excessive gestational weight gain: innovative data from the Belgian INTER-ACT study. *Int J Environ Res Public Health.* 2021;18(14):7482.
137. Lopez LB, Calvo EB, Poy MS, del Valle Balmaceda Y, Camera K. Changes in skinfolds and mid-upper arm circumference during pregnancy in Argentine women. *Matern Child Nutr.* 2011;7(3):253–62.
138. Kanniepan LM, Deussen AR, Grivell RM, Yelland L, Dodd JM. Developing a tool for obtaining maternal skinfold thickness measurements and assessing inter-observer variability among pregnant women who are overweight and obese. *BMC Pregnant Childb.* 2013;13(42):1–6.
139. Stevens-Simon C, Thureen P, Barrett J, Stamm E. Skinfold caliper and ultrasound assessments of change in the distribution of subcutaneous fat during adolescent pregnancy. *Int J Obes Relat Metab Disord.* 2001;25(9):1340.
140. Durnin J, Grant S, McKillop FM, Fitzgerald G. Energy requirements of pregnancy in Scotland. *Lancet.* 1987;330(8564):897–900.
141. Durnin J. Energy requirements of pregnancy: an integrated study in five countries: background and methods. *Lancet.* 1987;330(8564):895–6.
142. Durnin J. Energy requirements of pregnancy. *Diabetes.* 1991;40(S2):152–6.
143. Sohlström A, Forsum E. Changes in total body fat during the human reproductive cycle as assessed by magnetic resonance imaging, body water dilution, and skinfold thickness: a comparison of methods. *Am J Clin Nutr.* 1997;66(6):1315–22.
144. Presley LH, Wong WW, Roman NM, Amini SB, Catalano PM. Anthropometric estimation of maternal body composition in late gestation. *Obstet Gynecol.* 2000;96(1):33–7.
145. Soltani H, Fraser RB. A longitudinal study of maternal anthropometric changes in normal weight, overweight and obese women during pregnancy and postpartum. *Br J Nutr.* 2000;84(01):95.
146. Taggart NR, Holliday RM, Billewicz WZ, Hytten FE, Thomson AM. Changes in skinfolds during pregnancy. *Br J Nutr.* 1967;21(02):439.
147. Ehrenberg HM, Huston-Presley L, Catalano PM. The influence of obesity and gestational diabetes mellitus on accretion and the distribution of adipose tissue in pregnancy. *Am J Obstet Gynecol.* 2003;189(4):944–8.
148. Villar J, Cogswell M, Kestler E, Castillo P, Menendez R, Repke JT. Effect of fat and fat-free mass deposition during pregnancy on birth weight. *Am J Obstet Gynecol.* 1992;167(5):1344–52.
149. Tuazon MAG, Van Raaij JMA, Hautvast JGA, Barba CVC. Energy requirements of pregnancy in the Philippines. *Lancet.* 1987;330(8568):1129–31.
150. Catalano PM, Roman-Drago NM, Amini SB, Sims EA. Longitudinal changes in body composition and energy balance in lean women with normal and abnormal glucose tolerance during pregnancy. *Am J Obstet Gynecol.* 1998;179(1):156–65.
151. Branco M, Santos-Rocha R, Vieira F, Silva M-R, Aguiar L, Veloso AP. Influence of body composition on gait kinetics throughout pregnancy and postpartum period. *Scientifica.* 2016;2016:1–12.
152. Lohman TG, Roche AF, Martorell R. Anthropometric standardization reference manual. Champaign, IL: Human Kinetics; 1988.
153. López LB, Calvo EB, Poy MS, del Valle Balmaceda Y, Cámara K. Changes in skinfolds and mid-upper arm circumference during pregnancy in Argentine women: skinfolds and MUAC changes in pregnant Argentine women. *Matern Child Nutr.* 2011;7(3):253–62.
154. Heyward V, Wagner DR. Applied body composition assessment. Champaign, IL: Human Kinetics; 2004.
155. Stewart A, Marfell-Jones M, Olds T, de Ridder H. International standards for anthropometric assessment. Lower Hutt: ISAK; 2011.
156. Bern C, Nathanail L. Is mid-upper-arm circumference a useful tool for screening in emergency settings? *Lancet.* 1995;345(8950):631–3.
157. Vijayaraghavan K, Sastry JG. The efficacy of arm circumference as a substitute for weight in assessment of protein-calorie malnutrition. *Ann Hum Biol.* 1976;3(3):229–33.
158. Lindtjorn B. Measuring acute malnutrition: a need to redefine cut-off points for arm circumference? *Lancet.* 1985;2(8466):1229–30.
159. Carter EP. Comparison of weight:height ratio and arm circumference in assessment of acute malnutrition. *Arch Child.* 1987;62(8):833–5.
160. Hall G, Chowdhury S, Bloem M. Use of mid-upper-arm circumference Z scores in nutritional assessment. *Lancet.* 1993;341(8858):1481.
161. Demanet JC, Rorive G, Samii K, Van Cauwenberge H, Smets P. Effect of weight on prevalence of hypertension, and its interaction with the arm circumference: Belgian Hypertension Committee epidemiological study. *Clin Sci Mol Med Suppl.* 1976;3:665s–7s.
162. Harries AD, Jones LA, Heatley RV, Newcombe RG, Rhodes J. Precision of anthropometric measurements: the value of mid-arm circumference. *Clin Nutr.* 1984;2(3-4):193–6. PubMed PMID: 16829433.
163. Olukoya AA. Identification of underweight women by measurement of the arm circumference. *International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics.* 1990;31(3):231–5. PubMed PMID: 1969363.
164. Shao J-T, Yu J, Qi J-Q, Liu X-D. The relationship between neck circumference and pregnancy-induced hypertension in the third trimester pregnant women. *Hypertens Pregnant.* 2014;33(3):291–8.
165. He F, He H, Liu W, Lin J, Chen B, Lin Y, et al. Neck circumference might predict gestational diabetes mellitus in Han Chinese women: a nested case-control study. *J Diabetes Investig.* 2017;8(2):168–73.
166. Anglim B, O'Higgins A, Daly N, Farren M, Turner MJ. Maternal obesity and neck circumference. *Ir Med J.* 2015;108(6):179–80.
167. Clapp JF, Capeless EL. Neonatal morphometrics after endurance exercise during pregnancy. *Am J Obstet Gynecol.* 1990;163(6 Pt 1):1805–11.
168. Bisson M, Tremblay F, St-Onge O, Robitaille J, Pronovost E, Simonyan D, et al. Influence of maternal physical activity on infant's body composition: maternal activity and neonatal adiposity. *Pediatr Obes.* 2017;12:38–46.
169. Ferrari N, Bae-Gartz I, Bauer C, Janoschek R, Koxholt I, Mahabir E, et al. Exercise during pregnancy and its impact on mothers and offspring in humans and mice. *J Dev Orig Health Dis.* 2018;9(1):63–76.
170. Collings PJ, Farrar D, Gibson J, West J, Barber SE, Wright J. Associations of Pregnancy Physical Activity with Maternal Cardiometabolic Health, Neonatal delivery outcomes and body composition in a biethnic cohort of 7305 mother–child Pairs: the born in Bradford study. *Sports Med.* 2020;50(3):615–28.
171. Leppänen MH, Raitanen J, Husu P, Kujala UM, Tuominen PP, Vähä-Ypyä H, et al. Physical activity and body composition in children and their mothers according to mother's gestational diabetes risk: a seven-year follow-up study. *Medicina.* 2019;55(10):635.
172. ACOG. Physical activity and exercise during pregnancy and the postpartum period. *Obstet Gynecol.* 2020;135(4):e178–85.
173. Mottola MF, Davenport MH, Ruchat S-M, Davies GA, Poitras VJ, Gray CE, et al. 2019 Canadian guideline for physical activity throughout pregnancy. *Br J Sports Med.* 2018;52(21):1339–46.

174. Smith R, Reid H, Matthews A, Calderwood C, Knight M, Foster C. Infographic: physical activity for pregnant women. *Br J Sports Med.* 2018;52(8):532–3.
175. Gaston A, Cramp A. Exercise during pregnancy: a review of patterns and determinants. *J Sci Med Sport.* 2011;14(4):299–305.
176. Rogozińska E, Zamora J, Marlin N, Betrán AP, Astrup A, Bogaerts A, et al. Gestational weight gain outside the Institute of Medicine recommendations and adverse pregnancy outcomes: analysis using individual participant data from randomised trials. *BMC Pregn Childb.* 2019;19(1):322.
177. Rasmussen KM, Yaktine AL, Institute of Medicine (U.S.). Weight gain during pregnancy: reexamining the guidelines. Washington, DC: National Academies Press; 2009. 854 p.
178. Pellonperä O, Koivuniemi E, Vahlberg T, Makkala K, Tertti K, Rönnemaa T, et al. Body composition measurement by air displacement plethysmography in pregnancy: comparison of predicted versus measured thoracic gas volume. *Nutrition.* 2019;60:227–9.
179. Wasenius NS, Simonen M, Penttinen L, Salonen MK, Sandboge S, Eriksson JG. Effect of maternal weight during pregnancy on offspring muscle strength response to resistance training in late adulthood. *Adv Med Sci.* 2018;63(2):353–8.
180. Muhammad HFL, Pramono A, Rahman MN. The safety and efficacy of supervised exercise on pregnant women with overweight/obesity: a systematic review and meta-analysis of randomized controlled trials. *Clin Obes.* 2021;11(2):e12428. <https://onlinelibrary.wiley.com/doi/10.1111/cob.12428>. Accessed 20 Sep 2021.
181. da Silva SG, Ricardo LI, Evenson KR, Hallal PC. Leisure-time physical activity in pregnancy and maternal-child health: a systematic review and meta-analysis of randomized controlled trials and cohort studies. *Sports Med.* 2017;47(2):295–317.
182. Garnæs KK, Mørkved S, Salvesen KÅ, Salvesen Ø, Moholdt T. Exercise training during pregnancy reduces circulating insulin levels in overweight/obese women postpartum: secondary analysis of a randomised controlled trial (the ETIP trial). *BMC Pregn Childb.* 2018;18(1):18. <https://bmcpregnancychildbirth.biomedcentral.com/articles/10.1186/s12884-017-1653-5>. Accessed 12 Jan 2018.
183. Thangaratinam S, Rogozińska E, Jolly K, Glinkowski S, Roseboom T, Tomlinson JW, et al. Effects of interventions in pregnancy on maternal weight and obstetric outcomes: metaanalysis of randomised evidence. *BMJ.* 2012;344(4):e2088.
184. The International Weight Management in Pregnancy (i-WIP) Collaborative Group. Effect of diet and physical activity based interventions in pregnancy on gestational weight gain and pregnancy outcomes: meta-analysis of individual participant data from randomised trials. *BMJ.* 2017;358:j3119.
185. Thangaratinam S, Rogozińska E, Jolly K, Glinkowski S, Duda W, Borowiack E, et al. Interventions to reduce or prevent obesity in pregnant women: a systematic review. *Health Technol Assess.* 2012;16(31):iii. <https://www.journalslibrary.nihr.ac.uk/hta/hta16310/>. Accessed 20 Sep 2021.
186. Choi J, Fukuoka Y, Lee JH. The effects of physical activity and physical activity plus diet interventions on body weight in overweight or obese women who are pregnant or in postpartum: a systematic review and meta-analysis of randomized controlled trials. *Prev Med.* 2013;56(6):351–64.
187. Phelan S, Phipps MG, Abrams B, Darroch F, Grantham K, Schaffner A, et al. Does behavioral intervention in pregnancy reduce postpartum weight retention? Twelve-month outcomes of the Fit for Delivery randomized trial. *Am J Clin Nutr.* 2014;99(2):302–11.
188. Sagedal L, Sanda B, Øverby N, Bere E, Torstveit M, Lohne-Seiler H, et al. The effect of prenatal lifestyle intervention on weight retention 12 months postpartum: results of the Norwegian Fit for Delivery randomised controlled trial. *BJOG Int J Obstet Gynaecol.* 2017;124(1):111–21.
189. Huberty JL, Buman MP, Leiferman JA, Bushar J, Hekler EB, Adams MA. Dose and timing of text messages for increasing physical activity among pregnant women: a randomized controlled trial. *Transl Behav Med.* 2017;7(2):212–23.
190. Hayman M, Reaburn P, Browne M, Vandelanotte C, Alley S, Short CE. Feasibility, acceptability and efficacy of a web-based computer-tailored physical activity intervention for pregnant women - the Fit4Two randomised controlled trial. *BMC Pregn Childb.* 2017;17(1):96.
191. Willcox J, Wilkinson S, Lappas M, Ball K, Crawford D, McCarthy E, et al. A mobile health intervention promoting healthy gestational weight gain for women entering pregnancy at a high body mass index: the txt4two pilot randomised controlled trial. *BJOG Int J Obstet Gynaecol.* 2017;124(11):1718–28.
192. Choi J, Hyeon LJ, Vittinghoff E, Fukuoka Y. mHealth physical activity intervention: a randomized pilot study in physically inactive pregnant women. *Matern Child Health J.* 2016;20(5):1091–101.
193. Sandborg J, Söderström E, Henriksson P, Bendtsen M, Henström M, Leppänen MH, et al. Effectiveness of a smartphone app to promote healthy weight gain, diet, and physical activity during pregnancy (HealthyMoms): randomized controlled trial. *JMIR MHealth UHealth.* 2021;9(3):e26091.
194. Walker R, Bennett C, Blumfeld M, Gwini S, Ma J, Wang F, et al. Attenuating pregnancy weight gain—what works and why: a systematic review and meta-analysis. *Nutrients.* 2018;10(7):944.
195. Tanner-Smith EE, Steinka-Fry KT, Gesell SB. Comparative effectiveness of group and individual prenatal care on gestational weight gain. *Matern Child Health J.* 2014;18(7):1711–20.
196. Agha M, Agha RA, Sandell J. Interventions to reduce and prevent obesity in pre-conceptual and pregnant women: a systematic review and meta-analysis. *PLoS One.* 2014;9(5):e95132. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4020754/>. Accessed 14 May 2014.
197. Chiavaroli V, Hopkins SA, Derraik JGB, Biggs JB, Rodrigues RO, Brennan CH, et al. Exercise in pregnancy: 1-year and 7-year follow-ups of mothers and offspring after a randomized controlled trial. *Sci Rep.* 2018;8(1):12915.
198. Forsum E, Janerot-Sjöberg B, Löf M. MET-values of standardised activities in relation to body fat: studies in pregnant and non-pregnant women. *Nutr Metab.* 2018;15(1):45.
199. Clapp JF III, Kiess W. Effects of pregnancy and exercise on concentrations of the metabolic markers tumor necrosis factor α and leptin. *Am J Obstet Gynecol.* 2000;182(2):300–6.
200. van der Wijden CL, Delemarre-van de Waal HA, van Mechelen W, van Poppel MNM. The relationship between moderate-to-vigorous intensity physical activity and insulin resistance, insulin-like growth factor (IGF-1)-system 1, leptin and weight change in healthy women during pregnancy and after delivery. *Clin Endocrinol.* 2015;82(1):68–75.
201. Haas JS, Jackson RA, Fuentes-Affick E, Stewart AL, Dean ML, Brawarsky P, et al. Changes in the health status of women during and after pregnancy. *J Gen Intern Med.* 2005;20(1):45–51.
202. Most J, Altazan AD, St. Amant M, Beyl RA, Ravussin E, Redman LM. Increased energy intake after pregnancy determines postpartum weight retention in women with obesity. *J Clin Endocrinol Metab.* 2020;105(4):e1601–11.
203. Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Rep.* 1985;100(2):126–31.
204. de Oliveira Melo AS, Silva JLP, Tavares JS, Barros VO, Leite DFB, Amorim MMR. Effect of a physical exercise program during pregnancy on uteroplacental and fetal blood flow and fetal growth: a randomized controlled trial. *Obstet Gynecol.* 2012;120(2, Part 1):302–10.
205. Price BB, Amini SB, Kappeler K. Exercise in pregnancy: effect on fitness and obstetric outcomes—a randomized trial. *Med Sci Sports Exerc.* 2012;44(12):2263–9.
206. Barakat R, Pelaez M, Montejo R, Refoyo I, Coterón J. Exercise throughout pregnancy does not cause preterm delivery: a randomized, controlled trial. *J Phys Act Health.* 2014;11(5):1012–7.
207. US. Department of health and Human Services. Physical activity guidelines for Americans. 2nd ed. Washington, DC: DHHS; 2018. p. 118
208. WHO. WHO guidelines on physical activity and sedentary behaviour. Geneva: World Health Organization; 2020. <https://www.who.int/publications/item/9789240015128>.
209. Cordero Y, Mottola MF, Vargas J, Blanco M, Barakat R. Exercise is associated with a reduction in gestational diabetes mellitus. *Med Sci Sports Exerc.* 2015;47(7):1328–33.
210. Barakat R, Pelaez M, Cordero Y, Perales M, Lopez C, Coterón J, et al. Exercise during pregnancy protects against hypertension and macrosomia: randomized clinical trial. *Am J Obstet Gynecol.* 2016;214(5):649.e1–8.
211. Magro-Malosso ER, Saccone G, Di Tommaso M, Roman A, Berghella V. Exercise during pregnancy and risk of gestational hypertensive disorders: a systematic

- review and metaanalysis. *Acta Obstet Gynecol Scand.* 2017;96(8):921–31.
212. Muktabhant B, Lawrie TA, Lumbiganon P, Laopaiboon M. Diet or exercise, or both, for preventing excessive weight gain in pregnancy. *Cochrane Database Syst Rev.* 2015;(6):CD007145. <https://doi.wiley.com/10.1002/14651858.CD007145.pub3>. Accessed 20 Sep 2021.
 213. Kołomańska-Bogucka D, Mazur-Bialy AI. Physical activity and the occurrence of postnatal depression—a systematic review. *Medicina.* 2019;55(9):560.
 214. Nakamura A, van der Waerden J, Melchior M, Bolze C, El-Khoury F, Pryor L. Physical activity during pregnancy and postpartum depression: systematic review and meta-analysis. *J Affect Disord.* 2019;246:29–41.
 215. Marín-Jiménez N, Acosta-Manzano P, Borges-Cosic M, Baena-García L, Coll-Risco I, Romero-Gallardo L, et al. Association of self-reported physical fitness with pain during pregnancy: the GESTAFIT project. *Scand J Med Sci Sports.* 2019;29:1022.
 216. Seneviratne SN, McCowan LME, Cutfield WS, Derriak JGB, Hofman PL. Exercise in pregnancies complicated by obesity: achieving benefits and overcoming barriers. *Am J Obstet Gynecol.* 2015;212(4):442–9.
 217. Wang S-M, Dezinno P, Maranets I, Berman MR, Caldwell-Andrews AA, Kain ZN. Low back pain during pregnancy: prevalence, risk factors, and outcomes. *Obstet Gynecol.* 2004;104(1):65–70.
 218. Tennfjord MK, Engh ME, Bø K. The influence of early exercise postpartum on pelvic floor muscle function and prevalence of pelvic floor dysfunction 12 months postpartum. *Phys Ther.* 2020;100(9):1681–9.
 219. Mota P, Pascoal AG, Carita AI, Bø K. The immediate effects on inter-rectus distance of abdominal crunch and drawing-in exercises during pregnancy and the postpartum period. *J Orthop Sports Phys Ther.* 2015;45(10):781–8.
 220. Sancho MF, Pascoal AG, Mota P, Bø K. Abdominal exercises affect inter-rectus distance in postpartum women: a two-dimensional ultrasound study. *Physiotherapy.* 2015;101(3):286–91

منابع

1. Paisley TS, Joy EA, Price RJ Jr. Exercise during pregnancy: a practical approach. *Curr Sports Med Rep.* 2003;2(6):325–30.
2. A.C.O.G. Physical activity and exercise during pregnancy and the postpartum period: ACOG committee opinion, number 804. *Obstet Gynecol.* 2020;135(4):e178–e88. <https://doi.org/10.1097/aog.0000000000003772>.
3. American College of Sports Medicine, Riebe D, Ehrman JK, Liguori G, Magal M. ACSM's guidelines for exercise testing and prescription. 10th ed. Philadelphia, PA: Wolters Kluwer; 2018.
4. Bø K, Artal R, Barakat R, Brown W, Davies GAL, Dooley M, et al. Exercise and pregnancy in recreational and elite athletes: 2016 evidence summary from the IOC expert group meeting, Lausanne. Part 1—exercise in women planning pregnancy and those who are pregnant. *Br J Sport Med.* 2016;50(10):571.
5. Oken E, Ning Y, Rifas-Shiman SL, Radesky JS, Rich-Edwards JW, Gillman MW. Associations of physical activity and inactivity before and during pregnancy with glucose tolerance. *Obstet Gynecol.* 2006;108(5):1200–7. <https://doi.org/10.1097/01.aog.0000241088.60745.70>.
6. Foxcroft KF, Callaway LK, Byrne NM, Webster J. Development and validation of a pregnancy symptoms inventory. *BMC Pregnanc Childb.* 2013;13(1):3. <https://doi.org/10.1186/1471-2393-13-3/6>
7. Borg-Stein J, Dugan SA, Gruber J. Musculoskeletal aspects of pregnancy. *Am J Phys Med Rehabil.* 2005;84(3):180–92.
8. Domingues MR, Barros AJ. Leisure-time physical activity during pregnancy in the 2004 Pelotas Birth Cohort Study. *Rev Saude Publica.* 2007;41(2):173–80.
9. Pereira MA, Rifas-Shiman SL, Kleinman KP, Rich-Edwards JW, Peterson KE, Gillman MW. Predictors of change in physical activity during and after pregnancy: project Viva. *Am J Prev Med.* 2007;32(4):312–9. <https://doi.org/10.1016/j.amepre.2006.12.017>.
10. Borodulin K, Evenson KR, Monda K, Wen F, Herring AH, Dole N. Physical activity and sleep among pregnant women. *Paediatr Perinat Epidemiol.* 2010;24(1):45–52. <https://doi.org/10.1111/j.1365-3016.2009.01081.x>.
11. DiNallo JM, Williams NI, Downs DS, Le Masurier GC. Walking for health in pregnancy. *Res Q Exerc Sport.* 2008;79(1):28–35. <https://doi.org/10.1080/02701367.2008.10599457>.
12. Owe KM, Nystad W, Bø K. Correlates of regular exercise during pregnancy: the Norwegian Mother and Child Cohort Study. *Scand J Med Sci Sports.* 2009;19(5):637–45. <https://doi.org/10.1111/j.1600-0838.2008.00840.x>.
13. Evenson KR, Wen F. National trends in self-reported physical activity and sedentary behaviors among pregnant women: NHANES 1999–2006. *Prev Med.* 2010;50(3):123–8. <https://doi.org/10.1016/j.ypmed.2009.12.015>.
14. Walsh JM, McGowan CA, Mahony R, Foley ME, McAuliffe FM. Low glycaemic index diet in pregnancy to prevent macrosomia (ROLO study): randomised control trial. *BMJ.* 2012;345:e5605.
15. Hegaard HK, Damm P, Hedegaard M, Henriksen TB, Ottesen B, Dykes A-K, et al. Sports and leisure time physical activity during pregnancy in nulliparous women. *Matern Child Health J.* 2011;15(6):806–13. <https://doi.org/10.1007/s10995-010-0647-y>.
16. Tinloy J, Chuang CH, Zhu J, Pauli J, Kraschnewski JL, Kjerulff KH. Exercise during pregnancy and risk of late preterm birth, cesarean delivery, and hospitalizations. *Womens Health Issues.* 2014;24(1):e99–e104. <https://doi.org/10.1016/j.whi.2013.11.003>.
17. Liu L, Su H, Yu M. Full-term delivery in a pregnant breast cancer patient. *Acta Obstet Gynecol Scand.* 2011;90(12):1454. <https://doi.org/10.1111/j.1600-0412.2011.01095.x>.
18. Barakat R, Perales M, Garatachea N, Ruiz JR, Lucia A. Exercise during pregnancy. A narrative review asking: what do we know? *Br J Sports Med.* 2015;49(21):1377–81. <https://doi.org/10.1136/bjsports-2015-094756>.
19. Wastnedge EAN, Reynolds RM, van Boeckel SR, Stock SJ, Denison FC, Maybin JA, et al. Pregnancy and COVID-19. *Physiol Rev.* 2020;101(1):303–18. <https://doi.org/10.1152/physrev.00024.2020>.
20. Segal NA, Chu SR. Musculoskeletal anatomic, gait, and balance changes in pregnancy and risk for falls. In: Fitzgerald CM, Segal NA, editors. *Musculoskeletal health in pregnancy and postpartum: an evidence-based guide for clinicians.* Cham: Springer International Publishing; 2015. p. 1–18.
21. Reese ME, Casey E. Hormonal influence on the neuromusculoskeletal system in pregnancy. In: Fitzgerald CM, Segal NA, editors. *Musculoskeletal health in pregnancy and postpartum: an evidence-based guide for clinicians.* Cham: Springer International Publishing; 2015. p. 19–39.
22. Anselmo DS, Love E, Tango DN, Robinson L. Musculoskeletal effects of pregnancy on the lower extremity: a literature review. *J Am Podiatr Med Assoc.* 2017;107(1):60–4. <https://doi.org/10.7547/15-061>.
23. Institute of Medicine and National Research Council of the National Academies. *Weight gain during pregnancy: reexamining the guidelines.* Washington, DC: The National Academies Press; 2009.
24. Wang TW, Apgar BS. Exercise during pregnancy. *Am Fam Physician.* 1998;57(8):1846–52, 57.
25. Whitcome KK, Shapiro LJ, Lieberman DE. Fetal load and the evolution of lumbar lordosis in bipedal hominins. *Nature.* 2007;450(7172):1075–U11. <https://doi.org/10.1038/nature06342>.
26. Cunningham FG. *Williams obstetrics.* 25th ed. New York, NY: McGraw-Hill; 2018.
27. Ostgaard HC, Andersson GB, Schultz AB, Miller JA. Influence of some biomechanical factors on low-back pain in pregnancy. *Spine (Phila Pa 1976).* 1993;18(1):61–5
28. Gilleard WL, Brown JM. Structure and function of the abdominal muscles in primigravid subjects during pregnancy and the immediate postbirth period. *Phys Ther.* 1996;76(7):750–62.
29. Foti T, Davids JR, Bagley A. A biomechanical analysis of gait during pregnancy. *J Bone Joint Surg Am.* 2000;82A(5):625–32.
30. Gutke A, Ostgaard HC, Oberg B. Predicting persistent pregnancy-related low back pain. *Spine (Phila Pa 1976).* 2008;33(12):E386–93. <https://doi.org/10.1097/BRS.0b013e31817331a4>.

31. Wang SM, Dezinno P, Maranets I, Berman MR, Caldwell-Andrews AA, Kain ZN. Low back pain during pregnancy: prevalence, risk factors, and outcomes. *Obstet Gynecol.* 2004;104(1):65–70. <https://doi.org/10.1097/01.AOG.0000129403.54061.0e>.
32. Mogren IM, Pohjanen AI. Low back pain and pelvic pain during pregnancy: prevalence and risk factors. *Spine (Phila Pa 1976).* 2005;30(8):983–91. <https://doi.org/10.1097/01.brs.0000158957.42198.8e>.
33. Ng BK, Kipli M, Abdul Karim AK, Shohaimi S, Abdul Ghani NA, Lim PS. Back pain in pregnancy among office workers: risk factors and its impact on quality of life. *Horm Mol Biol Clin Invest.* 2017;32(3) <https://doi.org/10.1515/hmbci-2017-0037>.
34. Aldabe D, Milosavljevic S, Bussey MD. Is pregnancy related pelvic girdle pain associated with altered kinematic, kinetic and motor control of the pelvis? A systematic review. *Eur Spine J.* 2012;21(9):1777–87. <https://doi.org/10.1007/s00586-012-2401-1>.
35. Monteiro M, Gabriel R, Aranha J, Neves e Castro M, Sousa M, Moreira M. Influence of obesity and sarcopenic obesity on plantar pressure of postmenopausal women. *Clin Biomech.* 2010;25(5):461–7. <https://doi.org/10.1016/j.clinbiomech.2010.01.017>.
36. Woo J, Leung J, Kwok T. BMI, body composition, and physical functioning in older adults. *Obesity.* 2007;15(7):1886–94. <https://doi.org/10.1038/oby.2007.223>.
37. Bosch K, Nagel A, Weigend L, Rosenbaum D. From “first” to “last” steps in life – pressure patterns of three generations. *Clin Biomech.* 2009;24(8):676–81. <https://doi.org/10.1016/j.clinbiomech.2009.06.001>.
38. Ramachandra P, Kumar P, Kamath A, Maiya AG. Do structural changes of the foot influence plantar pressure patterns during various stages of pregnancy and postpartum? *Foot Ankle Spec.* 2017;10(6):513–9. <https://doi.org/10.1177/1938640016685150>.
39. Varol T, Göker A, Cezayirli E, Özgür S, Tuç Yücel A. Relation between foot pain and plantar pressure in pregnancy. *Turk J Med Sci.* 2017;47(4):1104–8. <https://doi.org/10.3906/sag-1601-185>.
40. Butler EE, Druzin M, Sullivan EV. Gait adaptations in adulthood: pregnancy, aging, and alcoholism. In: Rose J, Gamble JG, editors. *Human walking*. 3rd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2006. p. 131–48.
41. Hong Y, Bartlett R. *Routledge handbook of biomechanics and human movement science*. Routledge international handbooks. London; New York, NY: Routledge; 2010.
42. Nigg BM, Herzog W. *Biomechanics of the musculo-skeletal system*. 3rd ed. Hoboken, NJ: John Wiley & Sons; 2007.
43. Flanagan SP. *Biomechanics: a case-based approach*. 2nd ed. Burlington, MA: Jones & Bartlett Learning; 2019.
44. Elliott B. Biomechanics: an integral part of sport science and sport medicine. *J Sci Med Sport.* 1999;2(4):299–310. [https://doi.org/10.1016/S1440-2440\(99\)80003-6](https://doi.org/10.1016/S1440-2440(99)80003-6).
45. Brüggemann G-P, Potthast W, Braunstein B, Niehoff A. Effect of increased mechanical stimuli on foot muscles functional capacity. In: Cavanagh PR, Crago PE, editors. *XXth Congress of the International Society of Biomechanics and 29th Annual Meeting of the American Society of Biomechanics*. Cleveland, OH: International Society of Biomechanics; 2005.
46. Nicholls JA, Grieve DW. Performance of physical tasks in pregnancy. *Ergonomics.* 1992;35(3):301–11. <https://doi.org/10.1080/00140139208967815>.
47. Perry J. *Gait analysis: normal and pathological function*. Thorofare, NJ: SLACK; 1992.
48. Forczek W, Staszkievicz R. Changes of kinematic gait parameters due to pregnancy. *Acta Bioeng Biomech.* 2012;14(4):113–9. <https://doi.org/10.5277/abb120413>.
49. Lymberry JK, Gilleard W. The stance phase of walking during late pregnancy - temporospatial and ground reaction force variables. *J Am Podiat Med Assoc.* 2005;95(3):247–53. <https://doi.org/10.7547/0950247>.
50. Gilleard WL. Trunk motion and gait characteristics of pregnant women when walking: report of a longitudinal study with a control group. *BMC Pregnant Childb.* 2013;13:71. <https://doi.org/10.1186/1471-2393-13-71>.
51. Bartlett R. *Introduction to sports biomechanics: analysing human movement patterns*. 3rd ed. Abingdon: Routledge; 2019.
52. Branco M, Santos-Rocha R, Vieira F, Aguiar L, Veloso AP. Three-dimensional kinematic adaptations of gait throughout pregnancy and postpartum. *Acta Bioeng Biomech.* 2016;18(2):153. <https://doi.org/10.5277/ABB-00418-2015-05>.
53. Abdel-Aziz YI, Karara HM, Hauck M. Direct linear transformation from comparator coordinates into object space coordinates in close-range photogrammetry*. *Photogramm Eng Remote Sens.* 2015;81(2):103–7. <https://doi.org/10.14358/PERS.81.2.103>.
54. Bartlett R. *Introduction to sports biomechanics: analysing human movement patterns*. 2nd ed. Abingdon, Oxon; New York, NY: Routledge; 2007.
55. Richards J. *Biomechanics in clinic and research: an interactive teaching and learning course*. Edinburgh; New York, NY: Churchill Livingstone/Elsevier; 2008.
56. Robertson DGE, Caldwell GE, Hamill J, Kamen G, Whittlesey SN. *Research methods in biomechanics*. 2nd ed. Champaign, IL: Human Kinetics; 2014.
57. Winter DA. *Biomechanics and motor control of human movement*. 4th ed. Hoboken, NJ: Wiley; 2009.
58. Nigg BM, Liu W. The effect of muscle stiffness and damping on simulated impact force peaks during running. *J Biomech.* 1999;32(8):849–56. [https://doi.org/10.1016/S0021-9290\(99\)00048-2](https://doi.org/10.1016/S0021-9290(99)00048-2).
59. Miller D. Ground reaction forces in distance running. In: Cavanagh P, editor. *Biomechanics of distance running*. Champaign, IL: Human Kinetics; 1990.
60. Peterson DR, Bronzino JD. *Biomechanics: principles and applications*. Boca Raton, FL. London: CRC, Taylor & Francis; 2008.
61. Whittle M. *Gait analysis: an introduction*. 4th ed. Edinburgh; New York, NY: ButterworthHeinemann; 2007.
62. Inman DJ, Soutas-Little R. *Engineering mechanics: dynamics*. Hoboken, NJ: Prentice Hall PTR; 1998.
63. Nigg BM, MacIntosh BR, Mester J. *Biomechanics and biology of movement*. Champaign, IL: Human Kinetics; 2000.
64. Watkins J. *Structure and function of the musculoskeletal system*. 2nd ed. Champaign, IL: Human Kinetics; 2010.
65. Turner CH, Robling AG. Designing exercise regimens to increase bone strength. *Exerc Sport Sci Rev.* 2003;31(1):45–50.
66. Witzke KA, Snow CM. Effects of plyometric jump training on bone mass in adolescent girls. *Med Sci Sports Exerc.* 2000;32(6):1051–7.
67. Hohmann E, Reaburn P, Tetsworth K, Imhoff A. Plantar pressures during long distance running: an investigation of 10 marathon runners. *J Sports Sci Med.* 2016;15(2):254–62.
68. Hennig EM, Milani TL. Shoe pressure distribution for running in various types of footwear. *J Appl Biomech.* 1995;11(3):299–310. <https://doi.org/10.1123/jab.11.3.299>.
69. Hughes J, Pratt L, Linge K, Clark P, Klenerman L. Reliability of pressure measurements: the EM ED F system. *Clin Biomech.* 1991;6(1):14–8. [https://doi.org/10.1016/0268-0033\(91\)90036-P](https://doi.org/10.1016/0268-0033(91)90036-P).
70. Santos-Rocha R, Veloso A. Comparative study of plantar pressure during step exercise in different foot conditions. *J Appl Biomech.* 2007;23(2):162–8. <https://doi.org/10.1123/jab.23.2.162>.
71. Abdul Razak AH, Zayegh A, Begg RK, Wahab Y. Foot plantar pressure measurement system: a review. *Sensors.* 2012;12(7):9884.
72. Robinson CC, Balbinot LF, Silva MF, Achaval M, Zaro MA. Plantar pressure distribution patterns of individuals with prediabetes in comparison with healthy individuals and individuals with diabetes. *J Diabetes Sci Technol.* 2013;7(5):1113–21. <https://doi.org/10.1177/193229681300700503>.
73. Keijsers NLW, Stolwijk NM, Louwerens JWK, Duysens J. Classification of forefoot pain based on plantar pressure measurements. *Clin Biomech.* 2013;28(3):350–6. <https://doi.org/10.1016/j.clinbiomech.2013.01.012>.
74. Amemiya A, Noguchi H, Oe M, Ohashi Y, Ueki K, Kadowaki T, et al. Elevated plantar pressure in diabetic patients and its relationship with their gait features. *Gait Posture.* 2014;40(3):408–14. <https://doi.org/10.1016/j.gaitpost.2014.05.063>.
75. Butterworth PA, Landorf KB, Gilleard W, Urquhart DM, Menz HB. The association between body composition and foot structure and function: a systematic review. *Obes Rev.* 2014;15(4):348–57. <https://doi.org/10.1111/obr.12130>.
76. O'Brien DL, Tyndyk M. Effect of arch type and Body Mass Index on plantar pressure distribution during stance phase of gait. *Acta Bioeng Biomech.* 2014;16(2):131–5.
77. Mickle KJ, Munro BJ, Lord SR, Menz HB, Steele JR. Foot pain, plantar pressures, and falls in older people: a prospective study. *J Am Geriatr Soc.*

- 2010;58(10):1936–40. <https://doi.org/10.1111/j.1532-5415.2010.03061.x>.
78. Fernando M, Crowther R, Lazzarini P, Sangla K, Cunningham M, Buttner P, et al. Biomechanical characteristics of peripheral diabetic neuropathy: a systematic review and meta-analysis of findings from the gait cycle, muscle activity and dynamic barefoot plantar pressure. *Clin Biomech.* 2013;28(8):831–45. <https://doi.org/10.1016/j.clinbiomech.2013.08.004>.
79. Justin S, Joshua B, Roger A, Evangelos P, Jack C. Musculoskeletal and activity-related factors associated with plantar heel pain. *Foot Ankle Int.* 2014;36(1):37–45. <https://doi.org/10.1177/1071100714551021>.
80. Ramalho F, Santos-Rocha R, Branco M, Moniz-Pereira V, André H-I, Veloso A, et al. Effect of 6-month community-based exercise interventions on gait and functional fitness of an older population: a quasi-experimental study. *Clin Interv Aging.* 2018;13:595–606. <https://doi.org/10.2147/cia.s157224>.
81. Shin Jin H, Lee Joong S, Han Ki H, Bae Kang H. Effects of foot strengthening exercises and functional insole on range of motion and foot plantar pressure in elderly women. *J Kor Soc Kinesiol.* 2018;28(1):45–54. <https://doi.org/10.5103/KJSB.2018.28.1.45>.
82. Rowlands C, Plumb MS. The effects of a 4-week barefoot exercise intervention on plantar pressure, impact, balance and pain in injured recreational runners: a pilot study. *Int J Osteopath Med.* 2019;33:1–7. <https://doi.org/10.1016/j.ijosm.2019.10.005>.
83. Lee NK, Kwon JW, Son SM, Nam SH, Choi YW, Kim CS. Changes of plantar pressure distributions following open and closed kinetic chain exercise in patients with stroke. *Neurorehabilitation.* 2013;32:385–90. <https://doi.org/10.3233/NRE-130859>.
84. Molina-Garcia P, Miranda-Aparicio D, Molina-Molina A, Plaza-Florido A, Migueles JH, Mora-Gonzalez J, et al. Effects of exercise on plantar pressure during walking in children with overweight/obesity. *Med Sci Sports Exerc.* 2020;52(3):654.
85. Jimenez EMM, Velazquez JID, Gomez RS, Nuno FS, Hernandez IC, Castells XG. Experimental studies of gait biomechanics during pregnancy: systematic review of clinical trials. (2000–2018). *Revista Internacional De Ciencias Podologicas.* 2019;13(2):77–86. <https://doi.org/10.5209/ricp.64723>.
86. Ribeiro AP, João SMA, Sacco ICN. Static and dynamic biomechanical adaptations of the lower limbs and gait pattern changes during pregnancy. *Women Health.* 2013;9(1):99–108. <https://doi.org/10.2217/whe.12.59>.
87. Branco M, Santos-Rocha R, Vieira F. Biomechanics of gait during pregnancy. *Sci World J.* 2014;2014:5. <https://doi.org/10.1155/2014/527940>.
88. Anselmo DS, Love E, Tango DN, Robinson L. Musculoskeletal effects of pregnancy on the lower extremity: a literature review. *J Am Podiat Med Assoc.* 2017;107(1):60–4. <https://doi.org/10.7547/15-061>.
89. Forczek W, Ivanenko YP, Bielatowicz J, Waclawik K. Gait assessment of the expectant mothers - systematic review. *Gait Posture.* 2018;62:7–19. <https://doi.org/10.1016/j.gaitpost.2018.02.024>.
90. Wong JKL, McGregor AH. Spatiotemporal gait changes in healthy pregnant women and women with pelvic girdle pain: a systematic review. *J Back Musculoskelet Rehabil.* 2018;31(5):821–38. <https://doi.org/10.3233/bmr-170828>.
91. Conder R, Zamani R, Akrami M. The biomechanics of pregnancy: a systematic review. *J Funct Morphol Kinesiol.* 2019;4(4):72. <https://doi.org/10.3390/jfkm4040072>.
92. Ribeiro AP. Posture and gait biomechanical aspects during pregnancy and the importance of therapeutic exercise: literature review. *Curr Women's Health Rev.* 2015;11(1):51–8. <https://doi.org/10.2174/157340481101150914201529>.
93. Salazar NQ. Alteraciones musculoesqueléticas y adaptaciones biomecánicas durante los trimestres de embarazo: una revisión sistemática. *Pensar en Movimiento: Revista de Ciencias del Ejercicio y la Salud.* 2021;19(1):e44961. <https://doi.org/10.15517/pensarmov.v19i1.44961>.
94. Hrvatin I, Rugelj D. Risk factors for accidental falls during pregnancy - a systematic literature review. *J Matern Fetal Neonatal Med.* 2021;1–10. <https://doi.org/10.1080/14767058.2021.1935849>.
95. Nyska M, Sofer D, Porat A, Howard CB, Levi A, Meizner I. Planter foot pressures in pregnant women. *Isr J Med Sci.* 1997;33(2):139–46.
96. Goldberg J, Besser MP, Selby-Silverstein L. Changes in foot function throughout pregnancy. *Obstet Gynecol.* 2001;97(4):S39. [https://doi.org/10.1016/S0029-7844\(01\)01235-2](https://doi.org/10.1016/S0029-7844(01)01235-2).
97. Huang T-H, Lin S-C, Ho C-S, Yu C-Y, Chou Y-L. The gait analysis of pregnant women. *Biomed Eng Appl Basis Commun.* 2002;14(2):4. <https://doi.org/10.4015/s1016237202000103>.
98. Ribas SI, Guirro ECO. Analysis of plantar pressure and postural balance during different phases of pregnancy. *Rev Bras Fis.* 2007;11(5):391–6.
99. Carpes F, Griebeler D, Kleinpaul J, Mann L, Mota C. Women able-bodied gait kinematics during and post pregnancy period. *Brazilian J Biomech.* 2008;9(16):33.
100. Gaymer C, Whalley H, Achten J, Vathis M, Costa ML. Midfoot plantar pressure significantly increases during late gestation. *Foot.* 2009;19(2):114–6. <https://doi.org/10.1016/j.foot.2009.02.001>.
101. Karadag-Saygi E, Unlu-Ozkan F, Basgul A. Plantar pressure and foot pain in the last trimester of pregnancy. *Foot Ankle Int.* 2010;31(2):153–7. <https://doi.org/10.3113/FAI.2010.0153>.
102. Hagan L, Wong CK. Gait in pregnant women: spinal and lower extremity changes from pre to postpartum. *J Women's Health Phys Therapy.* 2010;34(2):46–56. <https://doi.org/10.1097/jwh.0b013e3181e8fd4d>.
103. Ribeiro AP, Trombini-Souza F, Sacco IDN, Ruano R, Zugaib M, Joao SMA. Changes in the plantar pressure distribution during gait throughout gestation. *J Am Podiat Med Assoc.* 2011;101(5):415–23.
104. McCrory JL, Chambers AJ, Daftary A, Redfern MS. Ground reaction forces during gait in pregnant fallers and non-fallers. *Gait Posture.* 2011;34(4):524–8. <https://doi.org/10.1016/j.gaitpost.2011.07.007>.
105. Moccellini AS, Driusso P. Adjustments in static and dynamic postural control during pregnancy and their relationship with quality of life: a descriptive study. *Fisioterapia.* 2012;34(5):196–202. <https://doi.org/10.1016/j.ft.2012.03.004>.
106. Branco M, Santos-Rocha R, Aguiar L, Vieira F, Veloso AP. Kinematic analysis of gait in the second and third trimesters of pregnancy. *J Pregnancy.* 2013;2013:718095. <https://doi.org/10.1155/2013/718095>.
107. Sunaga Y, Anan M, Shinkoda K. Biomechanics of rising from a chair and walking in pregnant women. *Appl Ergon.* 2013;44(5):792–8. <https://doi.org/10.1016/j.apergo.2013.01.010>.
108. Aguiar L, Santos-Rocha R, Vieira F, Branco M, Andrade C, Veloso A. Comparison between overweight due to pregnancy and due to added weight to simulate body mass distribution in pregnancy. *Gait Posture.* 2015;42(4):511–7. <https://doi.org/10.1016/j.gaitpost.2015.07.065>.
109. Branco M, Santos-Rocha R, Vieira F, Aguiar L, Veloso AP. Three-dimensional kinetic adaptations of gait throughout pregnancy and postpartum. *Scientifica.* 2015;2015:580374. <https://doi.org/10.1155/2015/580374>.
110. Yoo H, Shin D, Song C. Changes in the spinal curvature, degree of pain, balance ability, and gait ability according to pregnancy period in pregnant and non-pregnant women. *J Phys Ther Sci.* 2015;27(1):279–84.
111. Gimunova M, Kasović M, Zvonar M, Turčinek P, Matković B, Ventruba P, et al. Analysis of ground reaction force in gait during different phases of pregnancy. *Kinesiology.* 2015;47(2):236–41.
112. Bertuit J, Leyh C, Rooze M, Feipel V. Plantar pressure during gait in pregnant women. *J Am Podiat Med Assoc.* 2016;106(6):398–405.
113. Branco M, Santos-Rocha R, Aguiar L, Vieira F, Veloso AP. Kinetic analysis of gait in the second and third trimesters of pregnancy. *J Mech Med Biol.* 2016;16(4):1. <https://doi.org/10.1142/S021951941650055x>.
114. Blaszczyk JW, Opala-Berdzik A, Plewa M. Adaptive changes in spatiotemporal gait characteristics in women during pregnancy. *Gait Posture.* 2016;43:160–4. <https://doi.org/10.1016/j.gaitpost.2015.09.016>.
115. Ramachandra P, Kumar P, Kamath A, Maiya AG. Do structural changes of the foot influence plantar pressure patterns during various stages of pregnancy and postpartum? *Foot Ankle Spec.* 2016;10:513. <https://doi.org/10.1177/1938640016685150>.
116. Elsayed E, Devreux I, Embaby H, Alsayed A, Alshehri M. Changes in foot plantar pressure in pregnant women. *J Back Musculoskelet Rehabil.* 2017;30(4):863–7. <https://doi.org/10.3233/BMR-160555>.
117. Krkeljas Z. Changes in gait and posture as factors of dynamic stability during walking in pregnancy. *Hum Mov Sci.* 2018;58:315–20. <https://doi.org/10.1016/j.humov.2017.12.011>.

118. Mei Q, Gu Y, Fernandez J. Alterations of pregnant gait during pregnancy and post-partum. *Sci Rep*. 2018;8(1):2217. <https://doi.org/10.1038/s41598-018-20648-y>.
119. Christensen L, Veierod MB, Vollestad NK, Jakobsen VE, Stuge B, Cabri J, et al. Kinematic and spatiotemporal gait characteristics in pregnant women with pelvic girdle pain, asymptomatic pregnant and non-pregnant women. *Clin Biomech*. 2019;68:45–52. <https://doi.org/10.1016/j.clinbiomech.2019.05.030>.
120. Martínez-Martí F, Ocón-Hernández O, Martínez-García MS, Torres-Ruiz F, Martínez-Olmos A, Carvajal MA, et al. Plantar pressure changes and their relationships with low back pain during pregnancy using instrumented insoles. *J Sensors*. 2019;2019:1567584. <https://doi.org/10.1155/2019/1567584>.
121. Mikeska O, Gimunova M, Zvonar M. Assessment of distribution of plantar pressures and foot characteristics during walking in pregnant women. *Acta Bioeng Biomech*. 2019;21(3):49–56. <https://doi.org/10.5277/abb-01373-2019-04>.
122. Forczek W, Masłoń A, Frączek B, Curyło M, Salamaga M, Suder A. Does the first trimester of pregnancy induce alterations in the walking pattern? *PLoS One*. 2019;14(1):e0209766. <https://doi.org/10.1371/journal.pone.0209766>.
123. Forczek W, Ivanenko Y, Salamaga M, Sylos-Labini F, Frączek B, Masłoń A, et al. Pelvic movements during walking throughout gestation - the relationship between morphology and kinematic parameters. *Clin Biomech*. 2020;71:146–51. <https://doi.org/10.1016/j.clinbiomech.2019.11.001>.
124. Bagwell JJ, Reynolds N, Walaszek M, Runez H, Lam K, Armour Smith J, et al. Lower extremity kinetics and muscle activation during gait are significantly different during and after pregnancy compared to nulliparous females. *Gait Posture*. 2020;81:33–40. <https://doi.org/10.1016/j.gaitpost.2020.07.002>.
125. Song Y, Liang M, Lian W. A comparison of foot kinematics between pregnant and nonpregnant women using the Oxford foot model during walking. *Int J Biomed Eng Technol*. 2020;34(1):20–30. <https://doi.org/10.1504/IJBET.2020.110335>.
126. Pauk J, Swinarska D, Daunoraviciene K. Mechanisms of gait adaptation in overweight pregnant women. *J Am Podiat Med Assoc*. 2020;110(4):2. <https://doi.org/10.7547/17-177>.
127. Catena RD, Wolcott WC. Self-selection of gestational lumbopelvic posture and bipedal evolution. *Gait Posture*. 2021;89:7–13. <https://doi.org/10.1016/j.gaitpost.2021.06.022>.
128. Aguiar L, Andrade C, Branco M, Santos-Rocha R, Vieira F, Veloso A. Global optimization method applied to the kinematics of gait in pregnant women. *J Mech Med Biol*. 2016;16(6):1. <https://doi.org/10.1142/S0219519416500846>.
129. Aguiar L, Santos-Rocha R, Branco M, Vieira F, Veloso A. Biomechanical model for kinetic and kinematic description of gait during second trimester of pregnancy to study the effects of biomechanical load on the musculoskeletal system. *J Mech Med Biol*. 2014;14(1):1450004. <https://doi.org/10.1142/S0219519414500043>.
130. Rodacki CL, Fowler NE, Rodacki AL, Birch K. Stature loss and recovery in pregnant women with and without low back pain. *Arch Phys Med Rehabil*. 2003;84(4):507–12. <https://doi.org/10.1053/apmr.2003.50119>.
131. Fries EC, Hellebrandt FA. The influence of pregnancy on the location of the center of gravity, postural stability, and body alignment. *Am J Obstet Gynecol*. 1943;46:374–80.
132. Opala-Berdzik A, Bacik B, Cieślińska-Świder J, Plewa M, Gajewska M. The influence of pregnancy on the location of the center of gravity in standing position. *J Hum Kinet*. 2010;20(26):5–11. <https://doi.org/10.2478/v10078-010-0042-1>.
133. Calguneri M, Bird HA, Wright V. Changes in joint laxity occurring during pregnancy. *Ann Rheum Dis*. 1982;41(2):126–8. <https://doi.org/10.1136/ard.41.2.126>.
134. Schauburger CW, Rooney BL, Goldsmith L, Shenton D, Silva PD, Schaper A. Peripheral joint laxity increases in pregnancy but does not correlate with serum relaxin levels. *Am J Obstet Gynecol*. 1996;174(2):667–71. [https://doi.org/10.1016/S0002-9378\(96\)70447-7](https://doi.org/10.1016/S0002-9378(96)70447-7).
135. Jang J, Hsiao KT, Hsiao-Weckler ET. Balance (perceived and actual) and preferred stance width during pregnancy. *Clin Biomech*. 2008;23(4):468–76. <https://doi.org/10.1016/j.clinbiomech.2007.11.011>.
136. Sancar Ş, Atalay Güzel N, Çobanoğlu G, Özdemir Y, Bayram M. The changes in static balance during pregnancy: a prospective longitudinal study. *Clin Exp Health Sci*. 2021;11:127. <https://doi.org/10.33808/clinexphhealthsci.744603>.
137. Catena RD, Connolly CP, McGeorge KM, Campbell N. A comparison of methods to determine center of mass during pregnancy. *J Biomech*. 2018;71:217–24. <https://doi.org/10.1016/j.jbiomech.2018.02.004>.
138. Branco M, Santos-Rocha R, Vieira F, Silva MR, Aguiar L, Veloso AP. Influence of body composition on gait kinetics throughout pregnancy and postpartum period. *Scientifica*. 2016;2016:3921536. <https://doi.org/10.1155/2016/3921536>.
139. Paisley JE, Mellion MB. Exercise during Pregnancy. *Am Fam Physician*. 1988;38(5):143–50.
140. Gilleard W, Crosbie J, Smith R. Effect of pregnancy on trunk range of motion when sitting and standing. *Acta Obstet Gynecol Scand*. 2002;81(11):1011–20.
141. Vullo VJ, Richardson JK, Hurvitz EA. Hip, knee, and foot pain during pregnancy and the postpartum period. *J Fam Pract*. 1996;43:63.
142. Bertuit J, Leyh C, Feipel V. Center of plantar pressure during gait in pregnancy-related pelvic girdle pain and the effect of pelvic belts. *Acta Bioeng Biomech*. 2018;20(3):69–76. <https://doi.org/10.5277/abb-01141-2018-02>.
143. Vico Pardo FJ, López Del Amo A, Pardo Rios M, Gijón-Nogueron G, Yuste CC. Changes in foot posture during pregnancy and their relation with musculoskeletal pain: a longitudinal cohort study. *Women Birth*. 2018;31(2):e84–e8. <https://doi.org/10.1016/j.wombi.2017.08.114>.
144. Albino MA, Moccellini AS, Firmento Bda S, Driusso P. [Gait force propulsion modifications during pregnancy: effects of changes in feet's dimensions]. *Revista Brasileira de Ginecologia e Obstetricia* 2011;33(7):164–9.
145. Inanir A, Cakmak B, Hisim Y, Demirturk F. Evaluation of postural equilibrium and fall risk during pregnancy. *Gait Posture*. 2014;39(4):1122–5. <https://doi.org/10.1016/j.gaitpost.2014.01.013>.
146. Gottschall JS, Sheehan RC, Downs DS. Pregnant women exaggerate cautious gait patterns during the transition between level and hill surfaces. *J Electromyogr Kinesiol*. 2013;23(5):1237–42. <https://doi.org/10.1016/j.jelekin.2013.04.011>.
147. Wallberg CD, Smart DM, Mackelprang JL, Graves JM. Stair-related injuries among pregnant women treated in united states emergency departments. *Matern Child Health J*. 2021;25(6):892–9. <https://doi.org/10.1007/s10995-021-03141-3>.
148. Kavurmaci SA, Gulbahar A. Physical trauma etiologies in pregnancy in Turkey. *Clin Exp Obstet Gynecol*. 2021;48(2):292–8. <https://doi.org/10.31083/j.ceog.2021.02.2268>.
149. McCrory JL, Chambers AJ, Daftary A, Redfern MS. Ground reaction forces during stair locomotion in pregnancy. *Gait Posture*. 2013;38(4):684–90. <https://doi.org/10.1016/j.gaitpost.2013.03.002>.
150. Ersal T, McCrory JL, Sienko KH. Theoretical and experimental indicators of falls during pregnancy as assessed by postural perturbations. *Gait Posture*. 2014;39(1):218–23. <https://doi.org/10.1016/j.gaitpost.2013.07.011>.
151. McCrory JL, Chambers AJ, Daftary A, Redfern MS. Ground reaction forces during stair locomotion in pregnant fallers and non-fallers. *Clin Biomech*. 2014;29(2):143–8. <https://doi.org/10.1016/j.clinbiomech.2013.11.020>.
152. Takeda K, Yoshikata H, Imura M. Changes in posture control of women that fall during pregnancy. *Int J Womens Health Reprod Sci*. 2018;6(3):255–62. <https://doi.org/10.15296/ijwhr.2018.43>.
153. Sawa R, Doi T, Asai T, Watanabe K, Taniguchi T, Ono R. Differences in trunk control between early and late pregnancy during gait. *Gait Posture*. 2015;42(4):455–9. <https://doi.org/10.1016/j.gaitpost.2015.07.058>.
154. Wu WH, Meijer OG, Lamothe CJC, Uegaki K, van Dieën JH, Wuisman PIJM, et al. Gait coordination in pregnancy: transverse pelvic and thoracic rotations and their relative phase. *Clin Biomech*. 2004;19(5):480–8. <https://doi.org/10.1016/j.clinbiomech.2004.02.003>.
155. Alberton CL, Bgeginski R, Pinto SS, Nunes GN, Andrade LS, Brasil B, et al. Water-based exercises in pregnancy: apparent weight in immersion and ground reaction force at third trimester. *Clin Biomech*. 2019;67:148–52. <https://doi.org/10.1016/j.clinbiomech.2019.05.021>.
156. Kluge J, Hall D, Louw Q, Theron G, Grove D. Specific exercises to treat pregnancy-related low back pain in a South African population. *Int J Gynaecol Obstet*. 2011;113(3):187–91. <https://doi.org/10.1016/j.ijgo.2010.10.030>.
157. Shim MJ, Lee YS, Oh HE, Kim JS. Effects of a back-pain-reducing program during pregnancy for Korean women: a non-equivalent control-group pre-test-posttest study. *Int J Nurs Stud*. 2007;44(1):19–28. <https://doi.org/10.1016/j.ijnurstu.2005.11.016>.

1. Healey CH, Borley NR, Mundy A. True pelvis, pelvic floor and perineum. In: Standring S, Ellis H, Healy JC, Johnson D, Williams A, editors. Gray's anatomy: the anatomical basis of clinical practice. Edinburgh: Elsevier Churchill livingstone; 2005. p. 1357–71.
2. Delancey JO. Structural aspects of the extrinsic continence mechanism. *Obstet Gynecol.* 1988;72(3 Pt 1):296–301.
3. Delancey JO. Structural support of the urethra as it relates to stress urinary incontinence: the hammock hypothesis. *Am J Obstet Gynecol.* 1994;170(6):1713–20.
4. Ashton-Miller JA, Delancey JO. Functional anatomy of the female pelvic floor. *Ann N Y Acad Sci.* 2007;1101:266–96.
5. Norton PA. Pelvic floor disorders: the role of fascia and ligaments. *Clin Obstet Gynecol.* 1993;36(4):926–38.
6. Kegel AH. Stress incontinence and genital relaxation; a nonsurgical method of increasing the tone of sphincters and their supporting structures. *Ciba Clin Symp.* 1952;4(2):35–51.
7. Bø K, Lilleas F, Talseth T, Hedland H. Dynamic MRI of the pelvic floor muscles in an upright sitting position. *Neurourol Urodyn.* 2001;20(2):167–74.
8. Taverner D, Smiddy FG. An electromyographic study of the normal function of the external anal sphincter and pelvic diaphragm. *Dis Colon Rectum.* 1959;2(2):153–60.
9. Ashton-Miller JA, Howard D, Delancey JO. The functional anatomy of the female pelvic floor and stress continence control system. *Scand J Urol Nephrol Suppl.* 2001;207:1–7.
10. Bø K, Aschehoug A. Pelvic floor and exercise science: strength training. In: Bø K, Berghmans B, Mørkved S, Van Kampen M, editors. Evidence-based physical therapy for the pelvic floor. Edinburgh: Churchill Livingstone Elsevier; 2007. p. 119–32.
11. Miller JM, Perucchini D, Carchidi LT, DeLancey JO, Ashton-Miller J. Pelvic floor muscle contraction during a cough and decreased vesical neck mobility. *Obstet Gynecol.* 2001;97(2):255–60.
12. Miller JM, Ashton-Miller JA, DeLancey JO. A pelvic muscle precontraction can reduce coughrelated urine loss in selected women with mild SUI. *J Am Geriatr Soc.* 1998;46(7):870–4.
13. Miller JM, Sampsel C, Ashton-Miller J, Hong GR, Delancey JO. Clarification and confirmation of the Knack maneuver: the effect of volitional pelvic floor muscle contraction to preempt expected stress incontinence. *Int Urogynecol J Pelvic Floor Dysfunct.* 2008;19(6):773–82.
14. Bump RC, Norton PA. Epidemiology and natural history of pelvic floor dysfunction. *Obstet Gynecol Clin N Am.* 1998;25(4):723–46.
15. MacLennan AH, Taylor AW, Wilson DH, Wilson D. The prevalence of pelvic floor disorders and their relationship to gender, age, parity and mode of delivery. *BJOG.* 2000;107(12):1460–70.
16. DeLancey JO, Kane LL, Miller JM, Patel DA, Tumbarello JA. Graphic integration of causal factors of pelvic floor disorders: an integrated life span model. *Am J Obstet Gynecol.* 2008;199(6):610–5.
17. Abrams P, Cardozo L, Fall M, Griffiths D, Rosier P, Ulmsten U, et al. The standardisation of terminology in lower urinary tract function: report from the standardisation sub-committee of the International Continence Society. *Urology.* 2003;61(1):37–49.
18. Milsom I, Altman D, Cartwright R, Lapitan M, Nelson R, Sjöström S, et al. Epidemiology of urinary incontinence [UI] and other lower urinary tract symptoms [LUTS], pelvic organ prolapse [POP] and anal [AI] incontinence. In: Abrams P, Wagg A, Wein A, editors. Incontinence. 6th international consultation on incontinence, Tokyo; 2017.
19. Thom D. Variation in estimates of urinary incontinence prevalence in the community: effects of differences in definition, population characteristics, and study type. *J Am Geriatr Soc.* 1998;46(4):473–80.
20. Botlero R, Urquhart DM, Davis SR, Bell RJ. Prevalence and incidence of urinary incontinence in women: review of the literature and investigation of methodological issues. *Int J Urol.* 2008;15(3):230–4.
21. Minassian VA, Stewart WF, Wood GC. Urinary incontinence in women: variation in prevalence estimates and risk factors. *Obstet Gynecol.* 2008;111(2 Pt 1):324–31.
22. Milsom I, Altman D, Lapitan MC, Nelson R, Sillén U, Thom D. Epidemiology of urinary (UI) and faecal (FI) incontinence and pelvic organ prolapse (POP). In: Abrams P, Cardozo L, Khoury S, Wein A, editors. Incontinence: 4th International Consultation on Incontinence. 4th ed. Paris: Health Publication Ltd; 2009. p. 35–111.
23. Dimpf T, Hesse U, Schussler B. Incidence and cause of postpartum urinary stress incontinence. *Eur J Obstet Gynecol Reprod Biol.* 1992;43(1):29–33.
24. Marshall K, Thompson KA, Walsh DM, Baxter GD. Incidence of urinary incontinence and constipation during pregnancy and postpartum: survey of current findings at the Rotunda Lying-In Hospital. *Br J Obstet Gynaecol.* 1998;105(4):400–2.
25. Mørkved S, Bø K. Prevalence of urinary incontinence during pregnancy and postpartum. *Int Urogynecol J Pelvic Floor Dysfunct.* 1999;10(6):394–8.
26. Hvidman L, Hvidman L, Foldspang A, Mommsen S, Bugge NJ. Correlates of urinary incontinence in pregnancy. *Int Urogynecol J Pelvic Floor Dysfunct.* 2002;13(5):278–83.
27. Wesnes SL, Rortveit G, Bø K, Hunskaar S. Urinary incontinence during pregnancy. *Obstet Gynecol.* 2007;109(4):922–8.
28. Borello-France D, Burgio KL, Richter HE, Zyczynski H, Fitzgerald MP, Whitehead W, et al. Fecal and urinary incontinence in primiparous women. *Obstet Gynecol.* 2006;108(4):863–72.
29. Bø K, Nygaard IE. Is Physical activity good or bad for the female pelvic floor? A narrative review. *Sports Med.* 2020;50:471. <https://doi.org/10.1007/s40279-019-01243-1>.
30. Koelbl H, Nitti V, Baessler K, Salvatore S, Sultan A, Yamaguchi O. Pathophysiology of urinary incontinence, faecal incontinence and pelvic organ prolapse. In: Abrams P, Cardozo L, Khoury S, Wein A, editors. Incontinence: 4th International Consultation on Incontinence. 4th ed. Paris: Helarh Publication Ltd; 2009. p. 255–330.
31. Thorp JM Jr, Norton PA, Wall LL, Kuller JA, Eucker B, Wells E. Urinary incontinence in pregnancy and the puerperium: a prospective study. *Am J Obstet Gynecol.* 1999;181(2):266–73.
32. Burgio KL, Locher JL, Zyczynski H, Hardin JM, Singh K. Urinary incontinence during pregnancy in a racially mixed sample: characteristics and predisposing factors. *Int Urogynecol J Pelvic Floor Dysfunct.* 1996;7(2):69–73.
33. Wilson PD, Herbison RM, Herbison GP. Obstetric practice and the prevalence of urinary incontinence three months after delivery. *Br J Obstet Gynaecol.* 1996;103(2):154–61.
34. Rasmussen KL, Krue S, Johansson LE, Knudsen HJ, Agger AO. Obesity as a predictor of postpartum urinary symptoms. *Acta Obstet Gynecol Scand.* 1997;76(4):359–62.
35. Viktrup L, Rortveit G, Lose G. Risk of stress urinary incontinence twelve years after the first pregnancy and delivery. *Obstet Gynecol.* 2006;108(2):248–54.
36. Sugerman H, Windsor A, Bessos M, Wolfe L. Intra-abdominal pressure, sagittal abdominal diameter and obesity comorbidity. *J Intern Med.* 1997;241(1):71–9.
37. Sampsel CM. Changes in pelvic muscle strength and stress urinary incontinence associated with childbirth. *J Obstet Gynecol Neonatal Nurs.* 1990;19(5):371–7.
38. Hahn I, Milsom I, Ohlsson BL, Ekelund P, Uhlemann C, Fall M. Comparative assessment of pelvic floor function using vaginal cones, vaginal digital palpation and vaginal pressure measurements. *Gynecol Obstet Invest.* 1996;41(4):269–74.
39. Samuelsson E, Victor A, Svardsudd K. Determinants of urinary incontinence in a population of young and middle-aged women. *Acta Obstet Gynecol Scand.* 2000;79(3):208–15.
40. Morin M, Bourbonnais D, Gravel D, Dumoulin C, Lemieux MC. Pelvic floor muscle function in continent and stress urinary incontinent women using dynamo-

- metric measurements. *Neurourol Urodyn*. 2004;23(7):668–74.
41. Mørkved S, Salvesen KA, Bø K, Eik-Nes S. Pelvic floor muscle strength and thickness in continent and incontinent nulliparous pregnant women. *Int Urogynecol J Pelvic Floor Dysfunct*. 2004;15(6):384–9.
 42. Thompson JA, O'Sullivan PB, Briffa NK, Neumann P. Assessment of voluntary pelvic floor muscle contraction in continent and incontinent women using transperineal ultrasound, manual muscle testing and vaginal squeeze pressure measurements. *Int Urogynecol J Pelvic Floor Dysfunct*. 2006;17(6):624–30.
 43. Shishido K, Peng Q, Jones R, Omata S, Constantinou CE. Influence of pelvic floor muscle contraction on the profile of vaginal closure pressure in continent and stress urinary incontinent women. *J Urol*. 2008;179(5):1917–22.
 44. Hilde G, Staer-Jensen J, Ellstrom EM, Braekken IH, Bø K. Continence and pelvic floor status in nulliparous women at midterm pregnancy. *Int Urogynecol J*. 2012;23(9):1257–63.
 45. Bø K, Stien R, Kulseng-Hanssen S, Kristofferson M. Clinical and urodynamic assessment of nulliparous young women with and without stress incontinence symptoms: a case-control study. *Obstet Gynecol*. 1994;84(6):1028–32.
 46. Sartore A, Pregazzi R, Bortoli P, Grimaldi E, Ricci G, Guaschino S. Assessment of pelvic floor muscle function after vaginal delivery. Clinical value of different tests. *J Reprod Med*. 2003;48(3):171–4.
 47. Hvidman L, Foldspang A, Mommsen S, Nielsen JB. Postpartum urinary incontinence. *Acta Obstet Gynecol Scand*. 2003;82(6):556–63.
 48. Foldspang A, Hvidman L, Mommsen S, Nielsen JB. Risk of postpartum urinary incontinence associated with pregnancy and mode of delivery. *Acta Obstet Gynecol Scand*. 2004;83(10):923–7.
 49. Altman D, Ekstrom A, Gustafsson C, Lopez A, Falconer C, Zetterstrom J. Risk of urinary incontinence after childbirth: a 10-year prospective cohort study. *Obstet Gynecol*. 2006;108(4):873–8.
 50. Groutz A, Gordon D, Keidar R, Lessing JB, Wolman I, David MP, et al. Stress urinary incontinence: prevalence among nulliparous compared with primiparous and grand multiparous premenopausal women. *Neurourol Urodyn*. 1999;18(5):419–25.
 51. Rortveit G, Hannestad YS, Daltveit AK, Hunskaar S. Age- and type-dependent effects of parity on urinary incontinence: the Norwegian EPINCONT study. *Obstet Gynecol*. 2001;98(6):1004–10.
 52. Lukacz ES, Lawrence JM, Contreras R, Nager CW, Luber KM. Parity, mode of delivery, and pelvic floor disorders. *Obstet Gynecol*. 2006;107(6):1253–60.
 53. Press JZ, Klein MC, Kaczorowski J, Liston RM, von DP. Does cesarean section reduce postpartum urinary incontinence? A systematic review. *Birth*. 2007;34(3):228–37.
 54. Peschers U, Schaer G, Anthuber C, Delancey JO, Schuessler B. Changes in vesical neck mobility following vaginal delivery. *Obstet Gynecol*. 1996;88(6):1001–6.
 55. Meyer S, Schreyer A, De GP, Hohlfield P. The effects of birth on urinary continence mechanisms and other pelvic-floor characteristics. *Obstet Gynecol*. 1998;92(4 Pt 1):613–8.
 56. Dietz HP, Clarke B, Vancaillie TG. Vaginal childbirth and bladder neck mobility. *Aust N Z J Obstet Gynaecol*. 2002;42(5):522–5.
 57. Meyer S, De GP, Schreyer A, Caccia G. The assessment of bladder neck position and mobility in continent nullipara, multipara, forceps-delivered and incontinent women using perineal ultrasound: a future office procedure? *Int Urogynecol J Pelvic Floor Dysfunct*. 1996;7(3):138–46.
 58. King JK, Freeman RM. Is antenatal bladder neck mobility a risk factor for postpartum stress incontinence? *Br J Obstet Gynaecol*. 1998;105(12):1300–7.
 59. Lavin JM, Smith ARB, Anderson J, Grant M, Buckley H, Critchley H, et al. The effect of the first pregnancy on the connective tissue of the rectus sheath. *Neurourol Urodyn*. 1997;16:381–2.
 60. Howard D, Miller JM, DeLancey JO, Ashton-Miller JA. Differential effects of cough, valsalva, and continence status on vesical neck movement. *Obstet Gynecol*. 2000;95(4):535–40.
 61. Smith AR, Hosker GL, Warrell DW. The role of pudendal nerve damage in the aetiology of genuine stress incontinence in women. *Br J Obstet Gynaecol*. 1989;96(1):29–32.
 62. Snooks SJ, Setchell M, Swash M, Henry MM. Injury to innervation of pelvic floor sphincter musculature in childbirth. *Lancet*. 1984;2(8402):546–50.
 63. Smith AR, Hosker GL, Warrell DW. The role of partial denervation of the pelvic floor in the aetiology of genitourinary prolapse and stress incontinence of urine. A neurophysiological study. *Br J Obstet Gynaecol*. 1989;96(1):24–8.
 64. Allen RE, Hosker GL, Smith AR, Warrell DW. Pelvic floor damage and childbirth: a neurophysiological study. *Br J Obstet Gynaecol*. 1990;97(9):770–9.
 65. Snooks SJ, Swash M, Mathers SE, Henry MM. Effect of vaginal delivery on the pelvic floor: a 5-year follow-up. *Br J Surg*. 1990;77(12):1358–60.
 66. Lien KC, Morgan DM, Delancey JO, Ashton-Miller JA. Pudendal nerve stretch during vaginal birth: a 3D computer simulation. *Am J Obstet Gynecol*. 2005;192(5):1669–76.
 67. Snooks SJ, Swash M, Henry MM, Setchell M. Risk factors in childbirth causing damage to the pelvic floor innervation. *Int J Color Dis*. 1986;1(1):20–4.
 68. Sultan AH, Kamm MA, Hudson CN. Pudendal nerve damage during labour: prospective study before and after childbirth. *Br J Obstet Gynaecol*. 1994;101(1):22–8.
 69. Gilpin SA, Gosling JA, Smith AR, Warrell DW. The pathogenesis of genitourinary prolapse and stress incontinence of urine. A histological and histochemical study. *Br J Obstet Gynaecol*. 1989;96(1):15–23.
 70. Delancey JO, Kearney R, Chou Q, Speights S, Binno S. The appearance of levator ani muscle abnormalities in magnetic resonance images after vaginal delivery. *Obstet Gynecol*. 2003;101(1):46–53.
 71. Kearney R, Miller JM, Ashton-Miller JA, Delancey JO. Obstetric factors associated with levator ani muscle injury after vaginal birth. *Obstet Gynecol*. 2006;107(1):144–9.
 72. Dietz HP. Pelvic floor trauma following vaginal delivery. *Curr Opin Obstet Gynecol*. 2006;18(5):528–37.
 73. DeLancey JO, Ashton-Miller JA. Measurement of pelvic floor muscle function and strength and pelvic organ prolapse: MRI of intact and injured female pelvic floor muscles. In: Bø K, Berghmans B, Mørkved S, Van Kampen M, editors. *Evidence-based physical therapy for the pelvic floor*. Edinburgh: Churchill Livingstone Elsevier; 2007. p. 93–105.
 74. Ashton-Miller JA, Delancey JO. On the biomechanics of vaginal birth and common sequelae. *Annu Rev Biomed Eng*. 2009;11:163–76.
 75. Turner CE, Young JM, Solomon MJ, Ludlow J, Benness C. Incidence and etiology of pelvic floor dysfunction and mode of delivery: an overview. *Dis Colon Rectum*. 2009;52(6):1186–95.
 76. Peschers UM, Schaer GN, Delancey JO, Schuessler B. Levator ani function before and after childbirth. *Br J Obstet Gynaecol*. 1997;104(9):1004–8.
 77. Botelho S, Riccetto C, Herrmann V, Pereira LC, Amorim C, Palma P. Impact of delivery mode on electromyographic activity of pelvic floor: comparative prospective study. *Neurourol Urodyn*. 2010;29(7):1258–61.
 78. Caroci AS, Riesco ML, Sousa WS, Cotrim AC, Sena EM, Rocha NL, et al. Analysis of pelvic floor musculature function during pregnancy and postpartum: a cohort study: (a prospective cohort study to assess the PFMS by perineometry and digital vaginal palpation during pregnancy and following vaginal or caesarean childbirth). *J Clin Nurs*. 2010;19(17–18):2424–33.
 79. Sigurdardottir T, Steingrimsdottir T, Arnason A, Bø K. Pelvic floor muscle function before and after first childbirth. *Int Urogynecol J*. 2011;22:1497.
 80. Hilde G, Staer-Jensen J, Siafarikas F, Engh ME, Braekken IH, Bø K. Impact of childbirth and mode of delivery on vaginal resting pressure and on pelvic floor muscle strength and endurance. *Am J Obstet Gynecol*. 2013;208(1):50–7.
 81. Lien KC, Mooney B, Delancey JO, Ashton-Miller JA. Levator ani muscle stretch induced by simulated vaginal birth. *Obstet Gynecol*. 2004;103(1):31–40.
 82. Hoyte L, Damaser MS, Warfield SK, Chukkappalli G, Majumdar A, Choi DJ, et al. Quantity and distribution of levator ani stretch during simulated vaginal childbirth. *Am J Obstet Gynecol*. 2008;199(2):198–5.
 83. Parente MP, Jorge RM, Mascarenhas T, Fernandes AA, Martins JA. Deformation of the pelvic floor muscles during a vaginal delivery. *Int Urogynecol J Pelvic Floor Dysfunct*. 2008;19(1):65–71.

84. Dietz HP. Quantification of major morphological abnormalities of the levator ani. *Ultrasound Obstet Gynecol.* 2007;29(3):329–34.
85. Dietz HP, Lanzarone V. Levator trauma after vaginal delivery. *Obstet Gynecol.* 2005;106(4):707–12.
86. Valsky DV, Lipschuetz M, Bord A, Eldar I, Messing B, Hochner-Celnikier D, et al. Fetal head circumference and length of second stage of labor are risk factors for levator ani muscle injury, diagnosed by 3-dimensional transperineal ultrasound in primiparous women. *Am J Obstet Gynecol.* 2009;201(1):91–7.
87. Krofta L, Otcenasek M, Kasikova E, Feyereisl J. Pubococcygeus-puborectalis trauma after forceps delivery: evaluation of the levator ani muscle with 3D/4D ultrasound. *Int Urogynecol J Pelvic Floor Dysfunct.* 2009;20(10):1175–81.
88. Jarvinen TA, Jarvinen TL, Kaariainen M, Aarimaa V, Vaittinen S, Kalimo H, et al. Muscle injuries: optimising recovery. *Best Pract Res Clin Rheumatol.* 2007;21(2):317–31.
89. Delancey JO, Morgan DM, Fenner DE, Kearney R, Guire K, Miller JM, et al. Comparison of levator ani muscle defects and function in women with and without pelvic organ prolapse. *Obstet Gynecol.* 2007;109(2 Pt 1):295–302.
90. Dietz HP, Shek C. Levator avulsion and grading of pelvic floor muscle strength. *Int Urogynecol J Pelvic Floor Dysfunct.* 2008;19(5):633–6.91. Steensma AB, Konstantinovic ML, Burger CW, de Timmerman RD, Deprest J. Prevalence of major levator abnormalities in symptomatic patients with an underactive pelvic floor contraction. *Int Urogynecol J.* 2010;21(7):861–7.
92. Brincat CA, Delancey JO, Miller JM. Urethral closure pressures among primiparous women with and without levator ani muscle defects. *Int Urogynecol J.* 2011;22(12):1491–5.
93. Hilde G, Staer-Jensen J, Siafarikas F, Gjestland K, Ellstrom EM, Bo K. How well can pelvic floor muscles with major defects contract? A cross-sectional comparative study 6 weeks after delivery using transperineal 3D/4D ultrasound and manometer. *BJOG.* 2013;120(11):1423–9.
94. Shek KL, Dietz HP. The effect of childbirth on hiatal dimensions. *Obstet Gynecol.* 2009;113(6):1272–8.
95. Majida M, Braekken IH, Bo K, Engh ME. Levator hiatus dimensions and pelvic floor function in women with and without major defects of the pubovisceral muscle. *Int Urogynecol J.* 2012;23:707.
96. Morgan DM, Larson K, Lewicky-Gaupp C, Fenner DE, Delancey JO. Vaginal support as determined by levator ani defect status 6 weeks after primary surgery for pelvic organ prolapse. *Int J Gynaecol Obstet.* 2011;114(2):141–4.
97. Dietz HP, Steensma AB. The prevalence of major abnormalities of the levator ani in urogynaecological patients. *BJOG.* 2006;113(2):225–30.
98. Dietz HP, Simpson JM. Levator trauma is associated with pelvic organ prolapse. *BJOG.* 2008;115(8):979–84.
99. Tunn R, Goldammer K, Neymeyer J, Gauruder-Burmester A, Hamm B, Beyersdorff D. MRI morphology of the levator ani muscle, endopelvic fascia, and urethra in women with stress urinary incontinence. *Eur J Obstet Gynecol Reprod Biol.* 2006;126(2):239–45.
100. Dietz HP, Kirby A, Shek KL, Bedwell PJ. Does avulsion of the puborectalis muscle affect bladder function? *Int Urogynecol J Pelvic Floor Dysfunct.* 2009;20(8):967–72.
101. Bodine-Fowler S. Skeletal muscle regeneration after injury: an overview. *J Voice.* 1994;8(1):53–62.
102. Jarvinen TA, Jarvinen TL, Kaariainen M, Kalimo H, Jarvinen M. Muscle injuries: biology and treatment. *Am J Sports Med.* 2005;33(5):745–64.
103. Orchard JW, Best TM, Mueller-Wohlfahrt HW, Hunter G, Hamilton BH, Webbhorn N, et al. The early management of muscle strains in the elite athlete: best practice in a world with a limited evidence basis. *Br J Sports Med.* 2008;42(3):158–9.
104. Lovering R. Physical therapy and related interventions. In: Tiidus PM, editor. *Skeletal muscle damage and repair.* Champaign, IL: Human Kinetics; 2007. p. 219–30.
105. Bø K, Artal R, Barakat R, Brown W, Davies GA, Dooley M, et al. Exercise and pregnancy in recreational and elite athletes: 2016 evidence summary from the IOC expert group meeting, Lausanne. Part 1-exercise in women planning pregnancy and those who are pregnant. *Br J Sports Med.* 2016;50(10):571–89. <https://doi.org/10.1136/bjsports-2016-096218>.
106. Benjamin DR, van der Water ATM, Peiris CL. Effects of exercise on diastasis of the rectus abdominis muscle in the antenatal and postnatal periods: a systematic review. *Physiotherapy.* 2014;100:1–8.
107. Vleeming A, Albert HB, Ostgaard HC, et al. European guidelines for the diagnosis and treatment of pelvic girdle pain. *Eur Spine J.* 2008;17:794–819.
108. Koelbl H, Igawa TY, Salvatore S, et al. Pathophysiology of urinary incontinence, faecal incontinence and pelvic organ prolapse. In: Abrams P, Cardozo L, Khoury S, Wein A, editors. *Incontinence.* 5th ed. Cardiff: Health publication Ltd; 2013. p. 261–359. Committee 4.
109. Lee D, Hodges PW. Behavior of the linea alba during a curl-up task in diastasis rectus abdominis; An Observational Study. *J Orthop Sports Phys Ther.* 2016;46:580–9.
110. Venes D, Taber CW. *Taber's cyclopedic medical dictionary* 20, 2005, Philadelphia, PA: Davis
111. Boissonnault JS, Blaschak MJ. Incidence of diastasis recti abdominis during the childbearing year. *Phys Ther.* 1988;68(7):1082–6.
112. Mota PGF, Pascoal AG, Carita AI, Bo K. The immediate effects on inter-rectus distance of abdominal crunch and drawing in exercises during pregnancy and the postpartum period. *J Orthop Sports Phys Ther.* 2015;45:781–8.
113. Rett MT, Braga MD, Bernardes NO, Andrade SC. Prevalence of diastasis of the rectus abdominis muscles immediately postpartum: comparison between primiparae and multiparae. *Revista Brasileira De Fisioterapia.* 2009;13(4):275–80.
114. Turan V, Colluoglu C, Turkiymaz E, Korucuoglu U. Prevalence of diastasis recti abdominis in the population of young multiparous adults in Turkey. *Ginekol Pol.* 2011;82(11):817–82.
115. Sperstad JB, Tennfjord MT, Hilde G, Engh ME, Bø K. Diastasis recti abdominis and risk of low back and pelvic girdle pain. *Br J Sports Med.* 2016;50:1092–6.
116. Spitznagle TM, Leong FC, Van Dillen LR. Prevalence of diastasis recti abdominis in a urogynecological patient population. *Int Urogynecol J.* 2007;18:321–8.
117. Lockwood T. Rectus muscle diastasis in males: primary indication for endoscopically assisted abdominoplasty. *Plast Reconstr Surg.* 1998;101:1685–91; discussion 1692–1684.
118. van de Water AT, Benjamin DR. Measurement methods to assess diastasis of the rectus abdominis muscle (DRAM): a systematic review of their measurement properties and metaanalytic reliability generalisation. *Man Ther.* 2016;21:41–53.
119. Keeler J, Albrecht M, Eberhardt L, Horn L, Donnelly C, Lowe D. Diastasis recti abdominis; a survey of women's health specialists for current physical therapy clinical practice for postpartum women. *J Womens Health Phys Ther.* 2012;36:131–42.
120. Mota P, Pascoal AG, Sancho F, Carita AI, Bo K. Reliability of the inter-rectus distance measured by palpation. Comparison of palpation and ultrasound measurements. *Man Ther.* 2013;18(4):294–8.
121. Mota P, Pascoal AG, Sancho F, Bø K. Test-retest and intratester reliability of 2-dimensional ultrasound measurements of distance between rectus abdominis in women. *J Orthop Sports Phys Ther.* 2012;42(11):940–6.
122. Candido G, Lo T, Janssen PA. Risk factors for diastasis of the recti abdominis. *J Assoc Chart Physiother Women's Health.* 2005;97:49–54.
123. Mota P, Pascoal AG, Carita AI, Bø K. Normal width of the inter-recti distance in pregnant and postpartum primiparous women. *Musculoskelet Sci Pract.* 2018;35:34–7. <https://doi.org/10.1016/j.msksp.2018.02.004>.
124. Lo T, Candido G, Janssen P. Diastasis of the Recti abdominis in pregnancy: risk factors and treatment. *Physiother Can.* 1999;51:32.
125. Fernandes da Mota PG, Pascoal AG, Carita AI, Bo K. Prevalence and risk factors of diastasis recti abdominis from late pregnancy to 6 months postpartum, and relationship with lumbopelvic pain. *Man Ther.* 2015;20(1):200–5.
126. Lee DG, Lee LJ, McLaughlin L. Stability, continence and breathing: the role of fascia following pregnancy and delivery. *J Bodyw Mov Ther.* 2008;12:333–48.
127. Gilleard WL, Brown JM. Structure and function of the abdominal muscles in primigravid subjects during pregnancy and the immediate postbirth period. *Phys Ther.* 1996;76:750–62.
128. Liaw LJ, Hsu MJ, Liao CF, Liu MF, Hsu AT. The Relationships between inter-recti distance measured by ultrasound imaging and abdominal muscle function in postpartum women: a 6-month follow-up study. *J Orthop Sports Phys Ther.* 2011;41(6):435–43.
129. Benjamin DR, Frawley HC, Shields N, van de Water ATM, Taylor NF. Relationship between diastasis of the rectus abdominis muscle (DRAM) and musculo-

- skeletal dysfunctions, pain and quality of life: a systematic review. *Physiotherapy*. 2019;105(1):24–34.
130. Gluppe S, Engh ME, Bø K. Women with diastasis recti abdominis might have weaker abdominal muscles and more abdominal pain, but no higher prevalence of pelvic floor disorders, low back and pelvic girdle pain than women without diastasis recti abdominis. *Physiotherapy*. 2021;111:57. <https://doi.org/10.1016/j.physio.2021.01.008>.
 131. Parker MA, Millar LA, Dugan SA. Diastasis rectus abdominis and lumbo-pelvic pain and dysfunction-are they related? *J Women's Health Phys Therapy*. 2009;33:15–22.
 132. Braga A, Caccia G, Nasi I, Ruggeri G, Di Dedda MC, Lamberti G, et al. Diastasis recti abdominis after childbirth: is it a predictor of stress urinary incontinence? *J Gynecol Obstet Hum Reprod*. 2019;101657.
 133. Wang Q, Yu X, Chen G, Sun X, Wang J. Does diastasis recti abdominis weaken pelvic floor function? A cross-sectional study. *Int Urogynecol J*. 2020;31(2):277–83.
 134. Bjorklund K, Bergstrom S. Is pelvic pain in pregnancy a welfare complaint? *Acta Obstet Gynecol Scand*. 2000;79:24–30.
 135. Charpentier K, Leboucher J, Lawani M, et al. Back pain during pregnancy and living conditions: a comparison between Beninese and Canadian women. *Ann Phys Rehabil Med*. 2012;55:148–59.
 136. Mousavi SJ, Parnianpour M, Vleeming A. Pregnancy related pelvic girdle pain and low back pain in an Iranian population. *Spine*. 2007;32:E100–4.
 137. Gutke A, Boissonnault J, Brook G, et al. The severity and impact of pelvic girdle pain and lowback pain in pregnancy: a multinational study. *J Women's Health (Larchmt)*. 2017;27:510.
 138. Gashaw M, Gedlu S, Janakiraman B, Gashaw M, et al. Burden of pelvic girdle pain during pregnancy among women attending ante-natal clinic, Ethiopia: a cross-sectional study. *BMC Pregnan Childb*. 2020;20(1):494.
 139. Wormslev M, Juul AM, Marques B, et al. Clinical examination of pelvic insufficiency during pregnancy. An evaluation of the interobserver variation, the relation between clinical signs and pain and the relation between clinical signs and physical disability. *Scand J Rheumatol*. 1994;23:96–102.
 140. Olsson C, Nilsson-Wikmar L. Health-related quality of life and physical ability among pregnant women with and without back pain in late pregnancy. *Acta Obstet Gynecol Scand*. 2004;83:351–7.
 141. Stuge B, Veierød MB, Lærum E, et al. The efficacy of a treatment program focusing on specific stabilizing exercises for pelvic girdle pain after pregnancy. A two-year follow-up of a randomized clinical trial. *Spine*. 2004;29:E197–203.
 142. Persson M, Winkvist A, Dahlgren L, et al. "Struggling with daily life and enduring pain": a qualitative study of the experiences of pregnant women living with pelvic girdle pain. *BMC Pregnan Childb*. 2013;13:111.
 143. Pierce H, Homer CS, Dahlen HG, et al. Pregnancy-related lumbopelvic pain: listening to Australian women. *Nurs Res Pract*. 2012;2012:387428.
 144. Gutke A, Bullington J, Lund M, et al. Adaptation to a changed body. Experiences of living with long-term pelvic girdle pain after childbirth. *Disabil Rehabil*. 2017;40:1–7.
 145. Fredriksen EH, Moland KM, Sundby J. "Listen to your body". A qualitative text analysis of internet discussions related to pregnancy health and pelvic girdle pain in pregnancy. *Patient Educ Couns*. 2008;73:294–9.
 146. Engeset J, Stuge B, Fegran L. Pelvic girdle pain affects the whole life—a qualitative interview study in Norway on women's experiences with pelvic girdle pain after delivery. *BMC Res Notes*. 2014;7:686.
 147. Wu WH, Meijer OG, Uegaki K, et al. Pregnancy-related pelvic girdle pain (PPP), I: Terminology, clinical presentation, and prevalence. *Eur Spine J*. 2004;13:575–89.
 148. Ostgaard HC, Zetherstrom G, Roos-Hansson E, et al. Reduction of back and posterior pelvic pain in pregnancy. *Spine*. 1994;19:894–900.
 149. Gutke A, Ostgaard HC, Oberg B. Pelvic girdle pain and lumbar pain in pregnancy: a cohort study of the consequences in terms of health and functioning. *Spine*. 2006;31:E149–55.
 150. Robinson HS, Mengshoel AM, Bjelland EK, et al. Pelvic girdle pain, clinical tests and disability in late pregnancy. *Man Ther*. 2010;15:280–5.
 151. Kristiansson P, Svardssudd K, von Schoultz B. Back pain during pregnancy: a prospective study. *Spine*. 1996;21:702–9.
 152. Ostgaard HC, Andersson GB. Previous back pain and risk of developing back pain in a future pregnancy. *Spine*. 1991;16:432–6.
 153. Ostgaard HC, Andersson GB, Karlsson K. Prevalence of back pain in pregnancy. *Spine*. 1991;16:549–52.
 154. Bjelland EK, Stuge B, Engdahl B, et al. The effect of emotional distress on persistent pelvic girdle pain after delivery: a longitudinal population study. *BJOG*. 2013;120:32–40.
 155. Bø K, Backe-Hansen KL. Do elite athletes experience low back, pelvic girdle and pelvic floor complaints during and after pregnancy? *Scand J Med Sci Sports*. 2007;17:480–7.
 156. O'Sullivan PB, Beales DJ. Diagnosis and classification of pelvic girdle pain disorders, Part 2: illustration of the utility of a classification system via case studies. *Man Ther*. 2007;12:e1–12.
 157. Aldabe D, Ribeiro DC, Milosavljevic S, et al. Pregnancy-related pelvic girdle pain and its relationship with relaxin levels during pregnancy: a systematic review. *Eur Spine J*. 2012;21:1769–76.
 158. Nielsen LL. Clinical findings, pain descriptions and physical complaints reported by women with post-natal pregnancy-related pelvic girdle pain. *Acta Obstet Gynecol Scand*. 2010;89:1187–91.
 159. Goode A, Hegedus EJ, Sizer P, et al. Three-dimensional movements of the sacroiliac joint: a systematic review of the literature and assessment of clinical utility. *J Man Manip Ther*. 2008;16:25–38.
 160. Mens JM, Vleeming A, Snijders CJ, et al. The active straight leg raising test and mobility of the pelvic joints. *Eur Spine J*. 1999;8:468–74.
 161. Kibsgard TJ, Roise O, Stureson B, et al. Radiostereometric analysis of movement in the sacroiliac joint during a single-leg stance in patients with long-lasting pelvic girdle pain. *Clin Biomech*. 2014;29:406–11.
 162. Snijders CJ, Vleeming A, Stoeckart R, et al. Biomechanics of the interface between spine and pelvis in different postures. In: Vleeming A, Mooney V, Dorman T, et al., editors. *Movement, stability & low back pain. The essential role of the pelvis*. Edinburgh: Churchill Livingstone; 1997. p. 103–14.
 163. Hungerford B, Gilleard W, Hodges P. Evidence of altered lumbopelvic muscle recruitment in the presence of sacroiliac joint pain. *Spine*. 2003;28:1593–600.
 164. Hungerford B, Gilleard W, Lee D. Altered patterns of pelvic bone motion determined in subjects with posterior pelvic pain using skin markers. *Clin Biomech*. 2004;19:456–64.
 165. Damen L, Buyruk HM, Guler-Uysal F, et al. Pelvic pain during pregnancy is associated with asymmetric laxity of the sacroiliac joints. *Acta Obstet Gynecol Scand*. 2001;80:1019–24.
 166. Palsson TS, Graven-Nielsen T. Experimental pelvic pain facilitates pain provocation tests and causes regional hyperalgesia. *Pain*. 2012;153:2233–40.
 167. Palsson TS, Hirata RP, Graven-Nielsen T. Experimental pelvic pain impairs the performance during the active straight leg raise test and causes excessive muscle stabilization. *Clin J Pain*. 2015;31:642.
 168. Torstensson T, Lindgren A, Kristiansson P. Corticosteroid injection treatment to the ischiadic spine reduced pain in women with long-lasting sacral low back pain with onset during pregnancy: a randomized, double blind, controlled trial. *Spine*. 2009;34:2254–8.
 169. Torstensson T, Lindgren A, Kristiansson P. Improved function in women with persistent pregnancy-related pelvic pain after a single corticosteroid injection to the ischiadic spine: a randomized double-blind controlled trial. *Physiother Theory Pract*. 2013;29:371–8.
 170. Eichenseer PH, Sybert DR, Cotton JR. A finite element analysis of sacroiliac joint ligaments in response to different loading conditions, vol. 36. *Spine*; 2011. p. E1446–52.
 171. Snijders CJ, Vleeming A, Stoeckart R. Transfer of lumbosacral load to iliac bones and legs. 1. Biomechanics of Self-bracing of the sacroiliac joints and its significance for treatment and exercise. *Clin Biomech*. 1993;8:285–94.
 172. Franklin ME, Conner-Kerr T. An analysis of posture and back pain in the first and third trimesters of pregnancy. *J Orthop Sports Phys Ther*. 1998;28:133–8.
 173. Moore K, Dumas GA, Reid JG. Postural changes associated with pregnancy and their relationship with low-back pain. *Clin Biomech*. 1990;5:169–74.

174. Okanishi N, Kito N, Akiyama M, et al. Spinal curvature and characteristics of postural change in pregnant women. *Acta Obstet Gynecol Scand.* 2012;91:856–61.
175. Aldabe D, Milosavljevic S, Bussey MD. Is pregnancy related pelvic girdle pain associated with altered kinematic, kinetic and motor control of the pelvis? A systematic review. *Eur Spine J.* 2012;21:1777–87.
176. Beales DJ, O’Sullivan PB, Briffa NK. Motor control patterns during an active straight leg raise in chronic pelvic girdle pain subjects. *Spine.* 2009;34:861–70.
177. Richardson CA, Snijders CJ, Hides JA, et al. The relation between the transversus abdominis muscles, sacroiliac joint mechanics, and low back pain. *Spine.* 2002;27:399–405.
178. Stuge B, Morkved S, Dahl HH, et al. Abdominal and pelvic floor muscle function in women with and without long lasting pelvic girdle pain. *Man Ther.* 2006;11:287–96.
179. Stuge B, Saetre K, Braekken IH. The association between pelvic floor muscle function and pelvic girdle pain--a matched case control 3D ultrasound study. *Man Ther.* 2012;17:150–6.
180. Stuge B, Saetre K, Ingeborg HB. The automatic pelvic floor muscle response to the active straight leg raise in cases with pelvic girdle pain and matched controls. *Man Ther.* 2013;18:327.
181. Dumas GA, Leger A, Plamondon A, et al. Fatigability of back extensor muscles and low back pain during pregnancy. *Clin Biomech.* 2010;25:1–5.
182. Bewyer KJ, Bewyer DC, Messenger D, et al. Pilot data: association between gluteus medius weakness and low back pain during pregnancy. *Iowa Orthop J.* 2009;29:97–9.
183. Gutke A, Ostgaard HC, Oberg B. Association between muscle function and low back pain in relation to pregnancy. *J Rehabil Med.* 2008;40:304–11.
184. Pool-Goudzwaard ALGM, Spoor CW, et al. The active straight leg raising test (ASLR) in pregnant women: differences in muscle activity and force between patients and healthy subjects. *Man Ther.* 2008;13:68–74.
185. Remus A, et al. A core outcome set for research and clinical practice in women with pelvic girdle pain: PGP-COS. *PLoS One.* 2021;16(2):e0247466

1. Bø K, Artal R, Barakat R, Brown W, Davies GAL, Dooley M, et al. Exercise and pregnancy in recreational and elite athletes: 2016 evidence summary from the IOC expert group meeting, Lausanne. Part 1-exercise in women planning pregnancy and those who are pregnant. *Br J Sports Med.* 2016;50(10):571–89.
2. Bø K, Artal R, Barakat R, Brown W, Dooley M, Evenson KR, et al. Exercise and pregnancy in recreational and elite athletes: 2016 evidence summary from the IOC expert group meeting, Lausanne. Part 2-the effect of exercise on the fetus, labour and birth. *Br J Sports Med.* 2016;50(21):1297–305.
3. Davenport MH, Meah VL, Ruchat S-M, Davies GA, Skow RJ, Barrowman N, et al. Impact of prenatal exercise on neonatal and childhood outcomes: a systematic review and meta-analysis. *Br J Sports Med.* 2018;52(21):1386–96.
4. Davenport MH, Ruchat S-M, Sobierajski F, Poitras VJ, Gray CE, Yoo C, et al. Impact of prenatal exercise on maternal harms, labour and delivery outcomes: a systematic review and metaanalysis. *Br J Sports Med.* 2019;53:99.
5. Cai C, Ruchat S-M, Sivak A, Davenport MH. Prenatal exercise and cardiorespiratory health and fitness: a meta-analysis. *Med Sci Sports Exerc.* 2020;52(7):1538–48.
6. Hagen Haakstad LA, Voldner N, Bø K. Stages of change model for participation in physical activity during pregnancy. *J Pregnancy.* 2013;2013:1–7.
7. Ruchat S-M, Mottola MF. Preventing long-term risk of obesity for two generations: prenatal physical activity is part of the puzzle. *J Pregnancy.* 2012;2012:470247.
8. Perales M, Valenzuela PL, Barakat R, Cordero Y, Pelaez M, Lopez C, et al. Gestational exercise and maternal and child health: effects until delivery and at post-natal follow-up. *J Clin Med.* 2020;9(2):14.
9. Evenson KR, Savitz DA, Huston SL. Leisure-time physical activity among pregnant women in the US. *Paediatr Perinat Epidemiol.* 2004;18(6):400–7.
10. Petersen AM, Leet TL, Brwonson RC. Correlates of physical activity among pregnant women in the United States. *Med Sci Sports Exerc.* 2005;37(10):1748–53.
11. Liu J, Blair SN, Teng Y, Ness AR, Lawlor DA, Riddoch C. Physical activity during pregnancy in a prospective cohort of British women: results from the Avon longitudinal study of parents and children. *Eur J Epidemiol.* 2011;26(3):237–47.
12. Amezcua-Prieto C, Lardelli-Claret P, Olmedo-Requena R, Mozas-Moreno J, Bueno-Cavanillas A, Jiménez-Moleón JJ. Compliance with leisure-time physical activity recommendations in pregnant women. *Acta Obstet Gynecol Scand.* 2011;90(3):245–52.
13. Nascimento SL, Surita FG, Cecatti JG. Physical exercise during pregnancy: a systematic review. *Curr Opin Obstet Gynecol.* 2012;24(6):387–94.
14. Juhl M, Madsen M, Andersen AMN, Andersen PK, Olsen J. Distribution and predictors of exercise habits among pregnant women in the Danish National Birth Cohort. *Scand J Med Sci Sports.* 2012;22(1):128–38.
15. Wojtyła A, Kapka-Skrzypczak L, Paprzycki P, Skrzypczak M, Biliński P. Epidemiological studies in Poland on effect of physical activity of pregnant women on the health of offspring and future generations - adaptation of the hypothesis development origin of health and diseases. *Ann Agric Environ Med.* 2012;19(2):315–26.
16. Gaston A, Vamos C. Leisure-time physical activity patterns and correlates among pregnant women in Ontario, Canada. *Maternal Child Health J.* 2013;17(3):477–84.
17. Santos PC, Abreu S, Moreira C, Lopes D, Santos R, Alves O, et al. Impact of compliance with different guidelines on physical activity during pregnancy and perceived barriers to leisure physical activity. *J Sports Sci.* 2014;32(14):1398–408.
18. Christopher PC, Deborah LF, James MP. Overcoming barriers to physical activity during pregnancy and the postpartum period: the potential impact of social support. *Kinesiol Rev.* 2014;3(2):135–48.
19. Atkinson L, Parsons J, Jackson BR. Exercise in pregnancy - UK women's views and experiences: results of an online survey. *Pregnan Hypertens.* 2014;4(3):231.
20. Petrov Fieril K, Fagevik Olsén M, Glantz A, Larsson M. Experiences of exercise during pregnancy among women who perform regular resistance training: a qualitative study. *Phys Ther.* 2014;94(8):1135–43.
21. Thornton PL, Kieffer EC, Salabarria-Pena Y, Odoms-Young A, Willis SK, Kim H, et al. Weight, diet, and physical activity-related beliefs and practices among pregnant and postpartum Latino women: the role of social support. *Matern Child Health J.* 2006;10(1):95–104.
22. Evenson KR, Bradley CB. Beliefs about exercise and physical activity among pregnant women. *Patient Educ Couns.* 2010;79(1):124–9.
23. Cannella D, Lobel M, Monheit A. Knowing is believing: information and attitudes towards physical activity during pregnancy. *J Psychosom Obstet Gynecol.* 2010;31(4):236–42.
24. Mbada CE, Adebayo OE, Adeyemi AB, Arije OO, Dada OO, Akinwande OA, et al. Knowledge and attitude of Nigerian pregnant women towards antenatal exercise: a cross-sectional survey. *ISRN Obstet Gynecol.* 2014;2014:1–8.
25. Gouveia R, Martins S, Sandes AR, Nascimento C, Figueira J, Valente S, et al. [Pregnancy and physical exercise: myths, evidence and recommendations]. *Acta Medica Port.* 2007;20(3):209–14.
26. Tanha FD, Ghajarzadeh M, Mohseni M, Shariat M, Ranjbar M. Is ACOG guideline helpful for encouraging pregnant women to do exercise during pregnancy? *Acta Medica Iranica.* 2014;52(6):458–61.
27. van Poppel M, Owe K, Santos-Rocha R, Dias H, Oviedo-Caro MA. Physical activity, exercise, and health promotion for the pregnant exerciser and the pregnant athlete. In: Santos-Rocha R, editor. *Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines.* 2nd ed. Cham: Springer International Publishing; 2022. Chapter 1.
28. Tan EK, Tan EL. Alterations in physiology and anatomy during pregnancy. *Best Pract Res Clin Obstet Gynaecol.* 2013;27(6):791–802.
29. ACSM. ACSM's Resources for the personal trainer. 5th ed. Philadelphia, PA: Wolters Kluwer Health; 2017. 632 p.
30. Berk B. Motherwell maternity fitness plan. Champaign, IL: Human Kinetics, Inc; 2005. 232 p.
31. Clapp JF, Cram C. Exercise through your pregnancy. 2nd ed. Omaha, NB: Addicus Books; 2012. 268 p.
32. Evenson KR, Barakat R, Brown WJ, Dargent-Molina P, Haruna M, Mikkelsen EM, et al. Guidelines for physical activity during pregnancy: comparisons from around the world. *Am J Lifestyle Med.* 2014;8(2):102–21.
33. Szumilewicz A, Worska A, Rajkowska N, Santos-Rocha R. Summary of guidelines for exercise in pregnancy – are they comprehensive enough for designing the contents of a prenatal exercise program? *Curr Women's Health Rev.* 2015;11(1):3–12.
34. Hayman M, Brown W, Ferrar K, Marchese R, Tan J. SMA position statement for exercise in pregnancy and the postpartum period. Sydney Olympic Park, NSW: SMA; 2016. <http://sma.org.au/wp-content/uploads/2016/09/SMA-Position-Statement-Exercise-Pregnancy.pdf>.
35. Pre & post-natal exercise guidelines. 2013. https://fitnessaustralia.s3.amazonaws.com/uploads/uploaded_fle/fle/219/Pre-and-Post-Natal-Exercise-Guidelines.pdf.
36. Davies GAL, Wolfe LA, Mottola MF, MacKinnon C, Arseneault M-Y, Bartellas E, et al. Exercise in pregnancy and the postpartum period. *J Obstet Gynaecol Can.* 2003;25(6):516–29.
37. Alleyne J. Position statement: exercise and pregnancy. 2008. http://casem-acmse.org/wp-content/uploads/2013/07/Exercise-Pregnancy-Position-Paper_2008_.pdf.
38. Healthy habits – before, during and after pregnancy. 2010. <https://www.sst.dk/en/health-andlifestyle/~media/BCB704A368E3404C8CEEAE057CDEDE26.ashx>.
39. Holan S, Mathiesen M, Petersen K. A national clinical guideline for antenatal care. Short version.2005.<https://helsedirektoratet.no/Lists/Publikasjoner/Attachments/404/Nationalclinicalguideline-for-antenatal-care-short-version%20-IS-1339.pdf>.
40. Barsky E, Smith T, Patricios J, Collins R, Branfeld A, Ramagole M. South African Sports Medicine Association Position Statement on Exercise in Pregnancy. *S A J Sports Med.* 2012;24(2):69–71.
41. RCOG. Statement No. 4. Exercise in pregnancy. London: Royal College of Obstetricians and Gynaecologists (RCOG); 2006. <https://www.rcog.org.uk/globalassets/documents/guidelines/statements/statement-no-4.pdf>
42. ACOG. Physical Activity and exercise during pregnancy and the postpartum period. Washington, DC: The American College of Obstetricians and Gynecologists (ACOG); 2015. Committee Opinion No. 650.
43. DHHS US. Physical activity guidelines for Americans. Washington, DC: U.S. Department of Human and Health Services; 2008. <https://health.gov/paguidelines/>

44. ACNM. Exercise in pregnancy. *J Midwif Women's Health*. 2014;59(4):473–4.
45. ACSM. Current comment. Exercise during pregnancy. Indianapolis, IN: ACSM.
46. Bø K, Artal R, Barakat R, Brown WJ, Davies GAL, Dooley M, et al. Exercise and pregnancy in recreational and elite athletes: 2016/17 evidence summary from the IOC Expert Group Meeting, Lausanne. Part 3-exercise in the postpartum period. *Br J Sports Med*. 2017;51(21):1516–25.
47. SMA. Pregnancy and exercise. Women in sport. Sydney Olympic Park, NSW: SMA. SMA_AWiS_Pregnancy_Exercise.pdf. Accessed 13 Jul 2021.
48. AGDH. Guidelines for physical activity during pregnancy. Guidelines for physical activity during pregnancy (health.gov.au). Indianapolis, IN: Australian Government. Department of Health; 2021.
49. RANZCOG. Exercise in pregnancy. Melbourne, VIC: The Royal Australian and New Zealand College of Obstetricians and Gynaecologists; 2020.
50. Mottola MF, Davenport MH, Ruchat S-M, Davies GA, Poitras VJ, Gray CE, et al. 2019 Canadian guideline for physical activity throughout pregnancy. *Br J Sports Med*. 2018;52(21):1339–46.
51. NHS. Exercise in pregnancy exercise in pregnancy. London: NHS; 2020. www.nhs.uk.
52. ACOG. ACOG Committee opinion no. 804: Physical activity and exercise during pregnancy and the postpartum period. *Obstet Gynecol*. 2020;135(4):e178–e88.
53. ACSM. ACSM information on pregnancy physical activity. Indianapolis, IN: American College of Sports Medicine; 2020.
54. EIM/ACSM. Being active during pregnancy. Exercise is medicine. Indianapolis, IN: American College of Sports Medicine; 2019.
55. DHHS. Physical activity guidelines for Americans. 2nd ed. Washington, DC: U.S. Department of Health and Human Services; 2018.
56. Bø K, Artal R, Barakat R, Brown WJ, Davies GAL, Dooley M, et al. Exercise and pregnancy in recreational and elite athletes: 2016/2017 evidence summary from the IOC expert group meeting, Lausanne. Part 5. Recommendations for health professionals and active women. *Br J Sports Med*. 2018;52(17):1080–5.
57. WHO. WHO guidelines on physical activity and sedentary behaviour. Geneva: World Health Organization; 2020.
58. Beyaz EA, Özcan E, Ketenci A, Beyaz MM. The Effectiveness of pregnancy rehabilitation: effects on low back pain and calf cramps during pregnancy and pregnancy outcomes. Gebelik Rehabilitasyonunun Etkinliği: Gebelik Sirasındaki Bel Ağrısı ve Baldır Kramplarına ve Gebelik Sonuçlarına Etkileri. 2011;7(2):67–74.
59. Piper TJ, Jacobs E, Haiduke M, Waller M, McMillan C. Core training exercise selection during pregnancy. *Streng Condition J*. 2012;34(1):55–62.
60. Santos-Rocha R, Szumilewicz A, Perales M, Pajaujiene S. EuropeActive standards EQF level 5 - pregnancy and postnatal exercise specialist. EuropeActive. 2016;
61. Kehler AK, Heinrich KM. A selective review of prenatal exercise guidelines since the 1950s until present: written for women, health care professionals, and female athletes. *Women Birth*. 2015;28(4):E93–E8.
62. Tafari N, Naeye RL, Gobeze A. Effects of maternal undernutrition and heavy physical work during pregnancy on birth-weight. *Br J Obstet Gynaecol*. 1980;87(3):222–6.
63. Terada M. Effect of physical activity before pregnancy on fetuses of mice exercised forcibly during pregnancy. *Teratology*. 1974;10(2):141–4.
64. Kader M, Naim-Shuchana S. Physical activity and exercise during pregnancy. *Eur J Physiother*. 2014;16(1):2–9.
65. Bo K, Artal R, Barakat R, Brown W, Dooley M, Evenson KR, et al. Exercise and pregnancy in recreational and elite athletes: 2016 evidence summary from the IOC expert group meeting, Lausanne. Part 2-the effect of exercise on the fetus, labour and birth. *Br J Sports Med*. 2016;50(21):1297–305.
66. Downs DS, Chasan-Taber L, Evenson KF, Leiferman J, Yeo S. Physical activity and pregnancy: past and present evidence and future recommendations. *Res Q Exerc Sport*. 2012;83(4):485–502.
67. ACOG. Committee opinion. Number 267, January 2002: exercise during pregnancy and the postpartum period. *Obstet Gynecol*. 2002;99(1):171–3.
68. SMA. SMA statement the benefits and risks of exercise during pregnancy. Sport Medicine Australia. *J Sci Med Sport*. 2002;5(1):11–9.
69. Bo K, Artal R, Barakat R, Brown WJ, Davies GAL, Dooley M, et al. Exercise and pregnancy in recreational and elite athletes: 2016/17 evidence summary from the IOC expert group meeting, Lausanne. Part 4-Recommendations for future research. *Br J Sports Med*. 2017;51(24):1724–6.
70. Mottola MF. Components of exercise prescription and pregnancy. *Clin Obstet Gynecol*. 2016;59(3):552–8.
71. Ruchat SM, Davenport MH, Giroux I, Hillier M, Batada A, Sopper MM, et al. Walking program of low or vigorous intensity during pregnancy confers an aerobic benefit. *Int J Sports Med*. 2012;33(8):661–6.
72. Artal R. Exercise during pregnancy and the postpartum period. Philadelphia, PA: WoltersKluwer; 2017. https://www.uptodate.com/contents/exercise-during-pregnancy-and-the-postpartum-period.
73. Juhl M, Strandberg-Larsen K, Larsen PS, Andersen PK, Svendsen SW, Bonde JP, et al. Occupational lifting during pregnancy and risk of fetal death in a large national cohort study. *Scand J Work Environ Health*. 2013;39(4):335–42.
74. Meah VL, Davies GA, Davenport MH. Why can't I exercise during pregnancy? Time to revisit medical 'absolute' and 'relative' contraindications: systematic review of evidence of harm and a call to action. *Br J Sports Med*. 2020;54(23):1395–404.
75. Jain V. Choosing wisely: bedrest-a panacea for all that ails the gravida? *J Obstet Gynaecol Can*. 2019;41(7):971–3.
76. McCall CA, Grimes DA, Lyster AD. "Therapeutic" bed rest in pregnancy: unethical and unsupported by data. *Obstet Gynecol*. 2013;121(6):1305–8.
77. Ozemek C, Arena R. Evidence supporting moving more and sitting less. *Prog Cardiovasc Dis*. 2021;64:3–8.
78. Jakicic JM, Kraus WE, Powell KE, Campbell WW, Janz KF, Troiano RP, et al. Association between bout duration of physical activity and health: systematic review. *Med Sci Sports Exerc*. 2019;51(6):1213–9.
79. Vandelandotte C, Van Itallie A, Brown W, Mummery WK, Duncan MJ. Every step counts: understanding the success of implementing the 10,000 steps project. *Stud Health Technol Inf*. 2020;268:15–30.
80. Ekelund U, Brown WJ, Steene-Johannessen J, Fagerland MW, Owen N, Powell KE, et al. Do the associations of sedentary behaviour with cardiovascular disease mortality and cancer mortality differ by physical activity level? A systematic review and harmonised meta-analysis of data from 850 060 participants. *Br J Sports Med*. 2019;53(14):886–94.
81. Conger J, Magann EF. Diving and pregnancy: what do we really know? *Obstet Gynecol Surv*. 2014;69(9):551–6.
82. Reid RL, Lorenzo M. SCUBA diving in pregnancy. *J Obstet Gynaecol Can*. 2018;40(11):1490–6.
83. Krans EE, Chang JC. Low-income African American women's beliefs regarding exercise during pregnancy. *Matern Child Health J*. 2012;16(6):1180–7.
84. Karowicz-Bilińska A, Sikora A, Estemberg D, Brzozowska M, Berner-Trabska M, Kuś E, et al. [Physiotherapy in obstetrics]. *Ginekol Pol*. 2010;81(6):441–5.
85. Zwelling E. Overcoming the challenges: maternal movement and positioning to facilitate labor progress. *MCN Am J Matern Child Nurs*. 2010;35(2):72–8.
86. Artieta-Pinedo I, Paz-Pascual C, Grandes G, Espinosa M. Framework for the establishment of a feasible, tailored and effective perinatal education programme. *BMC Pregn Childb*. 2017;17:1–10.
87. Miquelutti MA, Cecatti JG, Makuch MY. Antenatal education and the birthing experience of Brazilian women: a qualitative study. *BMC Pregn Childb*. 2013;13(1):1–8.
88. Levett KM, Smith CA, Bensoussan A, Dahlen HG. The Complementary Therapies for Labour and Birth Study making sense of labour and birth - experiences of women, partners and midwives of a complementary medicine antenatal education course. *Midwifery*. 2016;40:124–31.
89. Shiri R, Coggon D, Falah-Hassani K. Exercise for the prevention of low back and pelvic girdle pain in pregnancy: a meta-analysis of randomized controlled trials. *Eur J Pain*. 2018;22(1):19–27.
90. Magro-Malosso ER, Saccone G, Di Tommaso M, Roman A, Berghella V. Exercise during pregnancy and risk of gestational hypertensive disorders: a systematic review and meta-analysis. *Acta Obstet Gynecol Scand*. 2017;96(8):921–31.
91. Lemos A, de Souza AI, Ferreira ALCG, Figueiroa JN, Cabral-Filho JE. Do perineal exercises during pregnancy prevent the development of urinary incontinence? A systematic review. *Int J Urol*. 2008;15(10):875–80.
92. Szumilewicz A, Dornowski M, Piernicka M, Worska A, Kuchta A, Kortas J, et al. High low impact exercise program including pelvic floor muscle exercises improves pelvic floor muscle function in healthy pregnant women – a randomized control trial. *Front Physiol*. 2019;9:1867.
93. Jain S, Bhartiya N. Positive effects of antenatal yoga on pregnancy outcomes. *Indian Obstet Gynaecol*. 2017;7(4):27–31.

94. Riley K, Drake E. The effects of prenatal yoga on birth outcomes: a systematic review of the literature. *J Prenat Perinat Psychol Health*. 2013;28(1):3–19.
95. Jiang Q, Wu Z, Zhou L, Dunlop J, Chen P. Effects of yoga intervention during pregnancy: a review for current status. *Am J Perinatol*. 2015;32(6):503–14.
96. Muller A, Hammill H. The Effect of pilates and progressive muscle relaxation therapy (Mrt) on stress and anxiety during pregnancy: a literature review. *S A J Sports Med*. 2015;27:53.
97. Mazzarino M, Kerr D, Wajswelner H, Morris ME. Pilates method for women's health: systematic review of randomized controlled trials. *Arch Phys Med Rehabil*. 2015;96(12):2231–42.
98. Mota P, Pascoal AG, Carita AI, Bø K. The immediate effects on inter-rectus distance of abdominal crunch and drawing-in exercises during pregnancy and the postpartum period. *J Orthop Sports Phys Ther*. 2015;45(10):781–8.
99. Worska A, Szumilewicz A. Aktywność fizyczna kobiet w ciąży w świadomości przyszłych instruktorów rekreacji ruchowej [Physical activity of expecting mothers in the awareness of future exercise professionals]. *J Educ Health Sport*. 2015;5(8):91–102.
100. Schmidt T, Heilmann T, Savelsberg L, Maass N, Weisser B, Eckmann-Scholz C. Physical exercise during pregnancy - how active are pregnant women in germany and how well informed? *Geburtshilfe Frauenheilkd*. 2017;77(5):508–15.
101. Jukic AMZ, Evenson KR, Herring AH, Wilcox AJ, Hartmann KE, Daniels JL. Correlates of physical activity at two time points during pregnancy. *J Phys Act Health*. 2012;9(3):325–35.
102. Padmanabhan U, Summerbell CD, Heslehurst N. A qualitative study exploring pregnant women's weight-related attitudes and beliefs in UK: the BLOOM study. *BMC Pregnan Childb*. 2015;15:99.
103. Watson ED, Oddie B, Constantinou D. Exercise during pregnancy: knowledge and beliefs of medical practitioners in South Africa: a survey study. *BMC Pregnan Childb*. 2015;15:245.
104. Malta MB, Carvalhaes M, Takito MY, Tonete VLP, Barros AJD, Parada C, et al. Educational intervention regarding diet and physical activity for pregnant women: changes in knowledge and practices among health professionals. *BMC Pregnan Childb*. 2016;16:175.
105. PARmed-X for PREGNANCY (Physical Activity Readiness Medical Examination for Pregnancy). CSEP. 2013

1. Suleman A, Heffner KD. Exercise prescription. Medscape, 2016. <https://emedicine.medscape.com/article/88648-overview#a1>. Accessed 3 Sep 2021.
2. ACSM - American College of Sports Medicine. ACSM's guidelines for exercise testing and prescription. 11th ed. Philadelphia, PA: Wolters Kluwer Health; 2021.
3. Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Rep*. 1985;100(2):126–31.
4. USDHHS - U.S. Department of Health and Human Services. Physical activity guidelines for Americans. 2nd ed. Washington, DC: U.S. Department of Health and Human Services; 2018.
5. Szumilewicz A, Worska A, Santos-Rocha R, Oviedo-Caro MA. Evidence-based and practiceoriented guidelines for exercising during pregnancy. In: Santos-Rocha R, editor. Exercise and physical activity during pregnancy and postpartum. evidence-based guidelines. 2nd ed. Cham: Springer International Publishing; 2022. Chapter 7.
6. WHO - World Health Organization. WHO guidelines on physical activity and sedentary behaviour. Geneva: World Health Organization; 2020.
7. Artal R. Exercise during pregnancy and the postpartum period. UpToDate®. Philadelphia, PA: Wolters Kluwer; 2021. www.uptodate.com. Accessed 3 Sep 2021.
8. Dipietro L, Evenson KR, Bloodgood B, Sprow K, Troiano RP, Piercy KL, Vaux-Bjerke A, Powell KE, 2018 Physical Activity Guidelines Advisory Committee*. Benefits of physical activity during pregnancy and postpartum: an umbrella review. *Med Sci Sports Exerc*. 2019;51(6):1292–302.
9. Borodulin K, Evenson KR, Herring AH. Physical activity patterns during pregnancy through postpartum. *BMC Womens Health*. 2009;9:32.
10. Sjögren Forss K, Stjernberg L. Physical activity patterns among women and men during pregnancy and 8 months postpartum compared to pre-pregnancy: a longitudinal study. *Front Public Health*. 2019;7:294.
11. Krans EE, Gearhart JG, Dubbert PM, Klar PM, Miller AL, Replogle WH. Pregnant women's beliefs and influences regarding exercise during pregnancy. *J Miss State Med Assoc*. 2005;46(3):67–73.
12. RANZCOG - The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Exercise in pregnancy. Melbourne, VIC: RANZCOG; 2020.
13. NHS - National Health Service. Exercise in pregnancy exercise in pregnancy. London: National Health Service; 2020. www.nhs.uk.
14. EuropeActive. EuropeActive standards - European qualification framework level 5 - pregnancy and postnatal exercise specialist. 2016. <http://www.ehfa-standards.eu/es-standards>. Accessed 30 Dec 2017. Updated in 2022: https://www.europeactive-standards.eu/sites/europeactive-standards.eu/files/EuropeActive_Summary_Pregnancy-Postpartum-2022_0.pdf.
15. Atkinson L, Teychenne M. Psychological, social and behavioural changes during pregnancy: implications for physical activity and exercise. In: Santos-Rocha R, editor. Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines. 2nd ed. Cham: Springer International Publishing; 2022. Chapter 2.
16. Mottola MF, Davenport MH, Ruchat S-M, Davies GA, Poitras VJ, Gray CE, et al. 2019 Canadian guideline for physical activity throughout pregnancy. *Br J Sports Med*. 2018;52(21):1339–46.
17. AGDH - Australian Government. Department of Health. Guidelines for physical activity during pregnancy. Guidelines for physical activity during pregnancy (health.gov.au). Indianapolis, IN: Australian Government. Department of Health; 2021.
18. ACOG - American College of Obstetricians and Gynecologists. ACOG Committee opinion no. 804: Physical activity and exercise during pregnancy and the postpartum period. *Obstet Gynecol*. 2020;135(4):e178–e88.
19. SMA. Pregnancy and exercise. Women in sport. Sydney Olympic Park, NSW: SMA. SMA_AWiS_Pregnancy_Exercise.pdf. Sport Medicine Australia. Accessed 13 Jul 2021.
20. Bø K, Artal R, Barakat R, Brown WJ, Davies GAL, Dooley M, et al. Exercise and pregnancy in recreational and elite athletes: 2016/2017 evidence summary from the IOC expert group meeting, Lausanne. Part 5. Recommendations for health professionals and active women. *Br J Sports Med*. 2018;52(17):1080–5.
21. ACSM - American College of Sport Medicine. ACSM information on pregnancy physical activity. Indianapolis, IN: American College of Sports Medicine; 2020. <https://www.acsm.org/docs/currentcomments/exerciseduringpregnancy.pdf>. Accessed 3 Sep 2021.
22. EIM/ACSM. Being active during pregnancy. Indianapolis, IN: Exercise is Medicine/American College of Sports Medicine; 2019.
23. ACOG - American College of Obstetricians and Gynecologists. Exercise during pregnancy and the postnatal period. Washington DC: American College of Obstetricians and Gynecologists; 1985.
24. ACOG - American College of Obstetricians and Gynecologists. Exercise during pregnancy and the postpartum period. ACOG Technical Bulletin, Number 189--February 1994. *Int J Gynaecol Obstet*. 1994;45(1):65–70.
25. ACOG - American College of Obstetricians and Gynecologists. ACOG Committee Opinion. Exercise during pregnancy and the postpartum period. Number 267, January 2002. American College of Obstetricians and Gynecologists. *Int J Gynaecol Obstet*. 2002;77(1):79–81.
26. Evenson KR, Barakat R, Brown WJ, et al. Guidelines for physical activity during pregnancy: comparisons from around the world. *Am J Lifestyle Med*. 2013;XX(X):1–20.
27. Szumilewicz A, Worska A, Rajkowska N, Santos-Rocha R. Summary of guidelines for exercise in pregnancy – are they comprehensive enough for designing the contents of a prenatal exercise program? *Curr Women's Health Rev*. 2015;11(1):3–12.
28. ACOG - American College of Obstetricians and Gynecologists. Physical activity and exercise during pregnancy and the postpartum period. Committee Opinion No. 650. American College of Obstetricians and Gynecologists. *Obstet Gynecol*. 2015;126:e135–42.
29. Bø K, Artal R, Barakat R, Brown W, Davies GA, Dooley M, Evenson KR, Haakstad LA, Henriksson-Larsen K, Kayser B, Kinnunen TI, Mottola MF, Nygaard I, van Poppel M, Stuge B, Khan KM. Exercise and pregnancy in recreational and elite athletes: 2016 evidence summary from the IOC expert group meeting, Lausanne. Part 1-exercise in women planning pregnancy and those who are pregnant. *Br J Sports Med*. 2016;50(10):571–89.

30. Bø K, Artal R, Barakat R, Brown W, Dooley M, Evenson KR, Haakstad LA, Larsen K, Kayser B, Kinnunen TI, Mottola MF, Nygaard I, van Poppel M, Stuge B, Davies GA. IOC Medical Commission. Exercise and pregnancy in recreational and elite athletes: 2016 evidence summary from the IOC expert group meeting, Lausanne. Part 2-the effect of exercise on the fetus, labour and birth. *Br J Sports Med.* 2016;50:1297.
31. Bø K, Artal R, Barakat R, Brown WJ, Davies GAL, Dooley M, Evenson KR, Haakstad LAH, Kayser B, Kinnunen TI, Larsén K, Mottola MF, Nygaard I, van Poppel M, Stuge B, Khan KM. IOC Medical Commission. Exercise and pregnancy in recreational and elite athletes: 2016/17 evidence summary from the IOC Expert Group Meeting, Lausanne. Part 3-exercise in the postpartum period. *Br J Sports Med.* 2017;51(21):1516–25.
32. Bø K, Artal R, Barakat R, Brown WJ, Davies GAL, Dooley M, Evenson KR, Haakstad LAH, Kayser B, Kinnunen TI, Larsén K, Mottola MF, Nygaard I, van Poppel M, Stuge B, Khan KM. Exercise and pregnancy in recreational and elite athletes: 2016/17 evidence summary from the IOC expert group meeting, Lausanne. Part 4-Recommendations for future research. *Br J Sports Med.* 2017;51:1724.
33. Kilpatrick SJ, Papile LA, Macones GA. Guidelines for perinatal care. 8th ed. Elk Grove Village, IL; Washington, DC: AAP Committee on Fetus and Newborn and ACOG Committee on Obstetric Practice; 2017. <https://ebooks.aappublications.org/content/guidelines-for-perinatal-care-8th-edition.tab-info>.
34. Barakat R, Perales M, Bacchi M, Coterón J, Refoyo I. A program of exercise throughout pregnancy. Is it safe to mother and newborn? *Am J Health Promot.* 2013;29(1):2–8. Perales M, Santos-Lozano A, Ruiz JR, Lucia A, Barakat R. Benefits of aerobic or resistance training during pregnancy on maternal health and perinatal outcomes: a systematic review. *Early Hum Dev.* 2016;94:43–8.
36. Davenport MH, Skow RJ, Steinback CD. Maternal responses to aerobic exercise in pregnancy. *Clin Obstet Gynecol.* 2016;59(3):541–51.
37. Morales-Suárez-Varela M, Clemente-Bosch E, Peraita-Costa I, Llopis-Morales A, Martínez I, Llopis-González A. Maternal physical activity during pregnancy and the effect on the mother and newborn: a systematic review. *J Phys Act Health.* 2020;18(1):130–47.
38. Magro-Malosso ER, Saccone G, Di Tommaso M, Roman A, Berghella V. Exercise during pregnancy and risk of gestational hypertensive disorders: a systematic review and meta-analysis. *Acta Obstet Gynecol Scand.* 2017;96(8):921–31.
39. Magro-Malosso ER, Saccone G, Di Mascio D, Di Tommaso M, Berghella V. Exercise during pregnancy and risk of preterm birth in overweight and obese women: a systematic review and meta-analysis of randomized controlled trials. *Acta Obstet Gynecol Scand.* 2017;96(3):263–73.
40. Harrison AL, Shields N, Taylor NF, Frawley HC. Exercise improves glycaemic control in women diagnosed with gestational diabetes mellitus: a systematic review. *J Physiother.* 2016;62(4):188–96.
41. Daley AJ, Foster L, Long G, Palmer C, Robinson O, Walmsley H, Ward R. The effectiveness of exercise for the prevention and treatment of antenatal depression: systematic review with meta-analysis. *BJOG.* 2015;122(1):57–62.
42. Nakamura A, van der Waerden J, Melchior M, Bolze C, El-Khoury F, Pryor L. Physical activity during pregnancy and postpartum depression: systematic review and meta-analysis. *J Affect Disord.* 2019;246:29–41.
43. Blaize AN, Pearson KJ, Newcomer SC. Impact of maternal exercise during pregnancy on offspring chronic disease susceptibility. *Exerc Sport Sci Rev.* 2015;43(4):198–203.
44. SMA - Sport Medicine Australia. SMA statement the benefits and risks of exercise during pregnancy. *J Sci Med Sport.* 2002;5(1):11–9.
45. CSEP - Canadian Society for Exercise Physiology. Get Active Questionnaire for PREGNANCY. Ottawa, ON: Canadian Society for Exercise Physiology; 2021. <https://csep.ca/2021/01/20/pre-screening-for-physical-activity/#>. Accessed 6 Aug 2022.
46. PAR-Q+ Collaboration. Physical activity readiness questionnaire for everyone (PAR-Q+). 2017. <http://eparmedx.com/>. Accessed 9 Mar 2021.
47. ACSM - American College of Sports Medicine. ACSM's resources for the exercise physiologist. 2nd ed. Philadelphia, PA: Wolters Kluwer; 2018, 472 p.
48. ACSM - American College of Sports Medicine. ACSM's resources manual for guidelines for exercise testing and prescription. 7th ed. Philadelphia, PA: Wolters Kluwer, Lippincott Williams & Wilkins; 2014, 862 p.
49. ACSM - American College of Sports Medicine. ACSM's health status & health history questionnaire. Indianapolis, IN: ACSM. <http://www.wm.edu/offices/wellness/campusrec/documents/fitnessquestionnaire.pdf>. Accessed 3 Sep 2021.
50. Kavanagh JJ, Menz HB. Accelerometry: a technique for quantifying movement patterns during walking. *Gait Posture.* 2008;28(1):1–15.
51. Braakhuis HEM, Berger MAM, Bussmann JBJ. Effectiveness of healthcare interventions using objective feedback on physical activity: a systematic review and meta-analysis. *J Rehabil Med.* 2019;51(3):151–9.
52. Tang MSS, Moore K, McGavigan A, Clark RA, Ganesan AN. Effectiveness of wearable trackers on physical activity in healthy adults: systematic review and meta-analysis of randomized controlled trials. *JMIR Mhealth Uhealth.* 2020;8(7):e15576.
53. Sallis JF, Haskell WL, Wood PD, Fortmann SP, Rogers T, Blair SN. Physical activity assessment methodology in the Five-City Project. *Am J Epidemiol.* 1985;121:91–106.
54. Craig CL, Marshall AL, Sjoström M, Bauman AE, Booth ML, Ainsworth BE. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc.* 2003;35:1381–95.
55. Chasan-Taber L, Schmidt MD, Roberts DE, Hosmer D, Markenson G, Freedson PS. Development and validation of a pregnancy physical activity questionnaire. *Med Sci Sports Exerc.* 2004;36(10):1750–60.
56. Foxcroft KF, Callaway LK, Byrne NM, Webster J. Development and validation of a pregnancy symptoms inventory. *BMC Pregnant Childb.* 2013;13:3.
57. Barakat R, Pelaez M, Montejó R, Luaces M, Zakythinaki M. Exercise during pregnancy improves maternal health perception: a randomized controlled trial. *Am J Obstet Gynecol.* 2011;204(5):402.e401–7.
58. Smith R, Reid H, Matthews A, Calderwood C, Knight M, Foster C, CMO Physical Activity Expert Committee for Physical Activity and Pregnancy. Infographic: physical activity for pregnant women. *Br J Sports Med.* 2017;52:532. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/622335/CMO_physical_activity_pregnant_women_infographic.pdf. Accessed 3 Sep 2021.
59. Kendall-Raynor P. Physical activity for pregnant women. *Nurs Stand.* 2017;31(46):15.
60. ACOG - American College of Obstetricians and Gynecologists. Your pregnancy and childbirth. 7th ed. Washington, DC: American College of Obstetricians and Gynecologists; 2021.
61. Perales M, Nagpal TS, Barakat R. Physiological changes during pregnancy. Main adaptations and discomforts and implications for physical activity and exercise. In: Santos-Rocha R, editor. Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines. 2nd ed. Cham: Springer International Publishing; 2022. Chapter 3.
62. Pimenta N, van Poppel M. Body composition changes during pregnancy and effects of physical exercise. In: Santos-Rocha R, editor. Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines. 2nd ed. Cham: Springer International Publishing; 2022. Chapter 4.
63. Bø K, Stuge B, Hilde G. Specific musculoskeletal adaptations in pregnancy: pelvic floor, pelvic girdle and low back pain. Implications for physical activity and exercise. In: Santos Rocha R, editor. Exercise and physical activity during pregnancy and postpartum. Evidencebased guidelines. 2nd ed. Cham: Springer International Publishing; 2022. Chapter 6.
64. Fitzgerald CM, Segal NA. Musculoskeletal health in pregnancy and postpartum. Cham: Springer International Publishing; 2015.
65. Branco M, Santos-Rocha R, Aguiar L, Vieira F, Veloso AP. Biomechanical adaptations of gait in pregnancy. Implications for physical activity and exercise. In: Santos-Rocha R, editor. Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines. 2nd ed. Cham: Springer International Publishing; 2022. Chapter 5.
66. Dennis AT, Salman M, Paxton E, Flint M, Leeton L, Roodt F, Yentis S, Dyer RA. Resting hemodynamics and response to exercise using the 6-minute walk test in late pregnancy: an international prospective multicentre study. *Anesth Analg.* 2019;129(2):450–7.
67. Wowdzia JB, Davenport MH. Cardiopulmonary exercise testing during pregnancy. *Birth Defects Res.* 2021;113(3):248–64.
68. O'Toole ML, Artal R. Clinical exercise testing during pregnancy and the postpartum period. In: Weisman IM, Zeballos RJ, editors. Clinical exercise testing (Progress in respiratory research), vol. 32. Basel: Karger; 2002. p. 273–81.
69. Wolfe LA. Pregnancy. In: Skinner JS, editor. Exercise testing and exercise prescription for special cases: theoretical basis and clinical application. 3rd ed. Baltimore, MD: Lippincott Williams & Wilkins; 2005. p. 377–91.

70. Jędrzejko M, Nowosielski K, Poręba R, Ulman-Włodarz I, Bobiński R. Physical efficiency and activity energy expenditure in term pregnancy females measured during cardiopulmonary exercise tests with a supine cycle ergometer. *J Matern Fetal Neonatal Med.* 2016;29(23):3800–5.
71. Mottola MF, Davenport MH, Brun CR, Inglis SD, Charlesworth S, Stopper MM. VO2peak prediction and exercise prescription for pregnant women. *Med Sci Sports Exerc.* 2006;38(8):1389–95.
72. Tinius RA, Blankenship M, Maples JM, Pitts BC, Furgal K, Norris ES, Hoover DL, Olenick A, Lambert J, Cade WT. Validity of the 6-minute walk test and YMCA submaximal cycle test during midpregnancy. *J Strength Cond Res.* 2021;35(11):3236–42.
73. Szumilewicz A, Dornowski M, Piernicka M, Worska A, Kuchta A, Kortas J, Błudnicka M, Radziński Ł, Jastrzębski Z. High-low impact exercise program including pelvic floor muscle exercises improves pelvic floor muscle function in healthy pregnant women – a randomized control trial. *Front Physiol.* 2019;9:1867.
74. Melzer K, Schutz Y, Boulvain M, Kayser B. Physical activity and pregnancy: cardiovascular adaptations, recommendations and pregnancy outcomes. *Sports Med.* 2010;40(6):493–507.
75. Rikli RE, Jones CJ. Senior fitness test manual. 2nd ed. Champaign, IL: Human Kinetics; 2013.
76. Rose DJ. Fallproof!: a comprehensive balance and mobility training program. 2nd ed. Champaign, IL: Human Kinetics; 2015.
77. Garber CE, Blissmer B, Deschenes MR, Franklin BA, Lamonte MJ, Lee IM, Nieman DC, Swain DP, American College of Sports Medicine. American College of Sports Medicine position stand. Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. *Med Sci Sports Exerc.* 2011;43(7):1334–59.
78. Mørkved S, Bø K. Effect of pelvic floor muscle training during pregnancy and after childbirth on prevention and treatment of urinary incontinence: a systematic review. *Br J Sports Med.* 2014;48(4):299–310.
79. Miquelutti MA, Cecatti JG, Makuch MY. Developing strategies to be added to the protocol for antenatal care: an exercise and birth preparation program. *Clinics.* 2015;70(4):231–6.
80. Akca A, Corbacioglu Esmer A, Ozyurek ES, Aydin A, Korkmaz N, Gorgen H, Akbayir O. The influence of the systematic birth preparation program on childbirth satisfaction. *Arch Gynecol Obstet.* 2017;295(5):1127–33.
81. van Poppel M, Owe KM, Santos-Rocha R, Dias H. Physical activity, exercise and health promotion for the pregnant exerciser and the pregnant athlete. In: Santos-Rocha R, editor. Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines. 2nd ed. Cham: Springer International Publishing; 2022. Chapter 1.
82. Troy KL, Mancuso ME, Butler TA, Johnson JE. Exercise early and often: effects of physical activity and exercise on women's bone health. *Int J Environ Res Public Health.* 2018;15(5):878.
83. Sañudo B, de Hoyo M, Del Pozo-Cruz J, Carrasco L, Del Pozo-Cruz B, Tejero S, Firth E. A systematic review of the exercise effect on bone health: the importance of assessing mechanical loading in perimenopausal and postmenopausal women. *Menopause.* 2017;24(10):1208–16.
84. Boyle R, Hay-Smith EJ, Cody JD, Mørkved S. Pelvic floor muscle training for prevention and treatment of urinary and fecal incontinence in antenatal and postnatal women: a short version Cochrane review. *Neurourol Urodyn.* 2014;33(3):269–76.
85. Guelf KJ, Ong MJ, Crisp NA, Fournier PA, Wallman KE, Grove JR, Doherty DA, Newnham JP. Regular exercise to prevent the recurrence of gestational diabetes mellitus: a randomized controlled trial. *Obstet Gynecol.* 2016;128(4):819–27.
86. Wang C, Wei Y, Zhang X, Zhang Y, Xu Q, Sun Y, Su S, Zhang L, Liu C, Feng Y, Shou C, Guelf KJ, Newnham JP, Yang H. A randomized clinical trial of exercise during pregnancy to prevent gestational diabetes mellitus and improve pregnancy outcome in overweight and obese pregnant women. *Am J Obstet Gynecol.* 2017;216(4):340–51.
87. Andersen MB, Ovesen PG, Daugaard M, Ostenfeld EB, Fuglsang J. Cycling reduces blood glucose excursions after an oral glucose tolerance test in pregnant women: a randomized crossover trial. *Appl Physiol Nutr Metab.* 2020;45(11):1247–52.
88. Petrov Fieril K, Glantz A, Fagevik Olsen M. The efficacy of moderate-to-vigorous resistance exercise during pregnancy: a randomized controlled trial. *Acta Obstet Gynecol Scand.* 2015;94(1):35–42.
89. Barakat R, Perales M. Resistance exercise in pregnancy and outcome. *Clin Obstet Gynecol.* 2016;59(3):591–9.
90. Keskin Y, Kilic G, Taspinar O, Posul SO, Halac G, Eren F, Erol E, Urkmez B, Aydin T. Effectiveness of home exercise in pregnant women with carpal tunnel syndrome: randomized control trial. *J Pak Med Assoc.* 2020;70(2):202–7.
91. Mazzarino M, Kerr D, Wajswelner H, Morris ME. Pilates method for women's health: systematic review of randomized controlled trials. *Arch Phys Med Rehabil.* 2015;96(12):2231–42.
92. Rodríguez-Díaz L, Ruiz-Frutos C, Vázquez-Lara JM, Ramírez-Rodrigo J, Villaverde Gutiérrez C, Torres-Luque G. Effectiveness of a physical activity programme based on the Pilates method in pregnancy and labour. *Enferm Clin.* 2017;27(5):271–7. English, Spanish.
93. Hagen S, Glazener C, McClurg D, Macarthur C, Elders A, Herbison P, Wilson D, ToozsHobson P, Hemming C, Hay-Smith J, Collins M, Dickson S, Logan J. Pelvic floor muscle training for secondary prevention of pelvic organ prolapse (PREVPROL): a multicentre randomised controlled trial. *Lancet.* 2017;389(10067):393–402.
94. Sonmezer E, Özköslü MA, Yosmaoğlu HB. The effects of clinical pilates exercises on functional disability, pain, quality of life and lumbopelvic stabilization in pregnant women with low back pain: a randomized controlled study. *J Back Musculoskelet Rehabil.* 2021;34(1):69–76.
95. Gong H, Ni C, Shen X, Wu T, Jiang C. Yoga for prenatal depression: a systematic review and meta-analysis. *BMC Psychiatry.* 2015;15:14.
96. Sheffield KM, Woods-Giscombe CL. Efficacy, feasibility, and acceptability of perinatal yoga on women's mental health and well-being: a systematic literature review. *J Holist Nurs.* 2016;34(1):64–79.
97. Kwon R, Kasper K, London S, Haas DM. A systematic review: the effects of yoga on pregnancy. *Eur J Obstet Gynecol Reprod Biol.* 2020;250:171–7.
98. Katz VL. Water exercise in pregnancy. *Semin Perinatol.* 1996;20(4):285–91.
99. Waller B, Lambeck J, Daly D. Therapeutic aquatic exercise in the treatment of low back pain: a systematic review. *Clin Rehabil.* 2009;23(1):3–14.
100. Rodríguez-Blanque R, Aguilar-Cordero MJ, Marín-Jiménez AE, Menor-Rodríguez MJ, Montiel-Troya M, Sánchez-García JC. Water exercise and quality of life in pregnancy: a randomised clinical trial. *Int J Environ Res Public Health.* 2020;17(4):1288.
101. Jarski RW, Trippett DL. The risks and benefits of exercise during pregnancy. *J Fam Pract.* 1990;30(2):185–9.
102. DeMaio M, Magann EF. Exercise and pregnancy. *J Am Acad Orthop Surg.* 2009;17(8):504–14.
103. Juhl M, Kogevinas M, Andersen PK, Andersen AM, Olsen J. Is swimming during pregnancy a safe exercise? *Epidemiology.* 2010;21(2):253–8.
104. Kramer MS, McDonald SW. Aerobic exercise for women during pregnancy. *Cochrane Database Syst Rev.* 2006;(3):CD000180.
105. Lamina S, Agbanusi E. Effect of aerobic exercise training on maternal weight gain in pregnancy: a meta-analysis of randomized controlled trials. *Ethiop J Health Sci.* 2013;23(1):59–64.
106. Sanders SG. Dancing through pregnancy: activity guidelines for professional and recreational dancers. *J Dance Med Sci.* 2008;12(1):17–22.
107. Haakstad LA, Bø K. Exercise in pregnant women and birth weight: a randomized controlled trial. *BMC Pregnanc Childb.* 2011;11:66.
108. Jorge C, Santos-Rocha R, Bento T. Can group exercise programs improve health outcomes in pregnant women? A systematic review. *Curr Women's Health Rev.* 2015;11(1):75–87.
109. ASC - Australian Sports Commission. Pregnancy and sport: guidelines for the Australian sporting industry. Bruce, ACT: ASC; 2002.
110. Szymanski LM, Satin AJ. Strenuous exercise during pregnancy: is there a limit? *Am J Obstet Gynecol.* 2012;207(3):179.e1–6.
111. Pivarnik JM, Szymanski LM, Conway MR. The elite athlete and strenuous exercise in pregnancy. *Clin Obstet Gynecol.* 2016;59(3):613–9.
112. Szumilewicz A, Santos-Rocha R. Exercise selection during pregnancy. In: Santos-Rocha R, editor. Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines. 2nd ed. Cham: Springer International Publishing; 2022. Chapter 9.
113. Gellish RL, Goslin BR, Olson RE, McDonald A, Russi GD, Moudgil VK. Longitudinal modeling of the relationship between age and maximal heart rate. *Med Sci Sports Exerc.* 2007;39(5):822–9.
114. Centers for Disease Control and Prevention. Perceived exertion (Borg rating of perceived exertion scale). Atlanta, GA: CDC. <http://www.cdc.gov/physicalac->

- tivity/basics/measuring/exertion.htm. Accessed 3 Sep 2021.
115. Persinger R, Foster C, Gibson M, Fater DC, Porcari JP. Consistency of the talk test for exercise prescription. *Med Sci Sports Exerc.* 2004;36(9):1632–6.
116. Tudor-Locke C, Hatano Y, Pangrazi RP, Kang M. Revisiting “how many steps are enough?”. *Med Sci Sports Exerc.* 2008;40(7 Suppl):S537–43.
117. Mottola MF. Physical activity and maternal obesity: cardiovascular adaptations, exercise recommendations, and pregnancy outcomes. *Nutr Rev.* 2013;71(Suppl 1):S31–6.
118. Santos-Rocha R. Ativo em Casa / Active at Home. YouTube Channel. <https://www.youtube.com/channel/UCEUWdoBeh5rgfM0kZOn9Xtg/videos>.
119. Santos-Rocha R, Fernandes de Carvalho M, Prior de Freitas J. Gravidez Ativa - Active Pregnancy. YouTube Channel. <https://www.youtube.com/channel/UC0Vyookwc0mcQ5T70imtoNA/playlists>.
120. Miquelutti MA, Cecatti JG, Makuch MY. Evaluation of a birth preparation program on lumbopelvic pain, urinary incontinence, anxiety and exercise: a randomized controlled trial. *BMC Pregnanc Childb.* 2013;13:154.
121. Sichani LE, Bahadoran P, Fahami F, Esfahani PS. The investigation of effects of static immersion and calming in water on pregnant women’s stress participating in preparation classes for childbirth. *J Educ Health Promot.* 2019;8:238.
122. Sivan E, Homko CJ, Chen XH, Reece EA, Boden G. Effect of insulin on fat metabolism during and after normal pregnancy. *Diabetes.* 1999;48(4):834–8.
123. Zhang CL, Ning Y. Effect of dietary and lifestyle factors on the risk of gestational diabetes: review of epidemiologic evidence. *Am J Clin Nutr.* 2011;94(6):1975S–9S.
124. Association AD. Standards of medical care in diabetes—2016. *Diabetes Care.* 2016;39(Suppl 1):S1–S106.
125. IDF. Diabetes atlas. 7th ed. Brussels: IDF; 2015.
126. Carolan-Olah MC. Educational and intervention programmes for gestational diabetes mellitus (GDM) management: an integrative review. *Collegian.* 2016;23:103–14.
127. Pettit D, Bennett PH, Knowler WC, et al. Gestational diabetes mellitus and impaired glucose tolerance during pregnancy: long-term effects on obesity and glucose intolerance in the offspring. *Diabetes Care.* 1985;34:119–22.
128. Horvath K, Koch K, Jeitler K, et al. Effects of treatment in women with gestational diabetes mellitus: systematic review and meta-analysis. *BMJ.* 2010;340:1395.
129. Russo LM, Nobles C, Ertel KA, et al. Physical activity interventions in pregnancy and risk of gestational diabetes mellitus: a systematic review and meta-analysis. *Obstet Gynecol.* 2015;125:576–82.
130. Brankston GN, Mitchell BF, Ryan EA, Okun NB. Resistance exercise decreases the need for insulin in overweight women with gestational diabetes mellitus. *Am J Obstet Gynecol.* 2004;190(1):188–93.
131. Barakat R, Cordero Y, Coteron J, Luaces M, Montejo R. Exercise during pregnancy improves maternal glucose screen at 24–28 weeks: a randomised controlled trial. *Br J Sports Med.* 2012;46(9):656–61.
132. Sanabria-Martínez G, García-Hermoso A, Poyatos-León R, Álvarez-Bueno C, SánchezLópez M, Martínez-Vizcaino V. Effectiveness of physical activity interventions on preventing gestational diabetes mellitus and excessive maternal weight gain: a meta-analysis. *BJOG.* 2015;122(9):1167–74.
133. Bgeginski R, Ribeiro PAB, Mottola MF, Ramos JGL. Effects of weekly supervised exercise or physical activity counseling on fasting blood glucose in women diagnosed with gestational diabetes mellitus: a systematic review and meta-analysis of randomized trials. *J Diabetes.* 2017;9:1023–32.
134. Brown J, Ceyssens G, Boulvain M. Exercise for pregnant women with gestational diabetes for improving maternal and fetal outcomes. *Cochrane Database Syst Rev.* 2017;6(6):CD012202.
135. Shepherd E, Gomersall JC, Tieu J, Han S, Crowther CA, Middleton P. Combined diet and exercise interventions for preventing gestational diabetes mellitus. *Cochrane Database Syst Rev.* 2017;11(11):CD010443.
136. Davenport MH, Ruchat SM, Poitras VJ, Jaramillo Garcia A, Gray CE, Barrowman N, Skow RJ, Meah VL, Riske L, Sobierajski F, James M, Kathol AJ, Nuspl M, Marchand AA, Nagpal TS, Slater LG, Weeks A, Adamo KB, Davies GA, Barakat R, Mottola MF. Prenatal exercise for the prevention of gestational diabetes mellitus and hypertensive disorders of pregnancy: a systematic review and meta-analysis. *Br J Sports Med.* 2018;52(21):1367–75.
137. Ribeiro MM, Andrade A, Nunes I. Physical exercise in pregnancy: benefits, risks and prescription. *J Perinat Med.* 2021;50:4.
138. Choi J, Fukuoka Y, Lee JH. The effects of physical activity and physical activity plus diet interventions on body weight in overweight or obese women who are pregnant or in postpartum: a systematic review and meta analysis of randomized controlled trials. *Prev Med.* 2013;56(6):351–64.
139. ACOG - American College of Obstetricians and Gynecologists. Obesity and pregnancy. ACOG Committee opinion No. 549. American College of Obstetricians and Gynecologists. *Obstet Gynecol.* 2013;121:213–7.
140. Mottola MF, Giroux I, Gratton R, et al. Nutrition and exercise prevent excess weight gain in overweight pregnant women. *Med Sci Sports Exerc.* 2010;42(2):265–72.
141. Renault KM, Norgaard K, Nilas L, Carlsen EM, Cortes D, Pryds O, et al. The treatment of Obese Pregnant women (TOP) study: a randomized controlled trial of the effect of physical activity intervention assessed by pedometer with or without dietary intervention in obese pregnant women. *Am J Obstet Gynecol.* 2014;210:134.e1–9.
142. International Weight Management in Pregnancy (i-WIP) Collaborative Group. Effect of diet and physical activity based interventions in pregnancy on gestational weight gain and pregnancy outcomes: meta-analysis of individual participant data from randomised trials. *BMJ.* 2017;358:j3119.
143. Ruchat SM, Mottola MF, Skow RJ, Nagpal TS, Meah VL, James M, Riske L, Sobierajski F, Kathol AJ, Marchand AA, Nuspl M, Weeks A, Gray CE, Poitras VJ, Jaramillo Garcia A, Barrowman N, Slater LG, Adamo KB, Davies GA, Barakat R, Davenport MH. Effectiveness of exercise interventions in the prevention of excessive gestational weight gain and postpartum weight retention: a systematic review and meta-analysis. *Br J Sports Med.* 2018;52(21):1347–56.
144. Say L, Chou D, Gemmill A, et al. Global causes of maternal death: a WHO systematic analysis. *Lancet Glob Health.* 2014;2(6):e323–33.
145. Gillon TE, Pels A, von Döbeln P, et al. Hypertensive disorders of pregnancy: a systematic review of international clinical practice guidelines. *PLoS One.* 2014;9(12):e113715.
146. Berzan E, Doyle R, Brown CM. Treatment of preeclampsia: current approach and future perspectives. *Curr Hypertens Rep.* 2014;16(9):473.
147. Djuricic S, Hviid TV. HLA class Ib molecules and immune cells in pregnancy and preeclampsia. *Front Immunol.* 2014;5:652.
148. Mpampakas D, Goumenou A, Zachariades E, et al. Immune system function, stress, exercise and nutrition profile can affect pregnancy outcome: lessons from a Mediterranean cohort. *Exp Ther Med.* 2013;5(2):411–8.
149. Chawla S, Anim-Nyame N. Advice on exercise for pregnant women with hypertensive disorders of pregnancy. *Int J Gynaecol Obstet.* 2015;128(3):275–9.
150. Abu MA, Abdul Ghani NA, Lim Pei S, Sulaiman AS, Omar MH, Muhamad Ariffin MH, et al. Do exercises improve back pain in pregnancy? *Horm Mol Biol Clin Invest.* 2017;32(3):1–7.
151. Watelain E, Pinti A, Doya R, Garnier C, Toumi H, Boudet S. Benefits of physical activities centered on the trunk for pregnant women. *Phys Sportsmed.* 2017;45(3):293–302.
152. Sklempe Kokic I, Ivanisevic M, Uremovic M, Kokic T, Pisot R, Simunic B. Effect of therapeutic exercises on pregnancy-related low back pain and pelvic girdle pain: secondary analysis of a randomized controlled trial. *J Rehabil Med.* 2017;49(3):251–7.
153. Shiri R, Coggon D, Falah-Hassani K. Exercise for the prevention of low back and pelvic girdle pain in pregnancy: a meta-analysis of randomized controlled trials. *Eur J Pain.* 2018;22(1):19–27.
154. Bishop A, Holden MA, Ogollah RO, Foster NE. Current management of pregnancy-related low back pain: a national cross-sectional survey of U.K. physiotherapists. *Physiotherapy.* 2016;102(1):78–85.
155. Liddle SD, Pennick V. Interventions for preventing and treating low-back and pelvic pain during pregnancy. *Cochrane Database Syst Rev.* 2015;(9):CD001139.
156. Davenport MH, Marchand AA, Mottola MF, Poitras VJ, Gray CE, Jaramillo Garcia A, Barrowman N, Sobierajski F, James M, Meah VL, Skow RJ, Riske L, Nuspl M, Nagpal TS, Courbalay A, Slater LG, Adamo KB, Davies GA, Barakat R, Ruchat SM. Exercise for the prevention and treatment of low back, pelvic girdle and lumbopelvic pain during pregnancy: a systematic review and meta-analysis. *Br J Sports Med.* 2019;53(2):90–8.

157. Ohman SG, Grunewald C, Waldenstrom U. Women's worries during pregnancy: testing the Cambridge Worry Scale on 200 Swedish women. *Scand J Caring Sci.* 2003;17(2):148–52.
158. Gavin N, Gaynes BN, Lohr KN, Meltzer-Brody S. Perinatal depression: a systematic review of prevalence and incidence. *Obstet Gynecol.* 2005;106(5):1071–83.
159. Bennett HA, Einarsson A, Taddio A. Prevalence of depression during pregnancy: systematic review. *Obstet Gynecol.* 2006;103(4):698–709.
160. Trivedi MH, Greer TL, Grannemann BD, Chambliss HO, Jordan AN. Exercise as an augmentation strategy for treatment of major depression. *J Psychiatr Pract.* 2006;12:205–13.
161. Padmapriya N, Bernard J, Liang S, Loy S, Shen Z, Kwek K, et al. Association of physical activity and sedentary behavior with depression and anxiety symptoms during pregnancy in a multiethnic cohort of Asian women. *Archiv Women's Ment Health.* 2016;19(6):1119–28.
162. McCurdy AP, Boulé NG, Sivak A, Davenport MH. Effects of exercise on mild-to-moderate depressive symptoms in the postpartum period: a meta-analysis. *Obstet Gynecol.* 2017;129:1087.
163. Davenport MH, McCurdy AP, Mottola MF, Skow RJ, Meah VL, Poitras VJ, Jaramillo Garcia A, Gray CE, Barrowman N, Riske L, Sobierajski F, James M, Nagpal T, Marchand AA, Nusspl M, Slater LG, Barakat R, Adamo KB, Davies GA, Ruchat SM. Impact of prenatal exercise on both prenatal and postnatal anxiety and depressive symptoms: a systematic review and metaanalysis. *Br J Sports Med.* 2018;52(21):1376–85.
164. Davenport MH, Meyer S, Meah VL, Strynadka MC, Khurana R. Moms are not OK. COVID-19 and maternal mental health. *Front Glob Women's Health.* 2020;1:1.
165. Gildner TE, Laugier EJ, Thayer ZM. Exercise routine change is associated with prenatal depression scores during the COVID-19 pandemic among pregnant women across the United States. *PLoS One.* 2020;15(12):1–15.
166. Atkinson L, De Vivo M, Hayes L, Hesketh KR, Mills H, Newham JJ, et al. Encouraging physical activity during and after pregnancy in the COVID-19 era, and beyond. *Int J Environ Res Public Health.* 2020;17(19):7304.
167. Silva MRG, Rodriguez Doñate B, Che Carballo KN. Nutritional requirements for the pregnant exerciser and athlete. In: Santos-Rocha R, editor. *Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines.* 2nd ed. Cham: Springer International Publishing; 2022. Chapter 13.
168. Jorge R, Teixeira D, Ferreira I, Alvarez-Falcón AL. Diet recommendations for the pregnant exerciser and athlete. In: Santos-Rocha R, editor. *Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines.* 2nd ed. Cham: Springer International Publishing; 2022. Chapter 14.
169. Institute of Medicine (US) and National Research Council (US) Committee to reexamine IOM pregnancy weight guidelines, Rasmussen KM, Yaktine AL. *Weight gain during pregnancy: reexamining the guidelines.* Washington, DC: National Academies Press; 2009. <https://www.ncbi.nlm.nih.gov/books/NBK32813/>. Accessed 15 Sep 2021.
170. Yang X, Zhang A, Sayer L, Bassett S, Woodward S. The effectiveness of group-based pelvic floor muscle training in preventing and treating urinary incontinence for antenatal and postnatal women: a systematic review. *Int Urogynecol J.* 2021;33:1407.
171. Woodley SJ, Lawrenson P, Boyle R, Cody JD, Mørkved S, Kernohan A, Hay-Smith EJC. Pelvic floor muscle training for preventing and treating urinary and faecal incontinence in antenatal and postnatal women. *Cochrane Database Syst Rev.* 2020;5(5):CD007471.
172. American College of Sports Medicine, Sawka MN, Burke LM, et al. American College of Sports Medicine position stand. Exercise and fluid replacement. *Med Sci Sports Exerc.* 2007;39(2):377–90.
173. Schauburger CW, Rooney BL, Goldsmith L, Shenton D, Silva PD, Schaper A. Peripheral joint laxity increases in pregnancy but does not correlate with serum relaxin levels. *Am J Obstet Gynecol.* 1996;174(2):667–71.
174. Dumas GA, Reid JG. Laxity of knee cruciate ligaments during pregnancy. *J Orthop Sports Phys Therapy.* 1997;26(1):2–6.
175. Ebi KL, Capon A, Berry P, Broderick C, de Dear R, Havenith G, Honda Y, Kovats RS, Ma W, Malik A, Morris NB, Nybo L, Seneviratne SI, Vanos J, Jay O. Hot weather and heat extremes: health risks. *Lancet.* 2021;398(10301):698–708.
176. Dervis S, Dobson KL, Nagpal TS, Geurts C, Haman F, Adamo KB. Heat loss responses at rest and during exercise in pregnancy: a scoping review. *J Therm Biol.* 2021;99:103011.
177. Branco M, Santos-Rocha R, Vieira F. Biomechanics of gait during pregnancy. *Sci World J.* 2014;2014:527940.
178. Gimunová M, Zvonář M, Sebera M, Turčinek P, Kolářová K. Special footwear designed for pregnant women and its effect on kinematic gait parameters during pregnancy and postpartum period. *PLoS One.* 2020;15(5):e0232901.
179. Petrov Fieril K, Fagevik Olsén M, Glantz A, Larsson M. Experiences of exercise during pregnancy among women who perform regular resistance training: a qualitative study. *Phys Ther.* 2014;94(8):1135–43.
180. Harrison CL, Brown WJ, Hayman M, Moran LJ, Redman LM. The role of physical activity in preconception, pregnancy and postpartum health. *Semin Reprod Med.* 2016;34(2):e28–37.
181. Díaz-Burrueco JR, Cano-Ibáñez N, Martín-Peláez S, Khan KS, Amezcua-Prieto C. Effects on the maternal-fetal health outcomes of various physical activity types in healthy pregnant women. A systematic review and meta-analysis. *Eur J Obstet Gynecol Reprod Biol.* 2021;262:203–15.
182. Kehler AK, Heinrich KM. A selective review of prenatal exercise guidelines since the 1950s until present: written for women, health care professionals, and female athletes. *Women Birth.* 2015;28(4):e93–8.
183. Craig P, Dieppe P, Macintyre S, Michie S, Nazareth I, Petticrew M. Developing and evaluating complex interventions: the new Medical Research Council guidance. *Int J Nurs Stud.* 2013;50(5):587–92.
184. Möhler R, Köpke S, Meyer G. Criteria for reporting the development and evaluation of complex interventions in healthcare: revised guideline (CREDECI 2). *Trials.* 2015;16:204.
185. Slade SC, Dionne CE, Underwood M, Buchbinder R. Consensus on exercise reporting template (CERT): explanation and elaboration statement. *Br J Sports Med.* 2016;50:1428–37.
186. Santos-Rocha R, Fernandes de Carvalho M, Szumilewicz A. Active pregnancy - a physical exercise program aimed at promoting health and fitness during pregnancy. Development and validation of a complex intervention. *Int J Environ Res Public Health.* 2022;19:4902.
187. Biviji R, Williams KS, Vest JR, Dixon BE, Cullen T, Harle CA. Consumer perspectives on maternal and infant health apps: qualitative content analysis. *J Med Internet Res.* 2021;23(9):e27403.

منابع

1. Pivarnik JM, Mudd L. Oh baby! Exercise during pregnancy and the postpartum period. *ACSMs Health Fit J.* 2009;13(3):8–13.
2. ACOG. ACOG Committee Opinion No. 650. Physical activity and exercise during pregnancy and the postpartum period. In: *Obstetrics and gynecology.* Philadelphia: Lippincott Williams & Wilkins; 2015. p. e135–e42. Reaffirmed 2017.
3. ACOG. ACOG Committee Opinion No. 804. Physical activity and exercise during pregnancy and the postpartum period. *Obstet Gynecol.* 2020;135(4):e178–e88.
4. Szumilewicz A, Worska A, Rajkowska N, Santos-Rocha R. Summary of guidelines for exercise in pregnancy—are they comprehensive enough for designing the contents of a prenatal exercise program? *Curr Women Health Rev.* 2015;11(1):3–12.
5. Wojtyła A, Kapka-Skrzypczak L, Paprzycki P, Skrzypczak M, Biliński P. Epidemiological studies in Poland on effect of physical activity of pregnant women on the health of offspring and future generations—adaptation of the hypothesis development origin of health and diseases. *Ann Agric Environ Med.* 2012;19(2):315–26.
6. Hanghøj S. When it hurts I think: now the baby dies. Risk perceptions of physical activity during pregnancy. *Women Birth.* 2013;26(3):190–4.
7. ASC. *Pregnancy in sport: guidelines for the Australian sporting industry.* Bruce, ACT: Australian Sports Commission; 2002.
8. ASC. A new doubles partner: staying active during pregnancy—such as by hitting the court—can be beneficial to a woman's health. *Tennis.* 2017;53(5):14.
9. Szumilewicz A, Worska A, Santos-Rocha R, Oviedo-Caro M. Evidence-based and practice-oriented guidelines for exercising during pregnancy. In: Santos-Rocha

- R, editor. Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines. 2nd ed. Cham: Springer International; 2022, Ch.7.
10. Santos-Rocha R, Corrales-Gutierrez I, Szumilewicz A, Pajaujene S. Exercise testing and prescription in pregnancy. In: Santos-Rocha R, editor. Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines. 2nd ed. Cham: Springer International; 2022, Ch.8.
11. WHO. WHO guidelines on physical activity and sedentary behaviour. Geneva: World Health Organization; 2020.
12. DHHS. Physical activity guidelines for Americans. 2nd ed. Washington, DC: U.S. Department of Health and Human Services; 2018.
13. ACOG. Early pregnancy loss. 2015. <https://www.acog.org/-/media/Practice-Bulletins/Committee-on-Practice/Bulletins%2D%2D%2D%2DGynecology/Public/pb150.pdf>. Accessed 6 Jan 2018.
14. Artal R. Exercise during pregnancy and the postpartum period. Wolters Kluwer; 2017. <https://www.uptodate.com/contents/exercise-during-pregnancy-and-the-postpartum-period>.
15. Clapp JF. The effects of maternal exercise on early pregnancy outcome. Am J Obstet Gynecol. 1989;161:1453–6.
16. ACOG. Physical activity and exercise during pregnancy and the postpartum period. The American College of Obstetricians and Gynecologists (ACOG). Committee Opinion No. 650; 2015.
17. Pivarnik JM. Cardiovascular responses to aerobic exercise during pregnancy and postpartum. Semin Perinatol. 1996;20(4):242–9.
18. Wolfe LA, Weissgerber TL. Clinical physiology of exercise in pregnancy: a literature review. J Obstet Gynaecol. 2003;25(6):473–83.
19. Wolfe LA, Kemp JG, Heenan AP, Preston RJ, Ohtake PJ. Acid-base regulation and control of ventilation in human pregnancy. Can J Physiol Pharmacol. 1998;76(9):815–27.
20. McAuley SE, Jensen D, McGrath MJ, Wolfe LA. Effects of human pregnancy and aerobic conditioning on alveolar gas exchange during exercise. Can J Physiol Pharmacol. 2005;83(7):625–33.
21. Pivarnik JM, Connolly CP, Marshall MR, Schlaff RA. Can pregnancy be an ergogenic aid to athletic performance?: a review. Women Sport Phys Activ J. 2017;25(2):111–7.
22. WHO. Nutritional interventions. In: WHO recommendations on antenatal care for a positive pregnancy experience [Internet]. Geneva: World Health Organization; 2016. p. 14–39. <https://www.health.govt.nz/system/files/documents/publications/food-and-nutrition-guidelines-pregand-bfeed.pdf>. Accessed 6 Jan 2018.
23. Clapp JF, Cram C. Exercise through your pregnancy. 2nd ed. Omaha, NE: Addicus Books; 2012. p. 268.
24. Bryant CX, Franklin BA, S. N-M. ACE's guide to exercise testing and program design: a fitness professional's handbook. 2nd ed. Monterey: Healthy Learning; 2007.
25. Perales M, Santos-Lozano A, Ruiz JR, Lucia A, Barakat R. Benefits of aerobic or resistance training during pregnancy on maternal health and perinatal outcomes: a systematic review. Early Hum Dev. 2016;94:43–8.
26. White E, Pivarnik J, Pfeiffer K. Resistance training during Pregnancy and perinatal outcomes. J Phys Act Health. 2014;11(6):1141–8.
27. Karowicz-Bilińska A, Sikora A, Estemberg D, Brzozowska M, Berner-Trabska M, Kuś E, et al. Physiotherapy in obstetrics. Ginek Pol. 2010;81(6):441–5.
28. Zwelling E. Overcoming the challenges: maternal movement and positioning to facilitate labor progress. Am J Matern Child Nurs. 2010;35(2):72–8.
29. Artieta-Pinedo I, Paz-Pascual C, Grandes G, Espinosa M. Framework for the establishment of a feasible, tailored and effective perinatal education programme. BMC Pregnancy Childbirth. 2017;17:1–10.
30. Miquelutti MA, Cecatti JG, Makuch MY. Antenatal education and the birthing experience of Brazilian women: a qualitative study. BMC Pregnancy Childbirth. 2013;13(1):1–8.
31. Levett KM, Smith CA, Bensoussan A, Dahlen HG. The complementary therapies for labour and birth study making sense of labour and birth - experiences of women, partners and midwives of a complementary medicine antenatal education course. Midwifery. 2016;40:124–31.
32. Gaston A, Prapavessis H. Tired, moody and pregnant? Exercise may be the answer. Psychol Health. 2013;28(12):1353–69.
33. Foxcroft KF, Rowlands IJ, Byrne NM, McIntyre HD, Callaway LK. Exercise in obese pregnant women: the role of social factors, lifestyle and pregnancy symptoms. BMC Pregnancy Childbirth. 2011;11(1):1–7.
34. ACSM. In: Thompson WR, editor. ACSM's resources for the personal trainer. 5th ed. Philadelphia: Wolters Kluwer Health; 2017. p. 632.
35. Eckmann T, Stoddart D. The power of posture: a program to encourage optimal posture. J Active Aging. 2015;14(4):54–68.
36. Kennedy-Armbruster C, Yoke MM. Methods of group exercise instruction. 3rd ed. Champaign, IL: Human Kinetics; 2014. p. 440.
37. Jensen D, Wolfe LA, Slatkovska L, Webb KA, Davies GAL, O'Donnell DE. Effects of human pregnancy on the ventilatory chemoreflex response to carbon dioxide. Am J Physiol Regul Integr Comp Physiol. 2005;288(5):R1369–R75.
38. SMA. Pregnancy and exercise. Women in sport. SMA AWIS_Pregnancy_-_Exercise.Pdf: sport medicine Australia. Accessed 13 Jul 2021.
39. RANZCOG. Exercise in pregnancy. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists; 2020.
40. Mottola MF, Davenport MH, Rucht S-M, Davies GA, Poitras VJ, Gray CE, et al. 2019 Canadian guideline for physical activity throughout pregnancy. Br J Sports Med. 2018;52(21):1339–46.
41. ACSM. ACSM information on Pregnancy physical activity. Indianapolis, IN: American College of Sports Medicine; 2020.
42. DHHS US. 2008 Physical activity guidelines for Americans. U.S. Department of Human and Health Services; 2008. <https://health.gov/paguidelines/pdf/paguide.pdf>.
43. Santos-Rocha R, Pimenta N. Teaching group fitness to music. In: Santos Rocha R, Rieger T, Jimenez A, editors. EuropeActive's essentials for Fitness Instructors. Champaign, IL: Human Kinetics; 2015.
44. Haakstad LAH, Bø K. Exercise in pregnant women and birth weight: a randomized controlled trial. BMC Pregnancy Childbirth. 2011;11:66.
45. Halvorsen S, Haakstad LAH, Edvardsen E, Bø K. Effect of aerobic dance on cardiorespiratory fitness in pregnant women: a randomised controlled trial. Physiotherapy. 2013;99(1):42–8.
46. Barakat R, Cordero Y, Coteron J, Luaces M, Montejo R. Exercise during pregnancy improves maternal glucose screen at 24-28 weeks: a randomised controlled trial. Br J Sports Med. 2012;46(9):656–61.
47. Stafne SN, Salvesen K, Romundstad PR, Torjusen IH, Mørkved S. Does regular exercise including pelvic floor muscle training prevent urinary and anal incontinence during pregnancy? A randomised controlled trial. BJOG. 2012;119(10):1270–80.
48. Barakat R, Pelaez M, Montejo R, Refoyo I, Coteron J. Exercise throughout pregnancy does not cause preterm delivery: a randomized, controlled trial. J Phys Act Health. 2014;11(5):1012–7.
49. Barakat R, Pelaez M, Lopez C, Montejo R, Coteron J. Exercise during pregnancy reduces the rate of cesarean and instrumental deliveries: results of a randomized controlled trial. J Matern Fetal Neonatal Med. 2012;25(11):2372–6.
50. Szumilewicz A, Dornowski M, Piernicka M, Worska A, Kuchta A, Kortas J, et al. High-low impact exercise program including pelvic floor muscle exercises improves pelvic floor muscle function in healthy pregnant women—a randomized control trial. Front Physiol. 2019;9:1867.
51. Szumilewicz A, Kuchta A, Kranich M, Dornowski M, Jastrzębski Z. Prenatal high-low impact exercise program supported by pelvic floor muscle education and training decreases the life impact of postnatal urinary incontinence: a quasiexperimental trial. Medicine. 2020;99(6):e18874.
52. Laakkonen RM, Kalaja MK, Kalaja SP, Holmala EB, Paavolainen LM, Tummaavuori M, et al. Heart rate during aerobics classes in women with different previous experience of aerobics. Eur J Appl Physiol. 2001;84(1–2):64–8.
53. Bourcier AP. Incontinence during sports and fitness activities. In: Baessler K, Schüssler K, Burgio KL, Moore K, Norton PA, Stanton SL, editors. Pelvic floor re-education principles and practice. 2nd ed. Berlin: Springer; 2008. p. 267–70.
54. Reebok University Press. Introduction to step reebok. Stoughton: Reebok International; 1994.
55. Reebok University Press. Power Step Reebok. Stoughton: Reebok International; 1994.
56. Santos-Rocha R, Veloso A, Machado ML. Analysis of ground reaction forces in step exercise depending on step pattern and stepping rate. J Strength Cond Res. 2009;23(1):209–24.

57. Santos-Rocha RA, Oliveira CS, Veloso AP. Osteogenic index of step exercise depending on choreographic movements, session duration, and stepping rate. *Br J Sports Med.* 2006;40(10):860–6.
58. Engels HJ, Currie JS, Lueck CC, Wirth JC. Bench/step training with and without extremity loading. Effects on muscular fitness, body composition profile, and psychological affect. *J Sports Med Phys Fitness.* 2002;42(1):71–8.
59. Forczek W, Curyło M, Forczek B. Physical activity assessment during gestation and its outcomes: a review. *Obstet Gynecol Surv.* 2017;72(7):425–44.
60. Price BB, Amini SB, Kappeler K. Exercise in pregnancy: effect on fitness and obstetric outcomes—a randomized trial. *Med Sci Sports Exerc.* 2012;44(12):2263–9.
61. Skreden M, Øverby NC, Sagedal LR, Vistad I, Torstveit MK, Lohne-Seiler H, et al. Change in active transportation and weight gain in pregnancy. *Int J Behav Nutr Phys Act.* 2016;13:10.
62. Butler JM. *Fit & pregnant. The pregnant women guide to exercise.* 2nd ed. Montpelier: Vitesse Press; 2006. p. 192.
63. Nascimento SL, Surita FG, Godoy AC, Kasawara KT, Morais SS. Physical activity patterns and factors related to exercise during pregnancy: a cross sectional study. *PLoS One.* 2015;10(6):1–14.
64. Davenport MH, Mottola MF, McManus R, Gratton R. A walking intervention improves capillary glucose control in women with gestational diabetes mellitus: a pilot study. *Appl Physiol Nutr Metab.* 2008;33(3):511–7.
65. de Oliveria Melo AS, Silva JLP, Tavares JS, Barros VO, Leite DFB, Amorim MMR. Effect of a physical exercise program during pregnancy on uteroplacental and fetal blood flow and fetal growth: a randomized controlled trial. *Obstet Gynecol.* 2012;120(2 Pt 1):302–10.
66. Ruchat SM, Davenport MH, Giroux I, Hillier M, Batada A, Sopper MM, et al. Walking program of low or vigorous intensity during pregnancy confers an aerobic benefit. *Int J Sports Med.* 2012;33(8):661–6.
67. Garnæs KK, Nyrnes SA, Salvesen KÅ, Salvesen Ø, Mørkved S, Moholdt T. Effect of supervised exercise training during pregnancy on neonatal and maternal outcomes among overweight and obese women. Secondary analyses of the ETIP trial: a randomised controlled trial. *PLoS One.* 2017;12(3):1–15.
68. Garnæs KK, Mørkved S, Salvesen KÅ, Salvesen Ø, Moholdt T. Exercise training during pregnancy reduces circulating insulin levels in overweight/obese women postpartum: secondary analysis of a randomised controlled trial (the ETIP trial). *BMC Pregnancy Childbirth.* 2018;18:1–11.
69. Baciuk EP, Pereira RI, Cecatti JG, Braga AF, Cavalcante SR. Water aerobics in pregnancy: cardiovascular response, labor and neonatal outcomes. *Reprod Health.* 2008;5:10.
70. Cavalcante SR, Cecatti JG, Pereira RI, Baciuk EP, Bernardo AL, Silveira C. Water aerobics II: maternal body composition and perinatal outcomes after a program for low risk pregnant women. *Reprod Health.* 2009;6:1.
71. Vallim AL, Osis MJ, Cecatti JG, Baciuk EP, Silveira C, Cavalcante SR. Water exercises and quality of life during pregnancy. *Reprod Health.* 2011;8(1):14–20.
72. Batrakoulis A. European survey of fitness trends for 2020. *ACSMs Health Fit J.* 2019;23(6):28–35.
73. Wood G, Murrell A, van der Touw T, Smart N. HIIT is not superior to MICT in altering blood lipids: a systematic review and meta-analysis. *BMJ Open Sport Exerc Med.* 2019;5(1):e000647.
74. Campbell WW, Kraus WE, Powell KE, Haskell WL, Janz KF, Jakicic JM, et al. High intensity interval training for cardiometabolic disease prevention. *Med Sci Sports Exerc.* 2019;51(6):1220–6.
75. Yeh S-W, Lin L-F, Chen H-C, Huang L-K, Hu C-J, Tam K-W, et al. High-intensity functional exercise in older adults with dementia: a systematic review and meta-analysis. *Clin Rehabil.* 2021;35(2):169–81.
76. Lavín-Pérez AM, Collado-Mateo D, Mayo X, Humphreys L, Liguori G, James Copeland R, et al. High-intensity exercise to improve cardiorespiratory fitness in cancer patients and survivors: a systematic review and meta-analysis. *Scand J Med Sci Sports.* 2021;31(2):265–94.
77. Songstad NT, Kaspersen K-HF, Hafstad AD, Basnet P, Ytrehus K, Acharya G. Effects of high intensity interval training on pregnant rats, and the placenta, heart and liver of their fetuses. *PLoS One.* 2015;10(10):1–15.
78. Ong MJ, Wallman KE, Fournier PA, Newnham JP, Guelf KJ. Enhancing energy expenditure and enjoyment of exercise during pregnancy through the addition of brief higher intensity intervals to traditional continuous moderate intensity cycling. *BMC Pregnancy Childbirth.* 2016;16(1):161.
79. Nagpal TS, Everest C, Goudreau AD, Manicks M, Adamo KB. To HIIT or not to HIIT? The question pregnant women may be searching for online: a descriptive observational study. *Perspect Public Health.* 2021;1757913920985898.
80. El Refaye G. Insulin sensitivity response to high-intensity training in insulin resistance during pregnancy. *NCT04830995 ClinicalTrials.gov*; 2021.
81. Moholdt T. Acute effects of high intensity training in pregnancy on fetal well-being and blood flow distribution. *NCT04288479 ClinicalTrials.gov*; 2021.
82. Szumilewicz A. HIIT vs MICT during pregnancy and health and birth outcomes in mothers and children (HIIT MAMA). *ClinicalTrials.gov*; 2021.
83. Bø K, Artal R, Barakat R, Brown W, Davies GAL, Dooley M, et al. Exercise and pregnancy in recreational and elite athletes: 2016 evidence summary from the IOC expert group meeting, Lausanne. Part 1—exercise in women planning pregnancy and those who are pregnant. *Br J Sports Med.* 2016;50(10):571–89.
84. Palatini P, Mos L, Munari L, Valle F, Del Torre M, Rossi A, et al. Blood pressure changes during heavy-resistance exercise. *J Hypertens Suppl.* 1989;7(6):S72–S3.
85. Harman EA, Frykman PN, Clagett ER, Kraemer WJ. Intra-abdominal and intra-thoracic pressures during lifting and jumping. Pressions intra-abdominales et intra-thoraciques lors de soulevés de poids et de sauts. *Med Sci Sports Exerc.* 1988;20(2):195–201.
86. Bø K, Artal R, Barakat R, Brown WJ, Davies GAL, Dooley M, et al. Exercise and pregnancy in recreational and elite athletes: 2016/2017 evidence summary from the IOC expert group meeting, Lausanne. Part 5. Recommendations for health professionals and active women. *Br J Sports Med.* 2018;52(17):1080–5.
87. Avery ND, Stocking KD, Tranmer JE, Davies GA, Wolfe LA. Fetal responses to maternal strength conditioning exercises in late gestation. *Can J Appl Physiol.* 1999;24(4):362–76.
88. O'Connor PJ, Poudevigne MS, Cress ME, Moti RW, Clapp IIIJF. Safety and efficacy of supervised strength training adopted in Pregnancy. *J Phys Act Health.* 2011;8(3):309–20.
89. Dumas GA, Leger A, Plamondon A, Charpentier KM, Pinti A, McGrath M. Fatigability of back extensor muscles and low back pain during pregnancy. *Clin Biomech.* 2010;25(1):1–5.
90. Wells C, Kolt GS, Bialocerkowski A. Defining Pilates exercise: a systematic review. *Complement Ther Med.* 2012;20(4):253–62.
91. Benjamin DR, van de Water ATM, Peiris CL. Effects of exercise on diastasis of the rectus abdominis muscle in the antenatal and postnatal periods: a systematic review. *Physiotherapy.* 2014;100(1):1–8.
92. Shu-Ming W, Dezinno P, Maranets I, Berman MR, Caldwell-Andrews AA, Kain ZN. Low back pain during pregnancy: prevalence, risk factors, and outcomes. *Obstet Gynecol.* 2004;104(1):65–70.
93. Kwiecińska K. Aktywność prenatalnej aktywności fizycznej w świadomości przyszłych matek (the axioms about the prenatal physical activity in the awareness of expectant mothers). Gdansk: Gdansk University of Physical Education and Sport; 2013.
94. Worska A, Szumilewicz A. Aktywność fizyczna kobiet w ciąży w świadomości przyszłych instruktorów rekreacji ruchowej (physical activity of expecting mothers in the awareness of future exercise professionals). *J Educ Health Sport.* 2015;5(8):91–102.
95. Jeffreys RM, Stepanchak W, Lopez B, Hardis J, Clapp JF. 3rd. Uterine blood flow during supine rest and exercise after 28 weeks of gestation. *BJOG.* 2006;113(11):1239–47.
96. Mottola MF, Nagpal TS, Bgeginski R, Davenport MH, Poitras VJ, Gray CE, et al. Is supine exercise associated with adverse maternal and fetal outcomes? A systematic review. *Br J Sports Med.* 2019;53(2):82–9.
97. Raines DA, Whitten RA. Braxton Hicks Contractions. Treasure Island, FL: StatPearls; 2017.

98. Mota P, Pascoal AG, Vaz C, João F, Veloso A, Bø K. Diastasis recti during pregnancy and postpartum. In: Brandão S, DaRoza T, Ramos I, Mascarenhas T, editors. Women's health and biomechanics: where medicine and engineering meet. Lecture notes in computational vision and biomechanics, vol. 29. Cham: Springer; 2018. p. 121–32.
99. Bø K, Hilde G, Tennfjord MK, Sperstad JB, Engh ME. Pelvic floor muscle function, pelvic floor dysfunction and diastasis recti abdominis: prospective cohort study. *NeurourolUrodyn*. 2017;36(3):716–21.
100. Boissonnault JS, Blaschak MJ. Incidence of diastasis recti abdominis during the childbearing year. *Phys Ther*. 1988;68(7):1082–6.
101. Mota P, Pascoal AG, Carita AI, Bø K. Normal width of the inter-recti distance in pregnant and postpartum primiparous women. *Musculoskelet Sci Pract*. 2018;35:34–7.
102. Walton LM, Costa A, LaVanture D, McIlrath S, Stebbins B. The effects of a 6 week dynamic core stability plank exercise program compared to a traditional supine core stability strengthening program on diastasis recti abdominis closure, pain, Oswestry disability index (ODI) and pelvic floor disability index scores (PFDI). *Phys Ther Rehabil*. 2016;3.
103. Thabet AA, Alshehri MA. Efficacy of deep core stability exercise program in postpartum women with diastasis recti abdominis: a randomised controlled trial. *J Musculoskelet Neuronal Interact*. 2019;19(1):62–8.
104. Maring-Klug R. Reducing low back pain during pregnancy. *Nurse Pract*. 1982;7(10):18.
105. Szczygieł E, Blaut J, Zielonka-Pycka K, Tomaszewski K, Golec J, Czechowska D, et al. The impact of deep muscle training on the quality of posture and breathing. *J Mot Behav*. 2017;1–9.
106. Bouisset S, Duchêne JL. Is body balance more perturbed by respiration in seating than in standing posture? *Neuroreport*. 1994;5(8):957–60.
107. Opala-Berdzik A, Bacik B, Kurkowska M. Biomechanical changes in pregnant women. *Physiotherapy/Fizjoterapia*. 2009;17(3):51–5.
108. Behm DG, Blazevich AJ, Kay AD, McHugh M. Acute effects of muscle stretching on physical performance, range of motion, and injury incidence in healthy active individuals: a systematic review. *Appl Physiol Nutr Metab*. 2016;41(1):1–11.
109. Bø K, Berghmans B, Mørkved S, Van Kampen M. Evidence-based physical therapy for the pelvic floor: bridging science and clinical practice. 1st ed. London: Churchill Livingstone/Elsevier; 2007. p. 456.
110. Wagg A, Bunn F. Unassisted pelvic floor exercises for postnatal women: a systematic review. *J Adv Nurs*. 2007;58(5):407–17.
111. Woodley SJ, Boyle R, Cody JD, Mørkved S, Hay-Smith EJC. Pelvic floor muscle training for prevention and treatment of urinary and faecal incontinence in antenatal and postnatal women. *Cochrane Database Syst Rev*. 2017;12:CD007471.
112. Davenport MH, Nagpal TS, Mottola MF, Skow RJ, Riske L, Poitras VJ, et al. Prenatal exercise (including but not limited to pelvic floor muscle training) and urinary incontinence during and following pregnancy: a systematic review and meta-analysis. *Br J Sports Med*. 2018;52(21):1397–404.
113. Woodley SJ, Lawrenson P, Boyle R, Cody JD, Mørkved S, Kernohan A, et al. Pelvic floor muscle training for preventing and treating urinary and faecal incontinence in antenatal and postnatal women. *Cochrane Database Syst Rev*. 2020;5:CD007471.
114. Cerruto MA, D'Elia C, Aloisi A, Fabrello M, Artibani W. Prevalence, incidence and obstetric factors' impact on female urinary incontinence in Europe: a systematic review. *Urol Int*. 2013;90(1):1–9.
115. Delancey JOL, Kane Low L, Miller JM, Patel DA, Tumbarello JA. Graphic integration of causal factors of pelvic floor disorders: an integrated life span model. *Am J Obstet Gynecol*. 2008;199(6):610.e1–5.
116. Newman DK. Pelvic floor muscle rehabilitation using biofeedback. *Urol Nurs*. 2014;34(4):193–202.
117. Bø KB, Mørkved S. Motor learning. Ability to contract the pelvic-floor muscles. In: Bø KB, Mørkved S, Van Kampen M, editors. Evidence-based physical therapy for the pelvic floor: bridging science and clinical practice. 1st ed. London: Churchill Livingstone; 2007. p. 113–9.
118. Miller JM. Graduated strength training: a pelvic muscle exercise program. The Regents of the University of Michigan; 2012. <http://www.med.umich.edu/1libr/HealthyHealing/GraduatedStrengthTraining.pdf>.
119. Szumilewicz A, Hopkins WG, Dornowski M, Piernicka M. Exercise professionals improve their poor skills in contracting pelvic-floor muscles: a randomized controlled trial. *Res Q Exerc Sport*. 2019;90(4):641.
120. Kandadai P, O'Dell K, Saini J. Correct performance of pelvic muscle exercises in women reporting prior knowledge. *Female Pelvic Med Reconstr Surg*. 2015;21(3):135–40.
121. Vermandel A, De Wachter S, Beyltsens T, D'Hondt D, Jacquemyn Y, Wyndaele JJ. Pelvic floor awareness and the positive effect of verbal instructions in 958 women early postdelivery. *Int Urogynecol J*. 2015;26(2):223–8.
122. Henderson JW, Wang S, Egger MJ, Masters M, Nygaard I. Can women correctly contract their pelvic floor muscles without formal instruction? *Female Pelvic Med Reconstr Surg*. 2013;19(1):8–12.
123. Chiarelli P, Murphy B, Cockburn J. Women's knowledge, practices, and intentions regarding correct pelvic floor exercises. *NeurourolUrodyn*. 2003;22(3):246–9.
124. Batista RLA, Franco MM, Naldoni LMV, Duarte G, Oliveira AS, Ferreira CHJ. Biofeedback and the electromyographic activity of pelvic floor muscles in pregnant women. biofeedback na atividade eletromiográfica dos músculos do assoalho pélvico em gestantes. *Braz J Phys Ther*. 2011;15(5):386–92.
125. Bump RC, Hurt GW, Fantl AJ, Wymann JF. Assessment of Kegel pelvic muscle exercise performance after brief verbal instruction. *Am J Obstet Gynecol*. 1991;165(2):322–9.
126. Bludnicka M, Piernicka M, Szumilewicz A. The characteristics of biofeedback techniques used in pelvic floor muscle training for healthy pregnant women. A narrative review. *Baltic J Health Phys Activ*. 2019;11(4):87–95.
127. Opara J, Socha T, Prajsner A, Poświata A, Opara J, Socha T, et al. Fizjoterapia w wysiłkowym nietrzymaniu moczu u kobiet Część I. Aktualne rekomendacje dotyczące ćwiczeń według Kegla / Physiotherapy in stress urinary incontinence in females. Part I. Contemporary recommendations for Kegel exercises (PFME). *Physiotherapy*. 2011;19(3):41–9.
128. Piernicka M, Duda-Biernacka B, Bludnicka M, Szumilewicz A. The characteristics of the pelvic floor muscle training programs used in experimental studies with surface electromyography in non-Pregnant women: a systematic review. *Iran J Public Health*. 2020;49(6):1022–32.
129. Bø K, Mørkved S. Motor learning. In: Bø K, Berghmans B, Mørkved S, Van Kampen M, editors. Evidence-based physical therapy for the pelvic floor: bridging science and clinical practice. 1st ed. London: Churchill Livingstone/Elsevier; 2007. p. 113–9.
130. Chesnel C, Charlanes A, Tan E, Turmel N, Breton FL, Ismael SS, et al. Influence of the urine stream interruption exercise on micturition. *Int J Urol*. 2019;26(11):1059–63.
131. Miller JM. On pelvic floor muscle function and stress urinary incontinence: effects of posture, parity and volitional control. Dissertation [Thesis]. University of Michigan, Horace H. Rackham School of Graduate Studies; 1996. pp. 145–157.
132. Carriere B. Fitness for the pelvic floor. Stuttgart, New York: Thieme; 2002. p. 112.
133. Odent M. New reasons and new ways to study birth physiology. *Int J Gynaecol Obstet*. 2001;75(Suppl 1):S39–45.
134. WHO. Care in normal birth: a practical guide. Geneva: World Health Organization; 1996. http://apps.who.int/iris/bitstream/10665/63167/1/WHO_FRH_MSM_96.24.pdf.
135. Russell JB, Mitchell D, Musey PI, Collins DC. The relationship of exercise to anovulatory cycles in female athletes: hormonal and physical characteristics. *Obstet Gynecol*. 1984;63(4):452–6.
136. Magann EF, Evans SF, Weitz B, Newnham J. Antepartum, intrapartum, and neonatal significance of exercise on healthy low-risk pregnant working women.

- Obstet Gynecol. 2002;99(3):466.
137. Desseauve D, Fradet L, Lacouture P, Pierre F. Position for labor and birth: state of knowledge and biomechanical perspectives. *Eur J Obstet Gynecol Reprod Biol.* 2017;208:46–54.
 138. Blankfeld A. The optimum position for childbirth. *Med J Aust.* 1965;2(16):666–8.
 139. Jianfang W, Xuemei L, Chunhong W, Xuemei L. The effectiveness of delivery ball use versus conventional nursing care during delivery of primiparae. *Pak J Med Sci.* 2020;36(3):550–4.
 140. Zang Y, Lu H, Zhao Y, Huang J, Ren L, Li X. Effects of flexible sacrum positions during the second stage of labour on maternal and neonatal outcomes: a systematic review and metaanalysis. *J Clin Nurs.* 2020;29(17/18):3154–69.
 141. Panda S. Stress and health: symptoms and techniques of psychotherapeutic management. *Indian J Posit Psychol.* 2014;5(4):516–20.
 142. Illi SK, Held U, Frank I, Spengler CM. Effect of respiratory muscle training on exercise performance in healthy individuals: a systematic review and meta-analysis. *Sports Med.* 2012;42(8):707–24.
 143. Dominelli PB, Archiza B, Ramsok AH, Mitchell RA, Peters CM, Molgat-Seon Y, et al. Effects of respiratory muscle work on respiratory and locomotor blood flow during exercise. *Exp Physiol.* 2017;102(11):1535–47.
 144. Berk B. Motherwell maternity fitness plan. Champaign, IL: Human Kinetics; 2005. p. 232.
 145. Boaviagem A, Melo Junior E, Lubambo L, Sousa P, Aragão C, Albuquerque S, et al. The effectiveness of breathing patterns to control maternal anxiety during the first period of labor: a randomized controlled clinical trial. *Complement Ther Clin Pract.* 2017;26:30–5.
 146. Lewis LK, Williams MT, Olds T. Short-term effects on outcomes related to the mechanism of intervention and physiological outcomes but insufficient evidence of clinical benefits for breathing control: a systematic review. *Aust J Physiotherapy.* 2007;53(4):219–27.
 147. Amola M, Pawara S, Kalra S. Effect of inspiratory muscle training and diaphragmatic breathing exercises on dyspnea, pulmonary functions, fatigue and functional capacity in pregnancy during third trimester. *J Clin Diagn Res.* 2019;13(8):1–4.
 148. Yildirim G, Sahin NH. The effect of breathing and skin stimulation techniques on labour pain perception of Turkish women. *Pain Res Manag.* 2004;9(4):183–7.
 149. Ahmadi Z, Torkzahrani S, Roosta F, Shakeri N, Mhmoodi Z. Effect of breathing technique of blowing on the extent of damage to the perineum at the moment of delivery: a randomized clinical trial. *Iran J Nurs Midwifery Res.* 2017;22(1):62–6.
 150. Bergström M, Kieler H, Waldenström U. Effects of natural childbirth preparation versus standard antenatal education on epidural rates, experience of childbirth and parental stress in mothers and fathers: a randomised controlled multicentre trial. *BJOG.* 2009;116(9):1167–76.
 151. Ricchi A, La Corte S, Molinazzi MT, Messina MP, Banchelli F, Neri I. Study of childbirth education classes and evaluation of their effectiveness. *Clin Ter.* 2020;170(1):e78–86.
 152. Munzert J, Lorey B, Zentgraf K. Cognitive motor processes: the role of motor imagery in the study of motor representations. *Brain Res Rev.* 2009;60(2):306–26.
 153. Rakhshani A, Nagarathna R, Mhaskar R, Mhaskar A, Thomas A, Gunasheela S. Effects of yoga on utero-fetal-placental circulation in high-risk pregnancy: a randomized controlled trial. *Adv Prev Med.* 2015;2015:1–10.
 154. Möhler R, Köpke S, Meyer G. Criteria for reporting the development and evaluation of complex interventions in healthcare: revised guideline (CRReDECI 2). *Trials.* 2015;16:204.
 155. Barsky E, Smith T, Patricios J, Collins R, Branfeld A, Ramagole M. South African sports medicine association position statement on exercise in Pregnancy. *S Afr J Sports Med.* 2012;24(2):69–71.
 156. Carvalho MECC, Lima LC, de Lira Terceiro CA, Pinto DRL, Silva MN, Cozer GA, et al. Low back pain during pregnancy. *Rev Bras Anestesiol.* 2017;67(3):266–70.
 157. Stover MD, Edelstein AI, Matta JM. Chronic anterior pelvic instability: diagnosis and management. *J Am Acad Orthop Surg.* 2017;25(7):509–17.
 158. Bartnikowska I. Ćwiczenia oddechowe i pozycje porodowe w subiektywnym odczuciu kobiet ciężarnych w prenatalnych ćwiczeniach fizycznych (breathing exercises and positions of childbirth in the perception of pregnant women in prenatal exercise programs). Gdansk: Gdansk University of Physical Education and Sport; 2016.
 159. ACNM. Exercise in pregnancy. *J Midwifery Womens Health.* 2014;59(4):473–4.
 160. Oz M, Roizen M. Sleep like a baby. *Fit Preg.* 2012;56.
 161. ACSM. Current comment: exercise during pregnancy [press release].

منابع:

1. Szumilewicz A, Worska A, Santos-Rocha R, Oviedo-Caro MA. Evidence-based and practiceoriented guidelines for exercising during pregnancy. In: Santos-Rocha R, editor. Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines. 2nd ed. Cham: Springer International; 2022. Ch.7.
2. Saligheh M, McNamara B, Rooney R. Perceived barriers and enablers of physical activity in postpartum women: a qualitative approach. *BMC Pregnancy Childbirth.* 2016;16(1):131.
3. Romano M, Cacciatore A, Giordano R, La Rosa B. Postpartum period: three distinct but continuous phases. *J Prenatal Med.* 2010;4(2):22–5.
4. SMA. Sports Medicine Australia Position Statement. Exercise in pregnancy and the postpartum period. 2017. <http://sma.org.au/sma-site-content/uploads/2017/08/SMA-Position-StatementExercise-Pregnancy.pdf>. Accessed 20 Aug 2
5. Leon-Larios F, Corrales-Gutierrez I, Casado-Mejía R, Suarez-Serrano C. Influence of a pelvic floor training programme to prevent perineal trauma: a quasi-randomised controlled trial. *Midwifery.* 2017;50:72–7.
6. Mottola MF. Exercise in the postpartum period: practical applications. *Curr Sports Med Rep.* 2002;1(6):362–8.
7. Bø K, Stuge B, Hilde G. Specific musculoskeletal adaptations in pregnancy: pelvic floor, pelvic girdle and low back pain. Implications for physical activity and exercise. In: Santos-Rocha R, editor. Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines. 2nd ed. Cham: Springer International; 2022. Ch. 6.
8. Szumilewicz A, Santos-Rocha R. Exercise selection and adaptations during pregnancy. In: Santos-Rocha R, editor. Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines. 2nd ed. Cham: Springer International; 2022. Ch. 9.
9. Bø K, Berghmans B, Mørkved S, van Kampen M. Evidence-based physical therapy for the pelvic floor. In: Bridging science and clinical practice. Amsterdam: Elsevier; 2007. 435 p.
10. Evenson KR, Mottola MF, Owe KM, Rousham EK, Brown WJ, P. Summary of International for physical activity following pregnancy. *Obstet Gynecol Surv.* 2014;69(7):407–14.
11. Zourladani A, Zafarakas M, Chatzigiannis B, Papasozomenou P, Vavilis D, Matziari C. The effect of physical exercise on postpartum fitness, hormone and lipid levels: a randomized controlled trial in primiparous, lactating women. *Arch Gynecol Obstet.* 2015;291(3):525–30.
12. Carter T, Bastounis A, Guo B, Jane MC. The effectiveness of exercise-based interventions for preventing or treating postpartum depression: a systematic review and meta-analysis. *Arch Womens Ment Health.* 2019;22(1):37–53.
13. Davenport MH, McCurdy AP, Mottola MF, Skow RJ, Meah VL, Poitras VJ, Jaramillo Garcia A, Gray CE, Barrowman N, Riske L, Sobierajski F, James M, Nagpal T, Marchand AA, Nuspl M, Slater LG, Barakat R, Adamo KB, Davies GA, Ruchat SM. Impact of prenatal exercise on both prenatal and postnatal anxiety and depressive symptoms: a systematic review and metaanalysis. *Br J Sports Med.* 2018;52(21):1376–85.
14. Kołomańska-Bogucka D, Mazur-Biały AI. Physical activity and the occurrence of postnatal depression-a systematic review. *Medicina (Kaunas).* 2019;55(9):560.
15. Pritchett RV, Daley AJ, Jolly K. Does aerobic exercise reduce postpartum depressive symptoms? A systematic review and meta-analysis. *Br J Gen Pract.* 2017;67(663):e684–91.

16. Nakamura A, van der Waerden J, Melchior M, Bolze C, El-Khoury F, Pryor L. Physical activity during pregnancy and postpartum depression: systematic review and meta-analysis. *J Affect Disord.* 2019;246:29–41.
17. Saligheh M, Hackett D, Boyce P, Cobley S. Can exercise or physical activity help improve postnatal depression and weight loss? A systematic review. *Arch Womens Ment Health.* 2017;20(5):595–611.
18. Nascimento SL, Pudwell J, Surita FG, Adamo KB, Smith GN. The effect of physical exercise strategies on weight loss in postpartum women: a systematic review and meta-analysis. *Int J Obes (Lond).* 2014;38(5):626–35.
19. Liu N, Wang J, Chen DD, Sun WJ, Li P, Zhang W. Effects of exercise on pregnancy and postpartum fatigue: a systematic review and meta-analysis. *Eur J Obstet Gynecol Reprod Biol.* 2020;253:285–95.
20. Woodley SJ, Lawrenson P, Boyle R, Cody JD, Mørkved S, Kernohan A, Hay-Smith EJC. Pelvic floor muscle training for preventing and treating urinary and faecal incontinence in antenatal and postnatal women. *Cochrane Database Syst Rev.* 2020;5(5):CD007471.
21. Wu YM, McInnes N, Leong Y. Pelvic floor muscle training versus watchful waiting and pelvic floor disorders in postpartum women: a systematic review and meta-analysis. *Female Pelvic Med Reconstr Surg.* 2018;24(2):142–9.
22. Szumilewicz A, Kuchta A, Kranich M, Dornowski M, Jastrzębski Z. Prenatal high-low impact exercise program supported by pelvic floor muscle education and training decreases the life impact of postnatal urinary incontinence: a quasiexperimental trial. *Medicine.* 2020;99(6):e18874.
23. Moosdorff-Steinhauser HFA, Albers-Heitner P, Weemhoff M, et al. Factors influencing postpartum women's willingness to participate in a preventive pelvic floor muscle training program: a web-based survey. *Eur J Obstet Gynecol Reprod Biol.* 2015;195:182–7.
24. Lamina S, Agbanusi E. Effect of aerobic exercise training on maternal weight gain in pregnancy: a meta-analysis of randomized controlled trials. *Ethiop J Health Sci.* 2013;23(1):59–64.
25. American College of Obstetrics and Gynecology (ACOG). Technical bulletin: exercise during pregnancy and the postnatal period. Washington, DC: ACOG; 1985.
26. Bø K, Artal R, Barakat R, Brown WJ, Davies GAL, Dooley M, Evenson KR, Haakstad LAH, Kayser B, Kinnunen TI, Larsén K, Mottola MF, Nygaard I, van Poppel M, Stuge B, Khan KM, IOC medical commission. Exercise and pregnancy in recreational and elite athletes: 2016/17 evidence summary from the IOC expert group meeting, Lausanne. Part 3-exercise in the postpartum period. *Br J Sports Med.* 2017;51(21):1516–25.
27. World Health Organization (WHO). WHO guidelines on physical activity and sedentary behaviour. Geneva: World Health Organization; 2020.
28. Murray-Davis B, Grenier L, Atkinson SA, Mottola MF, Wahoush O, Thabane L, Xie F, VickersManzin J, Moore C, Hutton EK. Experiences regarding nutrition and exercise among women during early postpartum: a qualitative grounded theory study. *BMC Pregnancy Childbirth.* 2019;19(1):368.
29. American College of Obstetricians and Gynecologists (ACOG). Physical activity and exercise during pregnancy and the postpartum period. Committee Opinion No. 650. American College of Obstetricians and Gynecologists. *Obstet Gynecol.* 2015;126:e135–42.
30. Cary GB, Quinn TJ. Exercise and lactation: are they compatible? *Can J Appl Physiol.* 2001;26(1):55–75. English, French.
31. Bø K, Artal R, Barakat R, Brown WJ, Davies GAL, Dooley M, et al. Exercise and pregnancy in recreational and elite athletes: 2016/2017 evidence summary from the IOC expert group meeting, Lausanne. Part 5. Recommendations for health professionals and active women. *Br J Sports Med.* 2018;52(17):1080–5.
32. USDHHS—U.S. Department of Health and Human Services. Physical activity guidelines for Americans. 2nd ed. Washington, DC: U.S. Department of Health and Human Services; 2018. https://health.gov/sites/default/files/2019-09/Physical_Activity_Guidelines_2nd_edition.pdf#page=79. Accessed 20 Aug 2021.
33. ACOG—American College of Obstetricians and Gynecologists. Exercise after pregnancy. 2019. <https://www.acog.org/womens-health/faqs/exercise-after-pregnancy>. Accessed 20 Aug 2021.
34. ACOG—American College of Obstetricians and Gynecologists. ACOG Committee opinion no. 804: physical activity and exercise during pregnancy and the postpartum period. *Obstet Gynecol.* 2020;135(4):e178–e88.
35. ACSM—American College of Sport Medicine. ACSM information on Pregnancy Physical Activity. American College of Sports Medicine; 2020. <https://www.acsm.org/docs/currentcomments/exerciseduringpregnancy.pdf>. Accessed 20 Aug 2021.
36. AGDH—Australian Government. Department of Health. Guidelines for physical activity during pregnancy. Guidelines for physical activity during pregnancy (health.gov.au): Australian Government. Department of Health; 2021.
37. RANZCOG. The First Few Weeks Following Birth, 2021. <https://ranzcg.edu.au/womenshealth/patient-information-resources/first-few-weeks>. Accessed 20 Aug 2021.
38. Campos MDSB, Buglia S, Colombo CSSS, Buchler RDD, Brito ASX, Mizzaci CC, Feitosa RHF, Leite DB, Hossri CAC, Albuquerque LCA, Freitas OGA, Grossman GB, Mastrocola LE. Position statement on exercise during pregnancy and the post-partum period—2021. *Arq Bras Cardiol.* 2021;117(1):160–80. English, Portuguese.
39. Gaston A, Cramp A. Exercise during pregnancy: a review of patterns and determinants. *J Sci Med Sport.* 2011;14:299–305.
40. Bauman AE, Sallis JF, Dzawaltowski DA, Owen N. Toward a better understanding of the influences on physical activity: the role of determinants, correlates, causal variables, mediators, moderators, and confounders. *Am J Prev Med.* 2002;23(2 Suppl):5–14.
41. Bauman AE, Reis RS, Sallis JF, Wells JC, Loos RJ, Martin BW. Correlates of physical activity: why are some people physically active and others not? *Lancet.* 2012;380(9838):258–71.
42. Gaston A, Vamos CA. Leisure-time physical activity patterns and correlates among pregnant women in Ontario, Canada. *Matern Child Health J.* 2013;17(3):477–84.
43. Lim S, O'Reilly S, Behrens H, Skinner T, Ellis I, Dunbar JA. Effective strategies for weight loss in post-partum women: a systematic review and meta-analysis. *Obes Rev.* 2015;16(11):972–87.
44. Santos-Rocha R. Active at home/Active outdoors YouTube Channel. <https://www.youtube.com/channel/UCEUWdoBeh5rgfM0kZOn9Xtg/videos>.
45. Santos-Rocha R. Active Pregnancy YouTube Channel: <https://www.youtube.com/channel/UC0Vyookwc0mcQ5T70imtoNA/playlists>.
46. Santos-Rocha R, Corrales-Gutierrez I, Szumilewicz A, Pajaujene S. Exercise testing and prescription in pregnancy. In: Santos-Rocha R, editor. Exercise and physical activity during pregnancy and postpartum. Evidence-based guidelines. 2nd ed. Cham: Springer International; 2022, Ch. 8.
47. Goom T, Donnelly G, Brockwell E. Returning to running postnatal. Guidelines for medical, health and fitness professionals managing this population. The Association of Chartered Physiotherapists in Sports and Exercise Medicine; 2019.

1. Bull FC, Al-Ansari SS, Biddle S, Borodulin K, Buman MP, Cardon G, et al. World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *Br J Sports Med.* 2020;54(24):1451–62.
2. De Vivo M, Mills H. “They turn to you first for everything”: insights into midwives’ perspectives of providing physical activity advice and guidance to pregnant women. *BMC Pregnancy Childbirth.* 2019;19(1):462.
3. Hopkinson Y, Hill DM, Fellows L, Fryer S. Midwives understanding of physical activity guidelines during pregnancy. *Midwifery.* 2018;59:23–6.
4. Malta MB, Carvalhaes MA, Takito MY, Tonete VL, Barros AJ, Parada CM, et al. Educational intervention regarding diet and physical activity for pregnant women: changes in knowledge and practices among health professionals. *BMC Pregnancy Childbirth.* 2016;16(1):175.
5. Olander EK, Darwin ZJ, Atkinson L, Smith DM, Gardner B. Beyond the ‘teachable moment’—a conceptual analysis of women’s perinatal behaviour change. *Women Birth.* 2016;29(3):e67–71.
6. Phelan S. Pregnancy: a “teachable moment” for weight control and obesity prevention. *Am J Obstet Gynecol.* 2010;202(2):135 e1–8.
7. Aittasalo M, Pasanen M, Fogelholm M, Kinnunen TI, Ojala K, Luoto R. Physical activity counseling in maternity and child health care—a controlled trial. *BMC Womens Health.* 2008;8:14.
8. May LE, Suminski RR, Linklater ER, Jahnke S, Glaras AG. Exercise during pregnancy: the role of obstetric providers. *J Am Osteopath Assoc.* 2013;113(8):612–9.
9. McParlin C, Bell R, Robson SC, Muirhead CR, Araujo-Soares V. What helps or hinders midwives to implement physical activity guidelines for obese pregnant women? A questionnaire survey using the theoretical domains framework. *Midwifery.* 2017;49:110–6.
10. Walker R, Olander EK, Hill B, Willey S, Skouteris H. Weight management across pregnancy and postpartum care: the need for interprofessional education and collaboration. *Nurse Educ Pract.* 2019;41:102651.
11. Kolbe LJ. School health as a strategy to improve both public health and education. *Annu Rev Public Health.* 2019;40:443–63.
12. Melzer K, Schutz Y, Boulvain M, Kayser B. Physical activity and pregnancy: cardiovascular adaptations, recommendations and pregnancy outcomes. *Sports Med.* 2010;40(6):493–507.
13. Atkinson L, De Vivo M, Hayes L, Hesketh KR, Mills H, Newham JJ, et al. Encouraging physical activity during and after pregnancy in the COVID-19 era, and beyond. *Int J Environ Res Public Health.* 2020;17(19):e7304.
14. Antonovsky A, Sagy S. Aaron Antonovsky, the scholar and the man behind salutogenesis. In: Mittelmark MB, Sagy S, Eriksson M, Bauer GF, Pelikan JM, Lindstrom B, et al., editors. *The handbook of salutogenesis.* Cham: Springer International; 2017. p. 15–23.
15. Shorey S, Ng ED. Application of the salutogenic theory in the perinatal period: a systematic mixed studies review. *Int J Nurs Stud.* 2020;101:103398.
16. Wahedi M. Should midwives consider associated psychological factors when caring for women who are obese? *Br J Midwifery.* 2016;24.
17. Thompson EL, Vamos CA, Daley EM. Physical activity during pregnancy and the role of theory in promoting positive behavior change: a systematic review. *J Sport Health Sci.* 2017;6(2):198–206.
18. Harrison AL, Taylor NF, Shields N, Frawley HC. Attitudes, barriers and enablers to physical activity in pregnant women: a systematic review. *J Physiother.* 2018;64(1):24–32.
19. Downs DS, Hausenblas HA. Exercising for two: examining pregnant women’s second trimester exercise intention and behavior using the framework of the theory of planned behavior. *Womens Health Issues.* 2003;13(6):222–8.
20. Downs DSH, H.A. Pregnant women’s third trimester exercise behaviors, body mass index, and pregnancy outcomes. *Psychol Health.* 2007;22:545–59.
21. Hausenblas HD, D.S. Prospective examination of the theory of planned behavior applied to exercise behavior during women’s first trimester of pregnancy. *J Reprod Infant Psychol.* 2004;22:199–210.
22. Kolb DA. *Experiential learning: experience as a source of learning and development.* Englewood Cliffs, NJ: FT Press; 1984.
23. Organization WH. Framework for action on interprofessional education and collaborative practice. 2010. <https://apps.who.int/iris/handle/10665/70185>.
24. Aquino M, Olander EK, Bryar RM. A focus group study of women’s views and experiences of maternity care as delivered collaboratively by midwives and health visitors in England. *BMC Pregnancy Childbirth.* 2018;18(1):505.
25. Findley A, Smith DM, Hesketh K, Keyworth C. Exploring women’s experiences and decision making about physical activity during pregnancy and following birth: a qualitative study. *BMC Pregnancy Childbirth.* 2020;20(1):54.
26. Guthrie TM, de Jersey SJ, New K, Gallegos D. Midwife readiness to provide woman-centred weight gain support: exploring perspectives across models of care. *Women Birth.* 2020;33(6):e567–e73.
27. Kothe E, Bailey C, Weiner C, Nagle C, Nowson C, Hill B, et al. An investigation of Australian midwifery curricula for obesity management and health behaviour change training. *Nurse Educ Pract.* 2019;36:54–7.
28. Kothe E, Lamb M, Bruce L, McPhie S, Klas A, Hill B, et al. Student midwives’ intention to deliver weight management interventions: a theory of planned behaviour & self-determination theory approach. *Nurse Educ Today.* 2018;71:10–6.
29. Walker R, Bennett C, Blumfeld M, Gwini S, Ma J, Wang F, et al. Attenuating pregnancy weight gain-what works and why: a systematic review and meta-analysis. *Nutrients.* 2018;10(7):944.
30. Marcus MT, Taylor WC, Hormann MD, Walker T, Carroll D. Linking service-learning with community-based participatory research: an interprofessional course for health professional students. *Nurs Outlook.* 2011;59(1):47–54.
31. Ramaley J. The changing role of higher education: learning to deal with wicked problems. *J High Educ Outreach Engage.* 2014;18(3):7–21.
32. Walker R, Morris H, Lang S, Hampton K, Boyle J, Skouteris H. Co-designing preconception and pregnancy care for healthy maternal lifestyles and obesity prevention. *Women Birth.* 2020;33(5):473–8.
33. de Labrusse C, Ramelet AS, Humphrey T, MacLennan SJ. Patient-centered care in maternity services: a critical appraisal and synthesis of the literature. *Womens Health Issues.* 2016;26(1):100–9.
34. Leap N. Woman-centred or women-centred care: does it matter? *Br J Midwifery.* 2013;17(1):12–6.
35. Stubbs C, Schorn MN, Leavell JP, Espiritu EW, Davis G, Gentry CK, et al. Implementing and evaluating a community-based, inter-institutional, interprofessional education pilot programme. *J Interprof Care.* 2017;31(5):652–5.
36. Mullan F. Social mission in health professions education: beyond Flexner. *JAMA.* 2017;318(2):122–3.
37. Olander EK, Scamell M. Teaching students about maternal obesity without creating obesity stigma. *Nurse Educ Today.* 2016;42:59–61.
38. Muzigaba M, Kolbe-Alexander TL, Wong F. The perceived role and influencers of physical activity among pregnant women from low socioeconomic status communities in South Africa. *J Phys Act Health.* 2014;11(7):1276–83.
39. Move Your Baby. <https://moveyourbaby.ch>. Accessed Jul 2021.
40. Davidson NM, Major CH. Boundary crossings: cooperative learning, collaborative learning, and problem-based learning. *J Excell Coll Teach.* 2014;25:7–55.
41. Barr HF, Ford J, Gray R, Helme M, Hutchings M, Low H, Machin A, Reeves S. Interprofessional Education Guidelines Centre for the Advancement of Interprofessional Education. 2017. <https://www.caipe.org/resources/publications/caipe-publications/caipe-2017-interprofessional-education-guidelines-barr-h-ford-j-gray-r-helme-m-hutchings-m-low-h-machin-reeves-s>. Accessed Jul 2021.
42. Mathilde Hyvärinen, Franziska Schläppy, Claire de Labrusse, Jennifer Wegrzyk. Pedagogical innovation to promote physical activity in pregnancy: Interprofessional and real-life settings on the example of the educational program Move Your Baby. *Eur J Midwifery.* 2022;6:32.
43. Lindqvist M, Mogren I, Eurenus E, Edvardsson K, Persson M. “An on-going individual adjustment”: a qualitative study of midwives’ experiences counselling pregnant women on physical activity in Sweden. *BMC Pregnancy Childbirth.* 2014;14:343.
44. Zinsser LA, Stoll K, Wieber F, Pehlke-Milde J, Gross MM. Changing behaviour in pregnant women: a scoping review. *Midwifery.* 2020;85:102680.

45. Cramp AG, Bray SR. A prospective examination of exercise and barrier self-efficacy to engage in leisure-time physical activity during pregnancy. *Ann Behav Med*. 2009;37(3):325–34.
46. Michie S, Abraham C, Eccles MP, Francis JJ, Hardeman W, Johnston M. Strengthening evaluation and implementation by specifying components of behaviour change interventions: a study protocol. *Implement Sci*. 2011;6:10.
47. Abramson S, Stein J, Schaufele M, Frates E, Rogan S. Personal exercise habits and counseling practices of primary care physicians: a national survey. *Clin J Sport Med*. 2000;10(1):40–8.
48. Oberg EB, Frank E. Physicians' health practices strongly influence patient health practices. *J R Coll Physicians Edinb*. 2009;39(4):290–1.
49. Gates ABR, Ritchie IK. "Embedding physical activity in the undergraduate curriculum"—moving healthcare professionals programme. England: PHEaS; 2018.
50. Fazzi C, Saunders DH, Linton K, Norman JE, Reynolds RM. Sedentary behaviours during pregnancy: a systematic review. *Int J Behav Nutr Phys Act*. 2017;14(1):32.
51. Behringer J, Reiner I, Spangler G. Maternal representations of past and current attachment relationships, and emotional experience across the transition to motherhood: a longitudinal study. *J Fam Psychol*. 2011;25(2):210–9.
52. van der Pligt P, Willcox J, Hesketh KD, Ball K, Wilkinson S, Crawford D, et al. Systematic review of lifestyle interventions to limit postpartum weight retention: implications for future opportunities to prevent maternal overweight and obesity following childbirth. *Obes Rev*. 2013;14(10):792–805.
53. Herval AM, Oliveira DPD, Gomes VE, Vargas AMD. Health education strategies targeting maternal and child health: a scoping review of educational methodologies. *Medicine (Baltimore)*. 2019;98(26):e16174.
54. GymPoussette. <https://gympoussettes.ch>. Accessed Jul 2021.
55. Buggyft. <https://buggyft.ch/en/location/zurich/>. Accessed Jul 2021.
56. Thibault GE. The importance of an environment conducive to education. *J Grad Med Educ*. 2016;8(2):134–5.
57. Sidebotham M, Baird K, Walters C, Gamble J. Preparing student midwives for professional practice: evaluation of a student e-portfolio assessment item. *Nurse Educ Pract*. 2018;32:84–9.
58. Bauer PW, Broman CL, Pivarnik JM. Exercise and pregnancy knowledge among healthcare providers. *J Womens Health (Larchmt)*. 2010;19(2):335–41.
59. UNFPA W, ICM. The state of the world's midwifery 2021. 2021. [https://www.unfpa.org/publications/sowmy-2021#:~:text=The%20State%20of%20the%20World%27s%20Midwifery%20\(SoWMy\)%202021%20builds%20on,a%20particular%20focus%20on%20midwives](https://www.unfpa.org/publications/sowmy-2021#:~:text=The%20State%20of%20the%20World%27s%20Midwifery%20(SoWMy)%202021%20builds%20on,a%20particular%20focus%20on%20midwives). Accessed Jul 2021.
60. Donnellan-Fernandez RE, Creedy DK, Callander EJ. Cost-effectiveness of continuity of midwifery care for women with complex pregnancy: a structured review of the literature. *Health Econ Rev*. 2018;8(1):32.
61. Floris L, Irion O, Bonnet J, Politis Mercier MP, de Labrusse C. Comprehensive maternity support and shared care in Switzerland: comparison of levels of satisfaction. *Women Birth*. 2018;31(2):124–33.
62. Sandall J, Soltani H, Gates S, Shennan A, Devane D. Midwife-led continuity models versus other models of care for childbearing women. *Cochrane Database Syst Rev*. 2016;4:CD004667.
63. van den Heuvel JF, Groenof TK, Veerbeek JH, van Solinge WW, Lely AT, Franx A, et al. eHealth as the next-generation perinatal care: an overview of the literature. *J Med Internet Res*. 2018;20(6):e202.
64. Sandborg J, Soderstrom E, Henriksson P, Bendtsen M, Henstrom M, Leppanen MH, et al. Effectiveness of a smartphone app to promote healthy weight gain, diet, and physical activity during pregnancy (HealthyMoms): randomized controlled trial. *JMIR Mhealth Uhealth*. 2021;9(3):e26091.
65. Shaw J, Brewer LC, Veinot T. Recommendations for health equity and virtual care arising from the COVID-19 pandemic: narrative review. *JMIR Form Res*. 2021;5(4):e23233.
66. Tripp N, Hainey K, Liu A, Poulton A, Peek M, Kim J, et al. An emerging model of maternity care: smartphone, midwife, doctor? *Women Birth*. 2014;27(1):64–7.
67. Hayman M, Alfrey KL, Cannon S, Alley S, Rebar AL, Williams S, et al. Quality, features, and presence of behavior change techniques in mobile apps designed to improve physical activity in pregnant women: systematic search and content analysis. *JMIR Mhealth Uhealth*. 2021;9(4):e23649.
68. Stoyanov SR, Hides L, Kavanagh DJ, Wilson H. Development and validation of the user version of the mobile application rating scale (uMARS). *JMIR Mhealth Uhealth*. 2016;4(2):e72.
69. Rhodes A, Smith AD, Chadwick P, Croker H, Llewellyn CH. Exclusively digital health interventions targeting diet, physical activity, and weight gain in pregnant women: systematic review and meta-analysis. *JMIR Mhealth Uhealth*. 2020;8(7):e18255.
70. de Jong N, Savin-Baden M, Cunningham AM, Verstegen DM. Blended learning in health education: three case studies. *Perspect Med Educ*. 2014;3(4):278–88.
71. Perrenoud P, Chautems C, Kaech C. "Whatsapping" the continuity of postpartum care in Switzerland: a socio-anthropological study. *Women Birth*. 2021;35:e263–74.
72. Runkle J, Sugg M, Boase D, Galvin SL, C CC. Use of wearable sensors for pregnancy health and environmental monitoring: descriptive findings from the perspective of patients and providers. *Digit Health*. 2019;5:2055207619828220.
73. Poncette AS, Glauert DL, Mosch L, Braune K, Balzer F, Back DA. Undergraduate medical competencies in digital health and curricular module development: mixed methods study. *J Med Internet Res*. 2020;22(10):e22161.
74. Sandborg J, Henriksson P, Larsen E, Lindqvist AK, Rutberg S, Soderstrom E, et al. Participants' engagement and satisfaction with a smartphone app intended to support healthy weight gain, diet, and physical activity during pregnancy: qualitative study within the HealthyMoms trial. *JMIR Mhealth Uhealth*. 2021;9(3):e26159.
75. Mana A, Super S, Sardu C, Juvinya Canal D, Moran N, Sagy S. Individual, social and national coping resources and their relationships with mental health and anxiety: a comparative study in Israel, Italy, Spain, and the Netherlands during the coronavirus pandemic. *Glob Health Promot*. 2021;28(2):17–26.
76. Heinonen K. Strengthening antenatal care towards a salutogenic approach: a meta-ethnography. *Int J Environ Res Public Health*. 2021;18(10):5168.
1. American College of Obstetricians and Gynecologists. Physical Activity and Exercise During Pregnancy and the Postpartum Period. ACOG Committee Opinion No. 650. *Obstet Gynecol*. 2015;126(6):e135–e42.
2. Hay-Smith J, Mørkved S, Fairbrother KA, Herbison GP. Pelvic floor muscle training for prevention and treatment of urinary and fecal incontinence in antenatal and postnatal women. *Cochrane Database Syst Rev*. 2008;(4):CD007471. <https://doi.org/10.1002/14651858.CD007471>.
3. Kegell AH. Progressive resistance exercise in the functional restoration of the perineal muscles. *Am J Obstet Gynecol*. 1948;56(2):238–48.
4. Kegell AH. Stress incontinence and genital relaxation; a nonsurgical method of increasing the tone of sphincters and their supporting structures. *Ciba Clin Symp*. 1952;4(2):35–51.
5. Bø K. Pelvic floor muscle training is effective in treatment of female stress urinary incontinence, but how does it work? *Int Urogynecol J Pelvic Floor Dysfunct*. 2004;15(2):76–84. <https://doi.org/10.1007/s00192-004-1125-0>.
6. Ashton-Miller JA, DeLancey JO. Functional anatomy of the female pelvic floor. *Ann N Y Acad Sci*. 2007;1101:266–96. <https://doi.org/10.1196/annals.1389.034>.
7. DeLancey JO. Structural aspects of the extrinsic continence mechanism. *Obstet Gynecol*. 1988;72(3 Pt 1):296–301.
8. DeLancey JO. Structural support of the urethra as it relates to stress urinary incontinence: the hammock hypothesis. *Am J Obstet Gynecol*. 1994;170(6):1713–20; discussion 20–3.
9. Ashton-Miller JA, Howard D, DeLancey JO. The functional anatomy of the female pelvic floor and stress continence control system. *Scand J Urol Nephrol Suppl*. 2001;207:1–7; discussion 106–25.
10. Miller JM, Ashton-Miller JA, DeLancey JOL. A pelvic muscle Precontraction can reduce cough-related urine loss in selected women with mild SUI. *J Am Geriatr Soc*. 1998;46(7):870–4. <https://doi.org/10.1111/j.1532-5415.1998.tb02721.x>.
11. Miller JM, Sampselle C, Ashton-Miller J, Hong GR, DeLancey JO. Clarification and confirmation of the knack maneuver: the effect of volitional pelvic floor muscle contraction to preempt expected stress incontinence. *Int Urogynecol J Pelvic Floor Dysfunct*. 2008;19(6):773–82. <https://doi.org/10.1007/s00192-007-0525-3>.

12. Miller JM, Perucchini D, Carchidi LT, Delancey JOL, Ashton-Miller J. Pelvic floor muscle contraction during a cough and decreased vesical neck mobility. *Obstet Gynecol.* 2001;97(2):255–60.
13. Peschers UM, Vodusek DB, Fanger G, Schaer GN, DeLancey JO, Schuessler B. Pelvic muscle activity in nulliparous volunteers. *NeurourolUrodyn.* 2001;20(3):269–75.
14. Bø K. Pelvic floor muscle exercise for the treatment of stress urinary incontinence: an exercise physiology perspective. *Int Urogynecol J.* 1995;6(5):282–91. <https://doi.org/10.1007/bf01901527>.
15. DiNubile NA. Strength training. *Clin Sports Med.* 1991;10(1):33–62.
16. Åstrand PO. Textbook of work physiology: physiological bases of exercise. In: *Human Kinetics*; 2003.
17. Bø K, Kvarstein B, Hagen R, Larsen S. Pelvic floor muscle exercise for the treatment of female stress urinary incontinence: I. reliability of vaginal pressure measurements of pelvic floor muscle strength. *NeurourolUrodyn.* 1990;9(5):471–7. <https://doi.org/10.1002/nau.1930090503>.
18. Bø K, Kvarstein B, Hagen RR, Larsen S. Pelvic floor muscle exercise for the treatment of female stress urinary incontinence: II. Validity of vaginal pressure measurements of pelvic floor muscle strength and the necessity of supplementary methods for control of correct contraction. *NeurourolUrodyn.* 1990;9(5):479–87. <https://doi.org/10.1002/nau.1930090504>.
19. Benvenuti F, Caputo GM, Bandinelli S, Mayer F, Biagini C, Sommovilla A. Reeducative treatment of female genuine stress incontinence. *Am J Phys Med.* 1987;66(4):155–68.
20. Bø K, Jørgensen J, Larsen S, Oseid S, Kvarstein B, Hagen R. Knowledge about and ability to correct pelvic floor muscle exercises in women with urinary stress incontinence. *NeurourolUrodyn.* 1988;7:261–2.
21. Bump RC, Hurt WG, Fantl JA, Wyman JF. Assessment of Kegel pelvic muscle exercise performance after brief verbal instruction. *Am J Obstet Gynecol.* 1991;165(2):322–7. discussion 7-9
22. Messelink B, Benson T, Berghmans B, Bø K, Corcos J, Fowler C, et al. Standardization of terminology of pelvic floor muscle function and dysfunction: report from the pelvic floor clinical assessment group of the international continence society. *NeurourolUrodyn.* 2005;24(4):374–80. <https://doi.org/10.1002/nau.20144>.
23. Bø K, Sherburn M. Measurement of pelvic floor muscle function and strength and pelvic organ prolapse. In: Bø K, Berghmans B, Mørkved S, Kampen MV, editors. *Evidence-based physical therapy for the pelvic floor.* Edinburgh: Churchill Livingstone; 2007. p. 45–112.
24. Bø K, Mørkved S. Pelvic floor and exercise science. In: Bø K, Berghmans B, Mørkved S, Kampen MV, editors. *Evidence-based physical therapy for the pelvic floor.* Edinburgh: Churchill Livingstone; 2007. p. 113–32.
25. Haskell WL, Lee IM, Pate RR, Powell KE, Blair SN, Franklin BA, et al. Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Med Sci Sports Exerc.* 2007;39(8):1423–34. <https://doi.org/10.1249/mss.0b013e3180616b27>.
26. Garber CE, Blissmer B, Deschenes MR, Franklin BA, Lamonte MJ, Lee IM, et al. American College of Sports Medicine position stand. Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. *Med Sci Sports Exerc.* 2011;43(7):1334–59. <https://doi.org/10.1249/MSS.0b013e318213f6fb>.
27. Bø K, Aschehoug A. Pelvic floor and exercise science: strength training. In: Bø K, Berghmans B, Mørkved S, Kampen MV, editors. *Evidence-based physical therapy for the pelvic floor.* Edinburgh: Churchill Livingstone; 2007. p. 119–32.
28. Kraemer WJ, Ratamess NA. Fundamentals of resistance training: progression and exercise prescription. *Med Sci Sports Exerc.* 2004;36(4):674–88.
29. Dumoulin C, Hay-Smith EJC, Mac Habée-Séguin G. Pelvic floor muscle training versus no treatment, or inactive control treatments, for urinary incontinence in women. *Cochrane Database Syst Rev.* 2014;(5). <https://doi.org/10.1002/14651858.CD005654.pub3>.
30. Moore K, Dumoulin C, Bradley C, Burgio K, Chambers T, Hagen S, et al. Adult conservative management. In: Abrams P, Cardozo L, Khoury S, Wein A, editors. *Incontinence: 5th International Consultation on Incontinence.* Paris: SRC—GoogleScholar, ICUD-EAU; 2013. p. 1101–305.
31. Boyle R, Hay-Smith EJC, Cody JD, Mørkved S. Pelvic floor muscle training for prevention and treatment of urinary and faecal incontinence in antenatal and postnatal women. *Cochrane Database Syst Rev.* 2012;(10). <https://doi.org/10.1002/14651858.CD007471.pub2>.
32. Kruger JA, Dietz HP, Murphy BA. Pelvic floor function in elite nulliparous athletes. *Ultrasound Obstet Gynecol.* 2007;30(1):81–5. <https://doi.org/10.1002/uog.4027>.
33. Du Y, Xu L, Ding L, Wang Y, Wang Z. The effect of antenatal pelvic floor muscle training on labor and delivery outcomes: a systematic review with meta-analysis. *Int Urogynecol J.* 2015;26(10):1415–27. <https://doi.org/10.1007/s00192-015-2654-4>.
34. Bø K, Artal R, Barakat R, Brown W, Davies GAL, Dooley M, et al. Exercise and pregnancy in recreational and elite athletes: 2016 evidence summary from the IOC expert group meeting, Lausanne. Part I—exercise in women planning pregnancy and those who are pregnant. *Br J Sports Med.* 2016;50(10):571.
35. Mota PG, Pascoal AGBA, Carita AIAD, Bø K. Prevalence and risk factors of diastasis recti abdominis from late pregnancy to 6 months postpartum, and relationship with lumbo-pelvic pain. *Man Ther.* 2015;20(1):200–5. <https://doi.org/10.1016/j.math.2014.09.002>.
36. Boissonnault JS, Blaschak MJ. Incidence of diastasis recti abdominis during the childbearing year. *Phys Ther.* 1988;68(7):1082–6.
37. Fast A, Weiss L, Ducommun EJ, Medina E, Butler JG. Low-back pain in pregnancy. Abdominal muscles, sit-up performance, and back pain. *Spine.* 1990;15(1):28–30.
38. Gilleard WL, Brown JM. Structure and function of the abdominal muscles in primigravid subjects during pregnancy and the immediate postbirth period. *Phys Ther.* 1996;76(7):750–62.
39. Coldron Y, Stokes MJ, Newham DJ, Cook K. Postpartum characteristics of rectus abdominis on ultrasound imaging. *Man Ther.* 2008;13(2):112–21. <https://doi.org/10.1016/j.math.2006.10.001>.
40. Mota P, Pascoal AG, Carita AI, Bø K. The immediate effects on inter-rectus distance of abdominal crunch and drawing in exercises during pregnancy and the postpartum period. *J Orthop Sports Phys Ther.* 2015;1–24. <https://doi.org/10.2519/jospt.2015.5459>.
41. Benjamin DR, van de Water ATM, Peiris CL. Effects of exercise on diastasis of the rectus abdominis muscle in the antenatal and postnatal periods: a systematic review. *Physiotherapy.* 2014;100(1):1–8. <https://doi.org/10.1016/j.physio.2013.08.005>.
42. Akram J, Matzen SH. Rectus abdominis diastasis. *J Plast Surg Hand Surg.* 2014;48(3):163–9. <https://doi.org/10.3109/2000656X.2013.859145>.
43. Emanuelsson P, Gunnarsson U, Strigard K, Stark B. Early complications, pain, and quality of life after reconstructive surgery for abdominal rectus muscle diastasis: a 3-month follow-up. *J Plast Reconstr Aesthet Surg.* 2014;67(8):1082–8. <https://doi.org/10.1016/j.bjps.2014.04.015>.
44. Mesquita LA, Machado AC, Andrade AV. Fisioterapia para Redução da Diástase dos Músculos Retos Abdominais no Pós-Parto. *Rev Bras Ginecol Obstet.* 1999;21(5):267–72. <https://doi.org/10.1590/S0100-72031999000500004>.
45. Walton LM, Costa A, LaVanture D, McIlrath S, Stebbins B. The effects of a 6 week dynamic core stability plank exercise program compared to a traditional supine core stability strengthening program on diastasis recti abdominis closure, pain, Oswestry disability index (ODI) and pelvic floor disability index scores (PFDI). *Phys Ther Rehabil.* 2016;3(1):3. <https://doi.org/10.7243/2055-2386-3-3>.
46. Kamel DM, Yousif AM. Neuromuscular electrical stimulation and strength recovery of postnatal diastasis recti abdominis muscles. *Ann Rehabil Med.* 2017;41(3):465–74. <https://doi.org/10.5535/arm.2017.41.3.465>.
47. Carrera Pérez C, Da Cuña CI, González González Y. ¿Cuál es el mejor ejercicio para la rehabilitación de la diástasis abdominal? *Rehabilitación.* 2019;53(3):198–210. <https://doi.org/10.1016/j.rh.2018.12.004>.
48. Gluppe SB, Engh ME, Bø K. Immediate effect of abdominal and pelvic floor muscle exercises on Interrecti distance in women with diastasis recti abdominis who were parous. *Phys Ther.* 2020;100(8):1372–83. <https://doi.org/10.1093/ptj/pzaa070>.
49. Gluppe SL, Hilde G, Tennfjord MK, Engh ME, Bø K. Effect of a postpartum training program on the prevalence of diastasis recti abdominis in postpartum Primiparous women: a randomized controlled trial. *Phys Ther.* 2018;98(4):260–8. <https://doi.org/10.1093/ptj/pzy008>.
50. Theodorsen NM, Strand LI, Bø K. Effect of pelvic floor and transversus abdominis muscle contraction on inter-rectus distance in postpartum women: a cross-sectional experimental study. *Physiotherapy.* 2019;105(3):315–20. <https://doi.org/10.1016/j.physio.2018.08.009>.

51. Mota P, Pascoal AG, Sancho MF, Bo K. Test-retest and intra-observer reliability of 2D ultrasound measurements of distance between rectus abdominis in women. *J Orthop Sports Phys Ther.* 2012;42(11):940–6.
52. Sancho MF, Pascoal AG, Mota P, Bo K. Abdominal exercises affect inter-rectus distance in postpartum women: a two-dimensional ultrasound study. *Physiotherapy.* 2015;101(3):286–91. <https://doi.org/10.1016/j.physio.2015.04.004>.
53. Lee D, Hodges PW. Behavior of the Linea Alba during a curl-up task in diastasis rectus abdominis: an observational study. *J Orthop Sports Phys Ther.* 2016;46(7):580–9. <https://doi.org/10.2519/jospt.2016.6536>.
54. Smith BE, Littlewood C, May S. An update of stabilisation exercises for low back pain: a systematic review with meta-analysis. *BMC Musculoskelet Disord.* 2014;15:416. <https://doi.org/10.1186/1471-2474-15-416>.
55. Bø K, Artal R, Barakat R, Brown WJ, Davies GAL, Dooley M, et al. Exercise and pregnancy in recreational and elite athletes: 2016/17 evidence summary from the IOC Expert Group Meeting, Lausanne. Part 3—exercise in the postpartum period. *Br J Sports Med.* 2017;50:571.
56. Fell DB, Joseph KS, Armson BA, Dodds L. The impact of pregnancy on physical activity level. *Matern Child Health J.* 2008;13(5):597. <https://doi.org/10.1007/s10995-008-0404-7>.
57. Owe KM, Nystad W, Bo K. Correlates of regular exercise during pregnancy: the Norwegian mother and child cohort study. *Scand J Med Sci Sports.* 2009;19(5):637–45. <https://doi.org/10.1111/j.1600-0838.2008.00840.x>.
58. Pennick V, Liddle SD. Interventions for preventing and treating pelvic and back pain in pregnancy. *Cochrane Database Syst Rev.* 2013;(8):CD001139. <https://doi.org/10.1002/14651858.CD001139.pub3>
59. Haakstad LA, Bo K. Effect of a regular exercise programme on pelvic girdle and low back pain in previously inactive pregnant women: a randomized controlled trial. *J Rehabil Med.* 2015;47(3):229–34. <https://doi.org/10.2340/16501977-1906>.
60. Mogren IM. Previous physical activity decreases the risk of low back pain and pelvic pain during pregnancy. *Scand J Public Health.* 2005;33(4):300–6.
61. Bø K, Backe-Hansen KL. Do elite athletes experience low back, pelvic girdle and pelvic floor complaints during and after pregnancy? *Scand J Med Sci Sports.* 2007;17(5):480–7. <https://doi.org/10.1111/j.1600-0838.2006.00599.x>.
62. Thorell E, Kristiansson P. Pregnancy related back pain, is it related to aerobic fitness? A longitudinal cohort study. *BMC Pregnancy Childbirth.* 2012;12:30. <https://doi.org/10.1186/1471-2393-12-30>.
63. Boissonnault JS, Klestinski JU, Pearcy K. The role of exercise in the management of pelvic girdle and low back pain in pregnancy: a systematic review of the literature. *J Women Health Phys Ther.* 2012;36:69–77.
64. Ho SSM, Yu WWM, Lao TT, Chow DHK, Chung JWY, Li Y. Effectiveness of maternity support belts in reducing low back pain during pregnancy: a review. *J Clin Nurs.* 2009;18(11):1523–32. <https://doi.org/10.1111/j.1365-2702.2008.02749.x>.
65. Kanakaris NK, Roberts CS, Giannoudis PV. Pregnancy-related pelvic girdle pain: an update. *BMC Med.* 2011;9:15. <https://doi.org/10.1186/1741-7015-9-15>.
66. Katonis P, Kampouroglou A, Aggelopoulos A, Kakavelakis K, Lykoudis S, Makrigiannakis A, et al. Pregnancy-related low back pain. *Hippokratia.* 2011;15(3):205–10.
67. Lillios S, Young J. The effects of core and lower extremity strengthening on pregnancy-related low back and pelvic girdle pain: a review. *J Women Health Phys Ther.* 2012;36:116–24.
68. Richards E, Van Kessel G, Virgara R, Harris P. Does antenatal physical therapy for pregnant women with low back pain or pelvic pain improve functional outcomes? A systematic review. *Acta Obstet Gynecol Scand.* 2012;91(9):1038–45. <https://doi.org/10.1111/j.1600-0412.2012.01462.x>.
69. Stuge B, Hilde G, Vollestad N. Physical therapy for pregnancy-related low back and pelvic pain: a systematic review. *Acta Obstet Gynecol Scand.* 2003;82(11):983–90.
70. Vermani E, Mittal R, Weeks A. Pelvic girdle pain and low back pain in pregnancy: a review. *Pain Pract.* 2010;10(1):60–71. <https://doi.org/10.1111/j.1533-2500.2009.00327.x>.
71. Verstraete EH, Vanderstraeten G, Parewijk W. Pelvic girdle pain during or after pregnancy: a review of recent evidence and a clinical care path proposal. *Facts Views Vis Obgyn.* 2013;5(1):33–43.
72. Vleeming A, Albert HB, Östgaard HC, Sturesson B, Stuge B. European guidelines for the diagnosis and treatment of pelvic girdle pain. *Eur Spine J.* 2008;17(6):794–819. <https://doi.org/10.1007/s00586-008-0602-4>.
73. Shiri R, Coggon D, Falah-Hassani K. Exercise for the prevention of low back and pelvic girdle pain in pregnancy: a meta-analysis of randomized controlled trials. *Eur J Pain.* 2018;187:1093–101. <https://doi.org/10.1002/ejp.1096>.
74. Benten EV, Pool J, Mens J, Pool-Goudzwaard A. Recommendations for physical therapists on the treatment of Lumbopelvic pain during pregnancy: a systematic review. *J Orthop Sports Phys Ther.* 2014;44(7):464–A15. <https://doi.org/10.2519/jospt.2014.5098>.
75. Close C, Sinclair M, Liddle SD, Madden E, McCullough JEM, Hughes C. A systematic review investigating the effectiveness of complementary and alternative medicine (CAM) for the management of low back and/or pelvic pain (LBPP) in pregnancy. *J Adv Nurs.* 2014;70(8):1702–16. <https://doi.org/10.1111/jan.12360>.
76. Jiang Q, Wu Z, Zhou L, Dunlop J, Chen P. Effects of yoga intervention during pregnancy: a review for current status. *Am J Perinatol.* 2015;32(6):503–14. <https://doi.org/10.1055/s-0034-1396701>.
77. Gjestland K, Bø K, Owe KM, Eberhard-Gran M. Do pregnant women follow exercise guidelines? Prevalence data among 3482 women, and prediction of low-back pain, pelvic girdle pain and depression. *Br J Sports Med.* 2013;47(8):515.
78. Ferreira CWS, Alburquerque-Sendin F. Effectiveness of physical therapy for pregnancy-related low back and/or pelvic pain after delivery: a systematic review. *Physiother Theory Pract.* 2013;29(6):419–31. <https://doi.org/10.3109/09593985.2012.748114>.
79. Stuge B, Laerum E, Kirkesola G, Vollestad N. The efficacy of a treatment program focusing on specific stabilizing exercises for pelvic girdle pain after pregnancy: a randomized controlled trial. *Spine.* 2004;29(4):351–9.
80. Mens JM, Snijders CJ, Stam HJ. Diagonal trunk muscle exercises in peripartum pelvic pain: a randomized clinical trial. *Phys Ther.* 2000;80(12):1164–73.
81. Bastiaenen CH, de Bie RA, Vlaeyen JW, Goossens ME, Leffers P, Wolters PM, et al. Long-term effectiveness and costs of a brief self-management intervention in women with pregnancy-related low back pain after delivery. *BMC Pregnancy Childbirth.* 2008;8:19. <https://doi.org/10.1186/1471-2393-8-19>.
82. Gutke A, Sjødahl J, Öberg B. Specific muscle stabilizing as home exercises for persistent pelvic girdle pain after pregnancy: a randomized, controlled clinical trial. *J Rehabil Med.* 2010;42(10):929–35. <https://doi.org/10.2340/16501977-0615>.
83. Chaudry S, Rashid F, Shah S. Effectiveness of core stabilization exercises along with postural correction in postpartum back pain. *Rawal Med J.* 2013;38:256–9.
84. Backhausen MG, Tabor A, Albert H, Rosthøj S, Damm P, Hegaard HK. The effects of an unsupervised water exercise program on low back pain and sick leave among healthy pregnant women—a randomised controlled trial. *PLoS One.* 2017;12(9):e0182114. <https://doi.org/10.1371/journal.pone.0182114>.
85. Eggen MH, Stuge B, Mowinckel P, Jensen KS, Hagen KB. Can supervised group exercises including ergonomic advice reduce the prevalence and severity of low back pain and pelvic girdle pain in pregnancy? A randomized controlled trial. *Phys Ther.* 2012;92(6):781–90. <https://doi.org/10.2522/ptj.20110119>.
86. Mørkved SIV, Salvesen KÅ, Schei B, Lydersen S, Bø K. Does group training during pregnancy prevent lumbopelvic pain? A randomized clinical trial. *Acta Obstet Gynecol Scand.* 2007;86(3):276–82. <https://doi.org/10.1080/00016340601089651>.
87. Stafne SN, Salvesen KA, Romundstad PR, Stuge B, Mørkved S. Does regular exercise during pregnancy influence lumbopelvic pain? A randomized controlled trial. *Acta Obstet Gynecol Scand.* 2012;91(5):552–9. <https://doi.org/10.1111/j.1600-0412.2012.01382.x>.
88. Dankaerts W, O’Sullivan P. The validity of O’Sullivan’s classification system (CS) for a sub-group of NS-CLBP with motor control impairment (MCI): overview of a series of studies and review of the literature. *Man Ther.* 2011;16(1):9–14. <https://doi.org/10.1016/j.math.2010.10.006>.
89. Stuge B, Bergland A. Evidence and individualization: important elements in treatment for women with postpartum pelvic girdle pain. *Physiother Theory Pract.* 2011;27(8):557–65. <https://doi.org/10.3109/09593985.2010.551802>.
90. van Tulder M, Koes B. Low back pain (acute). *Clin Evid.* 2004;12:1643–58.
91. Liddle SD, David Baxter G, Gracey JH. Physiotherapists’ use of advice and exercise for the management of chronic low back pain: a national survey. *Man Ther.* 2009;14(2):189–96. <https://doi.org/10.1016/j.math.2008.01.012>.

92. Brumitt J, Matheson JW, Meira EP. Core stabilization exercise prescription, part 2: a systematic review of motor control and general (global) exercise rehabilitation approaches for patients with low back pain. *Sports Health*. 2013;5(6):510–3. <https://doi.org/10.1177/1941738113502634>.
93. Bruno P. The use of “stabilization exercises” to affect neuromuscular control in the lumbopelvic region: a narrative review. *J Can Chiropr Assoc*. 2014;58:119–30.
94. McGill S. Low back disorders: evidence-based prevention and rehabilitation. 2nd ed. Champaign, IL: Human Kinetics; 2007.
95. Richardson C, Hodges P, Hides J. Therapeutic exercise for lumbopelvic stabilization. Edinburgh: Churchill Livingstone; 2004.
96. Stuge B, Sætre K, Ingeborg HB. The automatic pelvic floor muscle response to the active straight leg raise in cases with pelvic girdle pain and matched controls. *Man Ther*. 2013;18(4):327–32. <https://doi.org/10.1016/j.math.2012.12.004>.
97. Hayden JA, van Tulder MW, Tomlinson G. Systematic review: strategies for using exercise therapy to improve outcomes in chronic low back pain. *Ann Intern Med*. 2005;142(9):776–85. <https://doi.org/10.7326/0003-4819-142-9-200505030-00014>.
98. Gomes-Neto M, Lopes JM, Conceicao CS, Araujo A, Brasileiro A, Sousa C, et al. Stabilization exercise compared to general exercises or manual therapy for the management of low back pain: a systematic review and meta-analysis. *Phys Ther Sport*. 2017;23:136–42. <https://doi.org/10.1016/j.ptsp.2016.08.004>.
99. Wang X-Q, Zheng J-J, Yu Z-W, Bi X, Lou S-J, Liu J, et al. A meta-analysis of core stability exercise versus general exercise for chronic low Back pain. *PLoS One*. 2012;7(12):e52082. <https://doi.org/10.1371/journal.pone.0052082>.
100. O’Sullivan PB, Beales DJ. Changes in pelvic floor and diaphragm kinematics and respiratory patterns in subjects with sacroiliac joint pain following a motor learning intervention: a case series. *Man Ther*. 2007;12(3):209–18. <https://doi.org/10.1016/j.math.2006.06.006>.
101. Boissonnault JS. A review of self-report functional outcome measures in selected obstetric physical therapy interventions. *J Women Health Phys Ther*. 2009;33(1):7–12.
102. Stuge B, Garratt A, Krogstad Jenssen H, Grotle M. The pelvic girdle questionnaire: a condition-specific instrument for assessing activity limitations and symptoms in people with pelvic girdle pain. *Phys Ther*. 2011;91(7):1096–108. <https://doi.org/10.2522/ptj.20100357>.
103. Grotle M, Garratt AM, Krogstad Jenssen H, Stuge B. Reliability and construct validity of self-report questionnaires for patients with pelvic girdle pain. *Phys Ther*. 2012;92(1):111–23. <https://doi.org/10.2522/ptj.20110076>.
104. Stuge B, Jenssen HK, Grotle M. The pelvic girdle questionnaire: responsiveness and minimal important change in women with pregnancy-related pelvic girdle pain, low back pain, or both. *Phys Ther*. 2017;97(11):1103–13. <https://doi.org/10.1093/ptj/pzx078>

منابع:

1. Tompkins WT, Wiehl DG. Nutritional deficiencies as a casual factor in toxemia and premature labor. *Am J Obstet Gynecol*. 1951;62:898–919.
2. Venkatachalam PS. Maternal nutritional status and its effect on the newborn. *Bull World Health Organ*. 1962;26:193–201.
3. Dodd JM, Grivell RM, Nguyen AM, et al. Maternal and perinatal health outcomes by body mass index category. *Aust N Z J Obstet Gynaecol*. 2011;51:136–40.
4. Guelinckx I, Devlieger R, Beckers K, et al. Maternal obesity: pregnancy complications, gestational weight gain and nutrition. *Obes Rev*. 2008;9:140–50.
5. Blumfeld ML, Hure AJ, Macdonald-Wicks L, et al. A systematic review and meta-analysis of micronutrient intakes during pregnancy in developed countries. *Nutr Rev*. 2013;71:118–32.
6. Grieger JA, Clifton VL. A review of the impact of dietary intakes in human pregnancy on infant birthweight. *Nutrients*. 2014;7(1):153–78.
7. Perng W, Stuart J, Rifas-Shiman SL, et al. Preterm birth and long-term maternal cardiovascular health. *Ann Epidemiol*. 2015;25(1):40–5.
8. Gillman MW, Rifas-Shiman SL, Kleinman K, et al. Developmental origins of childhood overweight: potential public health impact. *Obesity (Silver Spring)*. 2008;16:1651–6.
9. Callaway LK, Prins JB, Chang AM, et al. The prevalence and impact of overweight and obesity in an Australian obstetric population. *Med J Aust*. 2006;184:56–9.
10. Ehrenberg HM, Mercer BM, Catalano PM. The influence of obesity and diabetes on the prevalence of macrosomia. *Am J Obstet Gynecol*. 2004;191:964–8.
11. WHO. Energy and protein requirements. Report of a Joint FAO/WHO/UNU Expert Consultation. Technical Report Series No. 724. Geneva: World Health Organization; 1985.
12. Hytten FE. Nutrition. In: Hytten FE, Chamberlain G, editors. *Clinical physiology in obstetrics*. Oxford: Blackwell Scientific; 1980. p. 163–92.
13. Butte NF, King JC. Energy requirements during pregnancy and lactation. *Public Health Nutr*. 2005;8(7a):1010–27.
14. Butte N, Caballero B. Energy needs: assessment and requirements. In: Shils M, Shike M, Ross A, Caballero B, Cousins R, editors. *Modern nutrition in health and disease*. 10th ed. Baltimore/Philadelphia: Lippincott Williams & Wilkins; 2006. p. 136–48.
15. Artal R, O’toole M. Guidelines of the American College of Obstetricians and Gynecologists for exercise during pregnancy and the postpartum period. *Br J Sports Med*. 2003;37(1):6–12.
16. Silva M-RG, Bellotto ML. Nutritional requirements for maternal and newborn health. *Curr Women Health Rev*. 2015;11:41–50.
17. Silva M-RG, Paiva T. Low energy availability and low body fat of female gymnasts before an international competition. *Eur J Sport Sci*. 2015;15(7):591–9.
18. Loucks AB, Kiens B, Wright HH. Energy availability in athletes. *J Sports Sci*. 2011;29:S7–15.
19. Rodriguez NR, DiMarco NM, Langley S, et al. Position of the American dietetic association, dietitians of Canada and the American College of Sports Medicine: nutrition and athletic performance. *J Am Diet Assoc*. 2009;109:509–27.
20. Forsum E, Löf M. Energy metabolism during human pregnancy. *Annu Rev Nutr*. 2007;27:277–92.
21. Hoch AZ, Pajewski NM, Moraski L, et al. Prevalence of the female athlete triad in high school athletes and sedentary students. *Clin J Sport Med*. 2009;19(5):421–8.
22. Institute of Medicine and National Research Council of the National Academies. Weight gain during pregnancy: reexamining the guidelines. Washington, DC, USA: Institute of Medicine and National Research Council of the National Academies.; 2009.
23. Bø K, Artal R, Barakat R, et al. Exercise and pregnancy in recreational and elite athletes: 2016 evidence summary from the IOC expert group meeting, Lausanne. Part 1-exercise in women planning pregnancy and those who are pregnant. *Br J Sports Med*. 2016;50(10):571–89.
24. Sundgot-Borgen J, Torstveit MK. Prevalence of eating disorders in elite athletes is higher than in the general population. *Clin J Sport Med*. 2004;14:25–32.
25. Sundgot-Borgen J, Torstveit MK. Aspects of disordered eating continuum in elite highintensity sports. *Scand J Med Sci Sports*. 2010;20(Suppl 2):112–21.
26. Currie A. Sport and eating disorders—understanding and managing the risks. *Asian J Sports Med*. 2010;1:63–8.
27. Czech-Szczapa B, Szczapa T, Merritt TA, et al. Disordered eating attitudes during pregnancy in mothers of newborns requiring neonatal intensive care unit admission: a case control study. *J Matern Fetal Neonatal Med*. 2015;28:1711–5.
28. Silva M-RG, Paiva T. Sleep, nutrition, circadian rhythm, jet lag and athletic performance [in Portuguese]. Lisbon: Portuguese Federation of Gymnastics/Portuguese Institute of Sport and Youthhood I.P; 2015.
29. Silva M-RG. Nutritional evaluation and body composition [in Portuguese]. 3rd ed. Porto: University Fernando Pessoa Press; 2015.
30. Nielsen S, Møller-Madsen S, Isager T, et al. Standardized mortality in eating disorders—a quantitative summary of previously published and new evidence. *J Psychosom Res*. 1998;44:413–34.
31. Cardwell MS. Eating disorders during pregnancy. *Obstet Gynecol Surv*. 2013;68:312–23.
32. Franko DL, Spurrell EB. Detection and management of eating disorders during pregnancy. *Obstet Gynecol*. 2000;95(Pt 1):942–6.
33. Mazzeo SE, Slof-Opt Landt MC, Jones I, et al. Associations among postpartum depression, eating disorders, and perfectionism in a population-based sample of adult women. *Int J Eat Disord*. 2006;39:202–11.
34. Koubaa S, Hallstrom T, Lindholm C, et al. Pregnancy and neonatal outcomes in women with eating disorders. *Obstet Gynecol*. 2005;105:255–60.

35. Park RJ, Senior R, Stein A. The offspring of mothers with eating disorders. *Eur Child Adolesc Psychiatry*. 2003;12(Suppl 1):1110–9.
36. Patel P, Wheatcroft R, Park RJ, et al. The children of mothers with eating disorders. *Clin Child Fam Psychol Rev*. 2002;5:1–19.
37. James DC. Eating disorders, fertility, and pregnancy: relationships and complications. *J Perinat Neonatal Nurs*. 2001;15:36–48.
38. Brahmabhatt H, Kågesten A, Emerson M, et al. Prevalence and determinants of adolescent pregnancy in urban disadvantaged settings across five cities. *J Adolesc Health*. 2014;55:6S48–57.
39. van Baaren GJ, Peelen MJ, Schuit E, et al. Preterm birth in singleton and multiple pregnancies: evaluation of costs and perinatal outcomes. *Eur J Obstet Gynecol Reprod Biol*. 2015;3:34–41.
40. Kaiser LL, Allen L. Position of the American dietetic association: nutrition and lifestyle for a healthy pregnancy outcome. *J Am Diet Assoc*. 2002;102:1479–90.
41. Artal R, O'Toole M. Guidelines of the American College of Obstetricians and Gynecologists for exercise during pregnancy and the postpartum period. *Br J Sports Med*. 2003;37:6–12.
42. Food and Nutrition Board/Institute of Medicine. Dietary reference intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein and amino acids. Washington, DC: National Academies Press; 2005. http://www.nap.edu/catalog.php?record_id=10490.
43. Koletzko B, Bauer CP, Bung P, et al. German national consensus recommendations on nutrition and lifestyle in pregnancy by the 'Healthy start—young family Network'. *Ann Nutr Metab*. 2013;63(4):311–22.
44. Food and Nutrition Board/Institute of Medicine. Dietary reference intakes for vitamin A, vitamin K, arsenic, boron, chromium, copper, iodine, iron, manganese, molybdenum, nickel, silicon, vanadium, and zinc. Washington, DC: National Academies Press; 2001. <http://www.nap.edu/catalog/10026.html>
45. Food and Nutrition Board/Institute of Medicine. Dietary reference intakes for thiamin, riboflavin, niacin, vitamin B6, folate, vitamin B12, pantothenic acid, biotin, and choline. Washington, DC: National Academies Press; 1999. http://www.nap.edu/catalog.php?record_id=6015.
46. Food and Nutrition Board/Institute of Medicine. Dietary reference intakes for vitamin C, vitamin E, selenium, and carotenoids. Washington, DC: National Academies Press; 2000. http://www.nap.edu/catalog.php?record_id=9810.
47. Food and Nutrition Board/Institute of Medicine. Dietary reference intakes for calcium and vitamin D. Washington, DC: National Academies Press; 2011. http://www.nap.edu/catalog.php?record_id=13050.
48. Food and Nutrition Board/Institute of Medicine. Dietary reference intakes for water, potassium, sodium, chloride, and sulfate. Washington, DC: National Academies Press; 2005. <http://www.nap.edu/catalog/10925.html>.
49. Buford TW, Kreider RB, Stout JR, et al. International Society of Sports Nutrition position stand: creatine supplementation and exercise. *J Int Soc Sports Nutr*. 2007;4(1):6.
50. Kerkisick C, Harvey T, Stout J, et al. International Society of Sports Nutrition position stand: nutrient timing. *J Int Soc Sports Nutr*. 2008;3(5):17.
51. Thomas DT, Erdman KA, Burke LM. Position of the academy of nutrition and dietetics, dietitians of Canada, and the American College of Sports Medicine: nutrition and athletic performance. *J Acad Nutr Diet*. 2016;116(3):501–28.
52. Jeukendrup AE, Jentjens RLPG, Moseley L. Nutritional considerations in triathlon. *Sports Med*. 2005;35(2):163–81.
53. Jentjens RL, Wagenmakers AJ, Jeukendrup AE. Heat stress increases muscle glycogen use but reduces the oxidation of ingested carbohydrates during exercise. *J Appl Physiol*. 2002;92(4):1562–72.
54. Polańska K, Jurewicz J, Hanke W. Smoking and alcohol drinking during pregnancy as the risk factors for poor child neurodevelopment—a review of epidemiological studies. *Int J Occup Med Environ Health*. 2015;28(3):419–43.
55. Bakker R, Steegers EAP, Obradov A, Raat H, Hofman A, Jaddoe VVW. Maternal caffeine intake from coffee and tea, fetal growth, and the risks of adverse birth outcomes: the generation R study. *Am J Clin Nutr*. 2010;91(6):1691–8.
56. Rhee J, Kim R, Kim Y, et al. Maternal caffeine consumption during pregnancy and risk of low birth weight: a dose-response meta-analysis of observational studies. *PLoS One*. 2015;10(7):e0132334.
57. American College of Obstetricians and Gynecologists. Committee opinion: moderate caffeine consumption during pregnancy. *Obstet Gynecol*. 2010;116(462):467–8.
58. Araujo JR, Martel F, Keating E. Exposure to non-nutritive sweeteners during pregnancy and lactation: impact in programming of metabolic diseases in the progeny later in life. *Reprod Toxicol*. 2014;49:196–201.
59. Hedman C, Pohjasvaara T, Tolonen U, Suhonen-Malm AS, Myllylä VV. Effects of pregnancy on mothers' sleep. *Sleep Med*. 2002;3(1):37–42.
60. Mindell JA, Jacobson BJ. Sleep disturbances during pregnancy. *J Obstet Gynecol Neonatal Nurs*. 2000;29(6):590–7.
61. Lee KA, Gay CL. Sleep in late pregnancy predicts length of labor and type of delivery. *Am J Obstet Gynecol*. 2004;191(6):2041–6.
62. Lee KA, Zaffke ME, McEnany G. Parity and sleep patterns during and after pregnancy. *Obstet Gynecol*. 2000;95(1):14–8.
63. Le Bon O, Staner L, Hoffmann G, et al. The first-night effect may last more than one night. *J Psychiatr Res*. 2001;35(3):165–72.
64. Silva M-RG, Paiva T. Poor precompetitive sleep habits, nutrients' deficiencies, inappropriate body composition and athletic performance in elite gymnasts. *Eur J Sport Sci*. 2016;16(6):726–35.
65. Silva M-RG, Paiva T. Sleep during pregnancy: neurophysiology, disturbances and sleep hygiene [in Portuguese]. In: Santos-Rocha R, Branco M, editors. *Active pregnancy—physiological and biomechanical adaptations during pregnancy and postpartum*. Lisbon: Foundation for Science and Technology; 2016.
66. Centers for Disease Control and Prevention. National Sleep Awareness Week. *MMWR Morb Mortal Wkly Rep*. 2011;60(8):233.
67. Picchietti DL, Hensley JG, Bainbridge JL, et al. Consensus clinical practice guidelines for the diagnosis and treatment of restless legs syndrome/Willis-Ekbom disease during pregnancy and lactation. *Sleep Med Rev*. 2014;22:64–77.
68. Chang JJ, Pien GW, Duntley SP, et al. Sleep deprivation during pregnancy and maternal and fetal outcomes: is there a relationship? *Sleep Med Rev*. 2010;14:107–14.
69. Nodine PM, Matthews EE. Common sleep disorders: management strategies and pregnancy outcomes. *J Midwifery Womens Health*. 2013;58:368–77.
70. Okun ML, Schetter CD, Glynn LM. Poor sleep quality is associated with preterm birth. *Sleep*. 2011;34:1493–8.
71. Ramirez JO, Cabrera SA, Hidalgo H, et al. Is preeclampsia associated with restless legs syndrome? *Sleep Med*. 2013;14:894–6.
72. Vahdat M, Sariri E, Miri S, et al. Prevalence and associated features of restless legs syndrome in a population of Iranian women during pregnancy. *Int J Gynecol Obstet*. 2013;123:46–9.
73. Weststrom J, Skalkidou A, Manconi M, et al. Prepregnancy restless legs syndrome (Willis-Ekbom disease) is associated with perinatal depression. *J Clin Sleep Med*. 2014;10:527–33.
74. Ismailogullari S, Ozturk A, Mazicioglu MM, et al. Restless legs syndrome and pregnancy in Kayseri, Turkey: a hospital based survey. *Sleep Biol Rhythms*. 2010;8:137–43.
1. Dunford AR, Sangster JM. Maternal and paternal periconceptional nutrition as an indicator of offspring metabolic syndrome risk in later life through epigenetic imprinting: a systematic review. *Diab Metab Syndrome*. 2017;11(Suppl 2):S655–62.
2. Pullar J, Wickramasinghe K, Demaio AR, Roberts N, Perez-Blanco KM, Noonan K, Townsend N. The impact of maternal nutrition on offspring's risk of non-communicable diseases in adulthood: a systematic review. *J Glob Health*. 2019;9(2):020405.
3. Silva M-R, Doñate B, Carballo K. Nutritional requirements for the pregnant exerciser and athlete: evidence-based guidelines. In: Santos-Rocha R, editor. *Exercise and sporting activity during pregnancy*. Berlin: Springer; 2019. p. 327–45.
4. Koletzko B, Cremer M, Flothkötter M, Graf C, Hauner H, Hellmers C, Kersting M, Krawinkel M, Przyrembel H, Röbl-Mathieu M, et al. Diet and lifestyle before and during pregnancy—practical recommendations of the Germany-wide healthy start—young family network. *Geburtshilfe Frauenheilkd*. 2018;78(12):1262–82.
5. Guerrero M, Pérez-Rodríguez F. Diet quality indices for nutrition assessment: types and applications (chapter 14). In: *Functional food—improve health through*

- adequate food. London: IntechOpen; 2017.
6. Shapiro ALB, Kaar JL, Crume TL, Starling AP, Siega-Riz AM, Ringham BM, Glueck DH, Norris JM, Barbour LA, Friedman JE, et al. Maternal diet quality in pregnancy and neonatal adiposity: the healthy start study. *Int J Obes (Lond)*. 2016;40(7):1056–62.
7. Chen L-W, Aubert AM, Shivappa N, Bernard JY, Mensink-Bout SM, Geraghty AA, Mehegan J, Suderman M, Polanska K, Hanke W, et al. Maternal dietary quality, inflammatory potential and childhood adiposity: an individual participant data pooled analysis of seven European cohorts in the ALPHABET consortium. *BMC Med*. 2021;19(1):33.
8. Chen LW, Lyons B, Navarro P, Shivappa N, Mehegan J, Murrin CM, Hébert JR, Kelleher CC, Phillips CM. Maternal dietary inflammatory potential and quality are associated with offspring asthma risk over 10-year follow-up: the lifeways cross-generation cohort study. *Am J Clin Nutr*. 2020;111(2):440–7.
9. Pestoni G, Krieger J-P, Sych JM, Faeh D, Rohrmann S. Cultural differences in diet and determinants of diet quality in Switzerland: results from the National Nutrition Survey menuCH. *Nutrients*. 2019;11(1):126.
10. Doyle IM, Borrmann B, Grosser A, Razum O, Spallek J. Determinants of dietary patterns and diet quality during pregnancy: a systematic review with narrative synthesis. *Public Health Nutr*. 2017;20(6):1009–28.
11. Suárez-Martínez C, Yagüe-Guirao G, Santaella-Pascual M, Peso-Echarri P, Vioque J, Morales E, García-Marcos L, Martínez-Graciá C. Nela Study Group T: adherence to the Mediterranean diet and determinants among pregnant women: the NELA cohort. *Nutrients*. 2021;13(4):1248.
12. Rodrigues SS, Franchini B, Graça P, de Almeida MD. A new food guide for the Portuguese population: development and technical considerations. *J Nutr Educ Behav*. 2006;38(3):189–95.
13. Food-based dietary guidelines. <http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/en/>.
14. Herforth A, Arimond M, Álvarez-Sánchez C, Coates J, Christianson K, Muehlhoff E. A global review of food-based dietary guidelines. *Adv Nutr*. 2019;10(4):590–605.
15. Quarta S, Massaro M, Chervenkov M, Ivanova T, Dimitrova D, Jorge R, Andrade V, Philippou E, Zisimou C, Maksimova V, et al. Persistent moderate-to-weak mediterranean diet adherence and low scoring for plant-based foods across several Southern European countries: are we overlooking the mediterranean diet recommendations? *Nutrients*. 2021;13(5):1432.
16. Raymond J, Morrow K. Krause and Mahan's food & the nutrition care process. 15th ed. Amsterdam: Elsevier Health Sciences; 2020.
17. Rogerson D. Vegan diets: practical advice for athletes and exercisers. *J Int Soc Sports Nutr*. 2017;14:36.
18. European Food Safety Authority. Dietary reference values for nutrients. Summary report, vol. 14; 2017. p. e15121E.
19. Thomas DT, Erdman KA, Burke LM. American College of Sports Medicine joint position statement. Nutrition and athletic performance. *Med Sci Sports Exerc*. 2016;48(3):543–68.
20. Mousa A, Naqash A, Lim S. Macronutrient and micronutrient intake during pregnancy: an overview of recent evidence. *Nutrients*. 2019;11(2):443.
21. Rosenbloom CA, Coleman EJ. Sports nutrition: a practice manual for professionals. 5th ed. Chicago, IL: Academy of Nutrition and Dietetics; 2012.
22. Tabela da Composição de Alimentos. <http://portfr.insa.pt>.
23. World Health Organization. WHO guidelines approved by the guidelines review committee. In: WHO recommendations on antenatal care for a positive pregnancy experience. Geneva: World Health Organization; 2016.
24. Direção-Geral da Saúde. Norma no 004/2019: Prevenção e Tratamento da Deficiência de Vitamina D. Lisboa: Saúde DaoGd; 2019.
25. Larson-Meyer DE, Willis KS. Vitamin D and athletes. *Curr Sports Med Rep*. 2010;9(4):220–6.
26. Hyde NK, Brennan-Olsen SL, Bennett K, Moloney DJ, Pasco JA. Maternal nutrition during pregnancy: intake of nutrients important for bone health. *Matern Child Health J*. 2017;21(4):845–51.
27. Georgieff MK. Iron deficiency in pregnancy. *Am J Obstet Gynecol*. 2020;223(4):516–24.
28. Dalton LM, Flhoinn DMN, Gaydazhieva GT, Mazurkiewicz OM, Leeson H, Wright CP. Magnesium in pregnancy. *Nutr Rev*. 2016;74(9):549–57.
29. Abel MH, Ystrom E, Caspersen IH, Meltzer HM, Aase H, Torheim LE, Askeland RB, Reichborn-Kjennerud T, Brantsæter AL. Maternal iodine intake and offspring attention deficit/hyperactivity disorder: results from a large prospective cohort study. *Nutrients*. 2017;9(11):1239.
30. Farias PM, Marcelino G, Santana LF, de Almeida EB, Guimarães RCA, Pott A, Hiane PA, Freitas KC. Minerals in pregnancy and their impact on child growth and development. *Molecules*. 2020;25(23):5630.
31. Lăcătușu C-M, Grigorescu E-D, Floria M, Onofriescu A, Mihai B-M. The Mediterranean diet: from an environment-driven food culture to an emerging medical prescription. *Int J Environ Res Public Health*. 2019;16(6):942.
32. Davis C, Bryan J, Hodgson J, Murphy K. Definition of the Mediterranean diet; a literature review. *Nutrients*. 2015;7(11):9139–53.
33. Bach-Faig A, Berry EM, Lairon D, Reguant J, Trichopoulou A, Dernini S, Medina FX, Battino M, Belahsen R, Miranda G, et al. Mediterranean diet pyramid today. Science and cultural updates. *Public Health Nutr*. 2011;14(12a):2274–84.
34. Slomski A. Mediterranean diet during pregnancy. *JAMA*. 2019;322(12):1134.
35. Olmedo-Requena R, Gómez-Fernández J, Amezcua-Prieto C, Mozas-Moreno J, Khan KS, Jiménez-Moleón JJ. Pre-pregnancy adherence to the Mediterranean diet and gestational diabetes mellitus: a case-control study. *Nutrients*. 2019;11(5):1003.
36. Koutelidakis AE, Alexatou O, Kousaiti S, Gkretsi E, Vasios G, Sampani A, Tolia M, Kiortsis DN, Giaginis C. Higher adherence to Mediterranean diet prior to pregnancy is associated with decreased risk for deviation from the maternal recommended gestational weight gain. *Int J Food Sci Nutr*. 2018;69(1):84–92.
37. Amati F, Hassounah S, Swaka A. The impact of Mediterranean dietary patterns during pregnancy on maternal and offspring health. *Nutrients*. 2019;11(5):1098.
38. Biagi C, Nunzio MD, Bordonì A, Gori D, Lanari M. Effect of adherence to Mediterranean diet during pregnancy on children's health: a systematic review. *Nutrients*. 2019;11(5):997.
39. Sebastiani G, Herranz Barbero A, Borrás-Novell C, Alsina Casanova M, Aldecoa-Bilbao V, Andreu-Fernández V, Pascual Tutusaus M, Ferrero Martínez S, Gómez Roig MD, García-Algar O. The effects of vegetarian and vegan diet during pregnancy on the health of mothers and offspring. *Nutrients*. 2019;11(3):557.
40. Baroni L, Goggi S, Battagliolo R, Berveglieri M, Fasan I, Filippin D, Griffith P, Rizzo G, Tomasini C, Tosatti MA, et al. Vegan nutrition for mothers and children: practical tools for healthcare providers. *Nutrients*. 2018;11(1):5.
41. Melina V, Craig W, Levin S. Position of the academy of nutrition and dietetics: vegetarian diets. *J Acad Nutr Diet*. 2016;116(12):1970–80.
42. Yisahak SF, Hinkle SN, Mumford SL, Li M, Andriessen VC, Grantz KL, Zhang C, Grewal J. Vegetarian diets during pregnancy, and maternal and neonatal outcomes. *Int J Epidemiol*. 2021;50(1):165–78.
43. Agnoli C, Baroni L, Bertini L, Ciappellano S, Fabbri A, Papa M, Pellegrini N, Sbarbati R, Scarino ML, Siani V, et al. Position paper on vegetarian diets from the working group of the Italian Society of Human Nutrition. *Nutr Metab Cardiovasc Dis*. 2017;27(12):1037–52.
44. DellaValle DM. Iron supplementation for female athletes: effects on iron status and performance outcomes. *Curr Sports Med Rep*. 2013;12(4):234–9.
45. Hytten FE. Weight gain in pregnancy. In: *Clinical physiology in obstetrics*. Oxford: Blackwell Scientific; 1980. p. 193–230.
46. Beall MH, van den Wijngaard JP, van Gemert MJ, Ross MG. Amniotic fluid water dynamics. *Placenta*. 2007;28(8–9):816–23.
47. ACOG Committee Opinion No. 650. Physical activity and exercise during pregnancy and the postpartum period. *Obstet Gynecol*. 2015;126(6):e135–42.
48. Tulmaç ÖB, Kılıç R, Yaman S, Aktulum F, Şimşek G, Erdiñç S. Evaluation of the vestibular system with video head impulse test in pregnant women with hyperemesis gravidarum. *J Obstet Gynaecol Res*. 2021;47(1):96–102.
49. Institute of Medicine. Dietary reference intakes for water, potassium, sodium, chloride, and sulfate. Washington, DC: The National Academies Press; 2005. <https://doi.org/10.17226/10925>.
50. Malisova O, Bountziouka V, Panagiotakos DB, Zampelas A, Kapsokefalou M. The water balance questionnaire: design, reliability and validity of a questionnaire to evaluate water balance in the general population. *Int J Food Sci Nutr*. 2012;63(2):138–44.
51. Bradley CS, Kennedy CM, Turcea AM, Rao SS, Nygaard IE. Constipation in pregnancy: prevalence, symptoms, and risk factors. *Obstet Gynecol*. 2007;110(6):1351–7.
52. Goodrich JA, Frisco DJ, Kim S, Holliday M, Rueda M, Poddar S, Byrnes WC. The importance of lean mass and iron deficiency when comparing hemoglobin

- mass in male and female athletic groups. *J Appl Physiol*. 2020;129(4):855–63.
53. Jung S, Kim MH, Park JH, Jeong Y, Ko KS. Cellular antioxidant and anti-inflammatory effects of coffee extracts with different roasting levels. *J Med Food*. 2017;20(6):626–35.
54. Guest NS, VanDusseldorp TA, Nelson MT, Grgic J, Schoenfeld BJ, Jenkins NDM, Arent SM, Antonio J, Stout JR, Trexler ET, et al. International society of sports nutrition position stand: caffeine and exercise performance. *J Int Soc Sports Nutr*. 2021;18(1):1.
55. Darakjian LI, Kaddoumi A. Physiologically based pharmacokinetic/pharmacodynamic model for caffeine disposition in pregnancy. *Mol Pharm*. 2019;16(3):1340–9.
56. James JE. Maternal caffeine consumption and pregnancy outcomes: a narrative review with implications for advice to mothers and mothers-to-be. *BMJ Evid Based Med*. 2021;26(3):114–5.
57. Poole R, Kennedy OJ, Roderick P, Fallowfield JA, Hayes PC, Parkes J. Coffee consumption and health: umbrella review of meta-analyses of multiple health outcomes. *BMJ*. 2017;359:j5024.
58. Gaskins AJ, Rich-Edwards JW, Williams PL, Toth TL, Missmer SA, Chavarro JE. Prepregnancy caffeine and caffeinated beverage intake and risk of spontaneous abortion. *Eur J Nutr*. 2018;57(1):107–17.
59. European Food Safety Authority. Panel of dietetic products, nutrition and allergies. Scientific opinion on the safety of caffeine. *EFSA J*. 2015;13:4102.
60. ACOG Committee Opinion No. 462. Moderate caffeine consumption during pregnancy. *Obstet Gynecol*. 2010;116(2 Pt 1):467–8.
61. British Nutrition Foundation. What not to eat when pregnant. Scotland: British Nutrition Foundation; 2018. p. 2.
62. Serra-Majem L, Raposo A, Aranceta-Bartrina J, Varela-Moreiras G, Logue C, Laviada H, Socolovsky S, Pérez-Rodrigo C, Aldrete-Velasco JA, Meneses Sierra E, et al. Ibero-American consensus on low- and no-calorie sweeteners: safety, nutritional aspects and benefits in food and beverages. *Nutrients*. 2018;10(7):818.
63. WHO. WHO guidelines approved by the guidelines review committee. In: Guideline: sugars intake for adults and children. Geneva: World Health Organization; 2015.
64. Palatnik A, Moosreiner A, Olivier-Van Stichelen S. Consumption of non-nutritive sweeteners during pregnancy. *Am J Obstet Gynecol*. 2020;223(2):211–8.
65. Fitch C, Keim KS. Position of the academy of nutrition and dietetics: use of nutritive and nonnutritive sweeteners. *J Acad Nutr Diet*. 2012;112(5):739–58.
66. Evaluations of the Joint FAO/WHO Expert Committee on Food Additives (JECFA) list of chemicals in functional class sweetener. <http://apps.who.int/food-additives-contaminants-jecfa-database/search.aspx?fc=66#>.
67. Cavagnari BM. Non-caloric sweeteners in pregnancy and lactation. *Revista espanola de salud publica*. 2019;93.
68. Koletzko B. Developmental origins of adult disease: Barker's or Dornier's hypothesis? *Am J Hum Biol*. 2005;17(3):381–2.
69. Forsdahl A. Are poor living conditions in childhood and adolescence an important risk factor for arteriosclerotic heart disease? *Br J Prev Soc Med*. 1977;31(2):91–5.
70. Barker DJ, Osmond C. Infant mortality, childhood nutrition, and ischaemic heart disease in England and Wales. *Lancet (London, England)*. 1986;1(8489):1077–81.
71. Barker DJ, Thornburg KL. The obstetric origins of health for a lifetime. *Clin Obstet Gynecol*. 2013;56(3):511–9.
72. Koletzko B, Brands B, Grote V, Kirchberg FF, Prell C, Rzehak P, Uhl O, Weber M. Longterm health impact of early nutrition: the power of programming. *Ann Nutr Metab*. 2017;70(3):161–9.
73. Lowensohn RI, Stadler DD, Naze C. Current concepts of maternal nutrition. *Obstet Gynecol Surv*. 2016;71(7):413–26.
74. Poston L, Harthoorn LF, Van Der Beek EM. Obesity in pregnancy: implications for the mother and lifelong health of the child. A consensus statement. *Pediatr Res*. 2011;69(2):175–80.
75. de Borja C, Holtzman B, McCall LM, Carson TL, Moretti LJ, Farnsworth N, Ackerman KE. Specific dietary practices in female athletes and their association with positive screening for disordered eating. *J Eat Disord*. 2021;9(1):50.
76. Wells KR, Jeacocke NA, Appaneal R, Smith HD, Vlahovich N, Burke LM, Hughes D. The Australian Institute of Sport (AIS) and National Eating Disorders Collaboration (NEDC) position statement on disordered eating in high performance sport. *Br J Sports Med*. 2020;54(21):1247–58.
77. World Health Organization. Good maternal nutrition—the best start in life. Copenhagen; 2016.
78. Thangaratnam S, Rogozinska E, Jolly K, Glinkowski S, Roseboom T, Tomlinson JW, Kunz R, Mol BW, Coomarasamy A, Khan KS. Effects of interventions in pregnancy on maternal weight and obstetric outcomes: meta-analysis of randomised evidence. *BMJ (Clin Res Ed)*. 2012;344:e2088.
79. Englund-Ögge L, Brantsæter AL, Sengpiel V, Haugen M, Birgisdottir BE, Myhre R, Meltzer HM, Jacobsson B. Maternal dietary patterns and preterm delivery: results from large prospective cohort study. *BMJ (Clin Res Ed)*. 2014;348:g1446.
80. Aaltonen J, Ojala T, Laitinen K, Poussa T, Ozanne S, Isolauri E. Impact of maternal diet during pregnancy and breastfeeding on infant metabolic programming: a prospective randomized controlled study. *Eur J Clin Nutr*. 2011;65(1):10–9.
81. O'Brien SJ, Larose TL, Adak GK, Evans MR, Tam CC. Modelling study to estimate the health burden of foodborne diseases: cases, general practice consultations and hospitalisations in the UK, 2009. *BMJ Open*. 2016;6(9):e011119.
82. Gómez-Roig MD, Pascal R, Cahuana MJ, García-Algar O, Sebastiani G, Andreu-Fernández V, Martínez L, Rodríguez G, Iglesia I, Ortiz-Arrabal O, et al. Environmental exposure during pregnancy: influence on prenatal development and early life: a comprehensive review. *Fetal Diagn Ther*. 2021;48(4):245–57.
83. Blumberg JB, Cena H, Barr SI, Biesalski HK, Dagach RU, Delaney B, Frei B, Moreno González MI, Hwalla N, Lategan-Potgieter R, et al. The use of multivitamin/multimineral supplements: a modified Delphi consensus panel report. *Clin Ther*. 2018;40(4):640–57.
84. Denham BE. Dietary supplements in the USA: problematic trends. *Public Health Nutr*. 2021;24(9):2771–5.
85. Canadian Paediatric Society. Foodborne infections. *Paediatr Child Health*. 2008;13(9):779–88.
86. Adar T, Grisaru-Granovsky S, Ben Ya'acov A, Goldin E, Bar-Gil Shitrit A. Pregnancy and the immune system: general overview and the gastroenterological perspective. *Dig Dis Sci*. 2015;60(9):2581–9.
87. Smith JL. Foodborne infections during pregnancy. *J Food Prot*. 1999;62(7):818–29.
88. Food and Drug Administration. Food safety: for pregnant women, their unborn babies, and children under five. Nutrition CfFSaA: Center for Food Safety and Applied Nutrition; 2020.
89. Teixeira D, Pestana D, Calhau C, Graça P. Linhas de Orientação sobre Contaminantes de Alimentos, Direção-Geral da Saúde. Lisboa: Direção-Geral da Saúde; 2015.
90. World Health Organization, United Nations Environment Programme, Inter-Organization Programme for the Sound Management of Chemicals, Bergman A, Heindel J, Jobling S, Kidd K, Zoeller T. State of the science of endocrine disrupting chemicals 2012: summary for decision-makers. Geneva: World Health Organization; 2013.
91. Wigle DT, Arbuckle TE, Turner MC, Bérubé A, Yang Q, Liu S, Krewski D. Epidemiologic evidence of relationships between reproductive and child health outcomes and environmental chemical contaminants. *J Toxicol Environ Health B Crit Rev*. 2008;11(5–6):373–517.
92. Yazbeck C, Thiebaugeorges O, Moreau T, Goua V, Debotte G, Sahuquillo J, Forhan A, Foliguet B, Magnin G, Slama R, et al. Maternal blood lead levels and the risk of pregnancy-induced hypertension: the EDEN cohort study. *Environ Health Perspect*. 2009;117(10):1526–30.
93. Miranda ML, Edwards S, Maxson PJ. Mercury levels in an urban pregnant population in Durham County, North Carolina. *Int J Environ Res Public Health*. 2011;8(3):698–712.
94. Kalloo G, Wellenius GA, McCandless L, Calafat AM, Sjödin A, Romano ME, Karagas MR, Chen A, Yoltón K, Lanphear BP, et al. Exposures to chemical mixtures during pregnancy and neonatal outcomes: the HOME study. *Environ Int*. 2020;134:105219.
95. Kalloo G, Wellenius GA, McCandless L, Calafat AM, Sjödin A, Karagas M, Chen A, Yoltón K, Lanphear BP, Braun JM. Profiles and predictors of environmental chemical mixture exposure among pregnant women: the health outcomes and measures of the environment study. *Environ Sci Technol*. 2018;52(17):10104–13.
96. Chan-Hon-Tong A, Charles MA, Forhan A, Heude B, Sirot V. Exposure to food contaminants during pregnancy. *Sci Total Environ*. 2013;458–460:27–35.
97. Koletzko B, Brands B, Poston L, Godfrey K, Demmelmair H. Early nutrition programming of long-term health. *Proc Nutr Soc*. 2012;71(3):371–8.

98. EFSA Panel on Contaminants in the Food Chain (CONTAM). Presence of microplastics and nanoplastics in food, with particular focus on seafood. *EFSA J.* 2016;14(6):e04501.
99. Bulloch RE, Lovell AL, Jordan VMB, McCowan LME, Thompson JMD, Wall CR. Maternal folic acid supplementation for the prevention of preeclampsia: a systematic review and metaanalysis. *Paediatr Perinat Epidemiol.* 2018;32(4):346–57.
100. Haider BA, Bhutta ZA. Multiple-micronutrient supplementation for women during pregnancy. *Cochrane Database Syst Rev.* 2017;4(4):CD004905.
101. Lassi ZS, Kedzior SG, Tariq W, Jadoon Y, Das JK, Bhutta ZA. Effects of preconception care and periconception interventions on maternal nutritional status and birth outcomes in low and middle-income countries: a systematic review. *Nutrients.* 2020;12(3):606.
102. Viswanathan M, Treiman KA, Kish-Doto J, Middleton JC, Coker-Schwimmer EJ, Nicholson WK. Folic acid supplementation for the prevention of neural tube defects: an updated evidence report and systematic review for the US preventive services task force. *JAMA.* 2017;317(2):190–203.
103. Biesalski HK, Tinz J. Multivitamin/mineral supplements: rationale and safety—a systematic review. *Nutrition.* 2017;33:76–82.
104. Zeisel SH. Is maternal diet supplementation beneficial? Optimal development of infant depends on mother's diet. *Am J Clin Nutr.* 2009;89(2):685s–7s.
105. Bastos Maia S, Rolland Souza AS, Costa Caminha MF, Lins da Silva S, Callou Cruz R, Carvalho dos Santos C, Batista Filho M. Vitamin A and pregnancy: a narrative review. *Nutrients.* 2019;11(3):681.
106. Tucker J, Fischer T, Upjohn L, Mazzeo D, Kumar M. Unapproved pharmaceutical ingredients included in dietary supplements associated with US Food and Drug Administration warnings. *JAMA Netw Open.* 2018;1(6):e183337.
107. Rocha T, Amaral JS, Oliveira M. Adulteration of dietary supplements by the illegal addition of synthetic drugs: a review. *Compr Rev Food Sci Food Saf.* 2016;15(1):43–62.
108. Costa JG, Vidovic B, Saraiva N, Do Céu Costa M, Del Favero G, Marko D, Oliveira NG, Fernandes AS. Contaminants: a dark side of food supplements? *Free Radic Res.* 2019;53(sup1):1113–35.
109. Wowdzia JB, McHugh TL, Thornton J, Sivak A, Mottola MF, Davenport MH. Elite athletes and pregnancy outcomes: a systematic review and meta-analysis. *Med Sci Sports Exerc.* 2021;53(3):534–42.
110. Al Wattar B, Dodds J, Placzek A, Beresford L, Spyrelli E, Moore A, Gonzalez Carreras F, Austin F, Murugesu N, Roseboom TJ, et al. Mediterranean-style diet in pregnant women with metabolic risk factors (ESTEEM): a pragmatic multicentre randomised trial. *PLoS Med.* 2019;16(7):e1002857.
111. Muktabhant B, Lawrie TA, Lumbiganon P, Laopaiboon M. Diet or exercise, or both, for preventing excessive weight gain in pregnancy. *Cochrane Database Syst Rev.* 2015;(6):CD007145.
112. Rasmussen L, Poulsen C, Kampmann U, Smedegaard S, Ovesen P, Fuglsang J. Diet and healthy lifestyle in the management of gestational diabetes mellitus. *Nutrients.* 2020;12(10):3050.
113. Jebeile H, Mijatovic J, Louie JCY, Prvan T, Brand-Miller JC. A systematic review and metaanalysis of energy intake and weight gain in pregnancy. *Am J Obstet Gynecol.* 2016;214(4):465–83.
114. Rogozińska E, Zamora J, Marlin N, Betrán AP, Astrup A, Bogaerts A, Cecatti JG, Dodd JM, Facchinetti F, Geiker NRW, et al. Gestational weight gain outside the Institute of Medicine recommendations and adverse pregnancy outcomes: analysis using individual participant data from randomised trials. *BMC Pregnancy Childbirth.* 2019;19(1):322.
115. Sundgot-Borgen J, Sundgot-Borgen C, Myklebust G, Sølvsberg N, Torstveit MK. Elite athletes get pregnant, have healthy babies and return to sport early postpartum. *BMJ Open Sport Exerc Med.* 2019;5(1):e000652.
116. Butte N, King J. Energy requirements during pregnancy and lactation. *Public Health Nutr.* 2005;8(7a):1010–27.
117. Johnson M, Campbell F, Messina J, Preston L, Buckley Woods H, Goyder E. Weight management during pregnancy: a systematic review of qualitative evidence. *Midwifery.* 2013;29(12):1287–96.
118. Zhu Y, Zhang C. Prevalence of gestational diabetes and risk of progression to type 2 diabetes: a global perspective. *Curr Diab Rep.* 2016;16(1):7.
119. Zhang GH, Chen ML, Liu SS, Zhan YH, Quan Y, Qin YM, Deng SP. Effects of mother's dietary exposure to acesulfame-K in pregnancy or lactation on the adult offspring's sweet preference. *Chem Senses.* 2011;36(9):763–70.
120. Weschenfelder F, Hein F, Lehmann T, Schleußner E, Groten T. Contributing factors to perinatal outcome in pregnancies with gestational diabetes—what matters most? A retrospective analysis. *J Clin Med.* 2021;10(2):348.
121. Szlapinski SK, Hill DJ. Metabolic adaptations to pregnancy in healthy and gestational diabetic pregnancies: the pancreas—placenta axis. *Curr Vasc Pharmacol.* 2021;19(2):141–53.
122. Kapur K, Kapur A, Hod M. Nutrition management of gestational diabetes mellitus. *Ann Nutr Metab.* 2021:1–13.
123. EFSA Panel on Contaminants in the Food Chain (CONTAM). Scientific opinion on the risk for public health related to the presence of mercury and methylmercury in food. *EFSA J.* 2012;10(12):2985.
124. UN Committee recommends new dietary intake limits for mercury. <https://apps.who.int/mediacentre/news/notes/2003/np20/en/index.html>