

Obesity and overweight in ethnic minorities of the Detroit metropolitan area of Michigan.

Jamil HJ¹, Rajan AK,¹, Grzybowski M², Fakhouri M¹, Arnetz B^{1,4}.

- 1 Division of Occupational and Environmental Health, Department of Family Medicine and Public Health Sciences Wayne State University School of Medicine Detroit USA
- 2 Department of Emergency Medicine Wayne State University School of Medicine Detroit USA
- 3 Departments of Epidemiology and Pediatrics Michigan State University College of Human Medicine East Lansing USA
- 4 Department of Public Health and Caring Sciences Uppsala University Uppsala Sweden

Abstract

Race, ethnicity and socioeconomic factors influence the prevalence of obesity and overweight, which are major public health problems. Our objectives were (1) to calculate the prevalence of self-reported obesity and overweight in whites, blacks, Chaldeans, and Arabs in the Detroit metropolitan area; and (2) to examine the odds for self-reported overweight and obesity in the racial and ethnic minorities when compared to whites. The responses to a self-administered survey conducted among the adult residents ($n = 2,883$) of the Detroit metropolitan area of Michigan were analyzed. Prevalence of overweight and obesity were 47.4 and 34.6 % respectively for the whole sample, while it was 39.9 and 43.6 % for whites, 42.3 and 47.8 % for blacks, 46.2 and 30.3 % for Chaldeans, and 52.2 and 28.5 % for Arabs. The odds for obesity was significantly lower in Arabs [odds ratio (OR) 0.31; 95 % confidence interval (CI) 0.13-0.72] and Chaldeans (OR 0.14; 95 % CI 0.06-0.33) when compared to whites. Chaldeans (OR 0.36; 95 % CI 0.15-0.86) had significantly decreased likelihood for being overweight compared to whites. Odds for obesity and overweight can vary in the different ethnic minorities within whites. Sharing similar living conditions decreases the differences in the odds for overweight and obesity between whites and blacks. Taking into consideration the racial and ethnic differences of the target population may help in developing better programs for fighting overweight and obesity.

Abstract

Race, ethnicity and socioeconomic factors influence the prevalence of obesity and overweight, which are major public health problems. Our objectives were (1) to calculate the prevalence of self-reported obesity and overweight in whites, blacks, Chaldeans, and Arabs in the Detroit metropolitan area; and (2) to examine the odds for self-reported overweight and obesity in the racial and ethnic minorities when compared to whites. The responses to a self-administered survey conducted among the adult residents ($n = 2,883$) of the Detroit metropolitan area of Michigan were analyzed. Prevalence of overweight and obesity were 47.4 and 34.6 % respectively for the whole sample, while it was 39.9 and 43.6 % for whites, 42.3 and 47.8 % for blacks, 46.2 and 30.3 % for Chaldeans, and 52.2 and 28.5 % for Arabs. The odds for obesity was significantly lower in Arabs [odds ratio (OR) 0.31; 95 % confidence interval (CI) 0.13-0.72] and Chaldeans (OR 0.14; 95 % CI 0.06-0.33) when compared to

whites. Chaldeans (OR 0.36; 95 % CI 0.15-0.86) had significantly decreased likelihood for being overweight compared to whites. Odds for obesity and overweight can vary in the different ethnic minorities within whites. Sharing similar living conditions decreases the differences in the odds for overweight and obesity between whites and blacks. Taking into consideration the racial and ethnic differences of the target population may help in developing better programs for fighting overweight and obesity.

acknowledgments

The authors thank Kirk Allison, PhD, MS, Director at University of Minnesota Program in Human Rights and Health, for reviewing the article and making suggestions for improving it.

References

1. 1.

Haidar, Y. M., & Cosman, B. C. (2011). Obesity epidemiology. *Clinics in Colon and Rectal Surgery*, 24(4), 205–210. doi: [10.1055/s-0031-1295684](https://doi.org/10.1055/s-0031-1295684).[PubMedCentralPubMedCrossRefGoogle Scholar](#)

2. 2.

Haslam, D. W., & James, W. P. (2005). Obesity. *Lancet*, 366(9492), 1197–1209. doi: [10.1016/S0140-6736\(05\)67483-1](https://doi.org/10.1016/S0140-6736(05)67483-1).[PubMedCrossRefGoogle Scholar](#)

3. 3.

Madan, J. C., Davis, J. M., Craig, W. Y., Collins, M., Allan, W., Quinn, R., et al. (2009). Maternal obesity and markers of inflammation in pregnancy. *Cytokine*, 47(1), 61–64. doi: [10.1016/j.cyto.2009.05.004](https://doi.org/10.1016/j.cyto.2009.05.004).[PubMedCrossRefGoogle Scholar](#)

4. 4.

Wang, Y., Beydoun, M. A., Liang, L., Caballero, B., & Kumanyika, S. K. (2008). Will all Americans become overweight or obese? Estimating the progression and cost of the US obesity epidemic. *Obesity (Silver Spring)*, 16(10), 2323–2330. doi: [10.1038/oby.2008.351](https://doi.org/10.1038/oby.2008.351).[CrossRefGoogle Scholar](#)

5. 5.

Whitlock, G., Lewington, S., Sherliker, P., Clarke, R., Emberson, J., Halsey, J., et al. (2009). Body-mass index and cause-specific mortality in 900 000 adults: Collaborative analyses of 57 prospective studies. *Lancet*, 373(9669), 1083–1096. doi: [10.1016/S0140-6736\(09\)60318-4](https://doi.org/10.1016/S0140-6736(09)60318-4).[PubMedCrossRefGoogle Scholar](#)

6. 6.

CDC (Centers for Disease Control and Prevention). (2005a). *Behavioral Risk Factor Surveillance System Prevalence and Trends Data*. [Graph illustration of overweight and obesity for Michigan in 2005]. Retrieved from <http://apps.nccd.cdc.gov/BRFSS/display.asp?state=MI&cat=OB&yr=2005&qkey=4409&grp=0&SUBMIT4=Go>.

7. 7.

Paeratakul, S., Lovejoy, J. C., Ryan, D. H., & Bray, G. A. (2002). The relation of gender, race and socioeconomic status to obesity and obesity comorbidities in a sample of US adults. *International Journal of Obesity and Related Metabolic Disorders*, 26(9), 1205–1210. doi: [10.1038/sj.ijo.0802026](https://doi.org/10.1038/sj.ijo.0802026).[PubMedCrossRefGoogle Scholar](#)

8. 8.

Bowie, J. V., Juon, H. S., Cho, J., & Rodriguez, E. M. (2007). Factors associated with overweight and obesity among Mexican Americans and Central Americans: Results from the 2001 California Health Interview Survey. *Preventing Chronic Disease*, 4(1), A10.[PubMedCentralPubMedGoogle Scholar](#)

9. 9.

CDC (Centers for Disease Control and Prevention). (2011a). *Behavioral Risk Factor Surveillance System Prevalence and Trends Data*. [Graph illustration of overweight and obesity for the US in 2011 by race]. Retrieved from <http://apps.nccd.cdc.gov/BRFSS/race.asp?cat=OB&yr=2011&qkey=8261&state=US>.

10. 10.

CDC (Centers for Disease Control and Prevention). (2009). Differences in prevalence of obesity among black, white, and hispanic adults—United States, 2006–2008. *MMWR: Morbidity and Mortality Weekly Report*, 58(27), 740–744. Retrieved from <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5827a2.htm>.

11. 11.

U.S. Census Bureau. (2000a). *The Arab population: 2000. Census 2000 brief*. Retrieved from http://aems.us/files/US_Census_Data_2000.pdf.

12. 12.

U.S. Census Bureau (n.d.a) *About race*. Retrieved June 10, 2013 from <http://www.census.gov/population/race/about/>.

13. 13.

Kathleen, K. (Ed.). (2008). *Encyclopedia of obesity* (1st ed., pp. 116–117). Los Angeles, CA: Sage Publications. [Google Scholar](#)

14. 14.

Kumaraswamy, P. R. (2003). Problems of Studying Minorities in the Middle East. *Alternatives: Turkish Journal of International Relations*, 2(2), 244–264. [Google Scholar](#)

15. 15.

Al-Hazza, T., & Lucking, R. (2005). The minority of suspicion: Arab Americans. *Multicultural Review*, 14(3), 32–38. [Google Scholar](#)

16. 16.

Arab American National Museum. (n.d.). *Arab Americans-an integral part of American society* [Booklet]. Retrieved June 10, 2013 from http://www.arabamericanmuseum.org/umages/pdfs/resource_booklets/AANM-ArabAmericansBooklet-web.pdf.

17. 17.

CDC (Centers for Disease Control and Prevention). (2005b). *Behavioral Risk Factor Surveillance System Prevalence and Trends Data*. [Graph illustration of overweight and obesity for Michigan in 2005 by race]. Retrieved from <http://apps.nccd.cdc.gov/BRFSS/race.asp?cat=OB&yr=2005&qkey=4409&state=MI>.

18. 18.

CDC (Centers for Disease Control and Prevention). (2005c). Behavioral Risk Factor Surveillance System. *SMART: City and County Data* [Graph illustration of overweight and obesity for the Detroit-Livonia-Dearborn, MI Metropolitan Division in 2005]. Retrieved from <http://apps.nccd.cdc.gov/BRFSS-SMART/MMSARiskChart.asp?yr=2005&MMSA=26&cat=OB&qkey=4409&grp=0>.

19. 19.

U.S. Census Bureau (n.d.b). *State and county quickfacts*. Retrieved June 10, 2013 from <http://quickfacts.census.gov/qfd/states/26/2622000.html>.

20. 20.

U.S. Census Bureau. (2000b). *The white population: 2000. Census 2000 brief*. Retrieved from <http://www.census.gov/prod/2001pubs/c2kbr01-4.pdf>.

21. 21.

Chaldean American Chamber of Commerce. (2008). *The Chaldeans in Metropolitan Detroit-2008 household survey results*. Retrieved from <http://issuu.com/chaldeanchamber/docs/2008chaldeanhouseholdsurvey?mode=window&backgroundColor=%23222222>.

22. 22.

Dallo, F. J., & Borrell, L. N. (2006). Self-reported diabetes and hypertension among Arab Americans in the United States. *Ethnicity and Disease*, 16(3), 699–705.[PubMedGoogle Scholar](#)

23. 23.

Jamil, H., Fakhouri, M., Dallo, F., Templin, T., Khoury, R., & Fakhouri, H. (2008). Disparities in self-reported diabetes mellitus among Arab, Chaldean, and black Americans in Southeast Michigan. *Journal of Immigrant and Minority Health*, 10(5), 397–405. doi: [10.1007/s10903-007-9108-0.PubMedCrossRefGoogle Scholar](#)

24. 24.

Jaber, L. A., Brown, M. B., Hammad, A., Nowak, S. N., Zhu, Q., Ghafoor, A., et al. (2003). Epidemiology of diabetes among Arab Americans. *Diabetes Care*, 26(2), 308–313.[PubMedCrossRefGoogle Scholar](#)

25. 25.

Jamil, H., Raymond, D., Fakhouri, M., Templin, T., Khoury, R., Fakhouri, H., et al. (2011). Self-reported asthma in Chaldeans, Arabs, and African Americans: factors associated with asthma. *Journal of Immigrant and Minority Health*, 13(3), 568–575. doi: [10.1007/s10903-010-9390-0.PubMedCrossRefGoogle Scholar](#)

26. 26.

Jamil, H., Grzybowski, M., Hakim-Larson, J., Fakhouri, M., Sahutoglu, J., Khoury, R., et al. (2008). Factors associated with self-reported depression in Arab, Chaldean, and African Americans. *Ethnicity and Disease*, 18(4), 464–470.[PubMedGoogle Scholar](#)

27. 27.

Jamil, H., Fakhouri, M., Dallo, F., Templin, T., Khoury, R., & Fakhouri, H. (2008). Self-reported heart disease among Arab and Chaldean American women residing in southeast Michigan. *Ethnicity and Disease*, 18(1), 19–25.[PubMedGoogle Scholar](#)

28. 28.

Schwartz, K. L., Kulwicki, A., Weiss, L. K., Fakhouri, H., Sakr, W., Kau, G., et al. (2004). Cancer among Arab Americans in the metropolitan Detroit area. *Ethnicity and Disease*, 14(1), 141–146.[PubMedGoogle Scholar](#)

29. 29.

Gunaid, A. A. (2012). Obesity, overweight and underweight among adults in an urban community in Yemen. *Eastern Mediterranean Health Journal*, 18(12), 1187–1193.[PubMedGoogle Scholar](#)

30. 30.

Haddad, F. G., Brax, H., Zein, E., & Abou, E. H. T. (2006). Obesity and related diseases in a Lebanese medical center. *Le Journal médical libanais. The Lebanese medical journal*, 54(3), 152–155. [PubMedGoogle Scholar](#)

31. 31.

Sabbah, I., Vuitton, D. A., Droubi, N., Sabbah, S., & Mercier, M. (2007). Morbidity and associated factors in rural and urban populations of South Lebanon: A cross-sectional community-based study of self-reported health in 2000. *Tropical Medicine and International Health*, 12(8), 907–919. doi: [10.1111/j.1365-3156.2007.01886.x.PubMedCrossRefGoogle Scholar](#)

32. 32.

Al-Tawil, N. G., Abdulla, M. M., & Abdul Ameer, A. J. (2007). Prevalence of and factors associated with overweight and obesity among a group of Iraqi women. *Eastern Mediterranean Health Journal*, 13(2), 420–429. [PubMedGoogle Scholar](#)

33. 33.

Sibai, A. M., Hwalla, N., Adra, N., & Rahal, B. (2003). Prevalence and covariates of obesity in Lebanon: findings from the first epidemiological study. *Obesity Research*, 11(11), 1353–1361. doi: [10.1038/oby.2003.183.PubMedCrossRefGoogle Scholar](#)

34. 34.

Naja, F., Nasreddine, L., Itani, L., Chamieh, M. C., Adra, N., Sibai, A. M., et al. (2011). Dietary patterns and their association with obesity and sociodemographic factors in a national sample of Lebanese adults. *Public Health Nutrition*, 14(9), 1570–1578. doi: [10.1017/S136898001100070X.PubMedCrossRefGoogle Scholar](#)

35. 35.

Abdul-Rahim, H. F., Abu-Rmeileh, N. M., Husseini, A., Holmboe-Ottesen, G., Jervell, J., & Bjertness, E. (2001). Obesity and selected co-morbidities in an urban Palestinian population. *International Journal of Obesity and Related Metabolic Disorders*, 25(11), 1736–1740. doi: [10.1038/sj.ijo.0801799.PubMedCrossRefGoogle Scholar](#)

36. 36.

Hatahet, W., Khosla, P., & Fungwe, T. V. (2002). Prevalence of risk factors to coronary heart disease in an Arab-American population in southeast Michigan. *International Journal of Food Sciences and Nutrition*, 53(4), 325–335. doi: [10.1080/09637480220138124.PubMedCrossRefGoogle Scholar](#)

37. 37.

Yun, K., Hebrank, K., Graber, L. K., Sullivan, M. C., Chen, I., & Gupta, J. (2012). High prevalence of chronic non-communicable conditions among adult refugees: implications for practice and policy. *Journal of Community Health*, 37(5), 1110–1118. doi: [10.1007/s10900-012-9552-1.PubMedCrossRefGoogle Scholar](#)

38. 38.

CDC (Centers for Disease Control and Prevention). (2005d). *Behavioral Risk Factor Surveillance System Prevalence and Trends Data*. [Graph illustration of health care access/coverage for Michigan in 2005]. Retrieved from <http://apps.nccd.cdc.gov/brfss/display.asp?cat=HC&yr=2005&qkey=880&state=MI>.

39. 39.

U.S. Census Bureau. (2011). *American Community Survey*. Retrieved from http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_11_1YR_S1701&prodType=table.

40. 40.

Koebnick, C., Smith, N., Huang, K., Martinez, M. P., Clancy, H. A., & Kushi, L. H. (2012). The prevalence of obesity and obesity-related health conditions in a large, multiethnic cohort of young adults in California. *Annals of Epidemiology*, 22(9), 609–616. doi: [10.1016/j.annepidem.2012.05.006](https://doi.org/10.1016/j.annepidem.2012.05.006).[PubMedCentralPubMedCrossRefGoogle Scholar](#)

41. 41.

Smith, T. J., Marriott, B. P., Dotson, L., Bathalon, G. P., Funderburk, L., White, A., et al. (2012). Overweight and obesity in military personnel: sociodemographic predictors. *Obesity (Silver Spring)*, 20(7), 1534–1538. doi: [10.1038/oby.2012.25](https://doi.org/10.1038/oby.2012.25).[CrossRefGoogle Scholar](#)

42. 42.

Bleich, S. N., Thorpe, R. J, Jr, Sharif-Harris, H., Fesahazion, R., & Laveist, T. A. (2010). Social context explains race disparities in obesity among women. *Journal of Epidemiology and Community Health*, 64(5), 465–469. doi: [10.1136/jech.2009.096297](https://doi.org/10.1136/jech.2009.096297).[PubMedCentralPubMedCrossRefGoogle Scholar](#)

43. 43.

Link, C. L., & McKinlay, J. B. (2009). Disparities in the prevalence of diabetes: is it race/ethnicity or socioeconomic status? Results from the Boston Area Community Health (BACH) survey. *Ethnicity and Disease*, 19(3), 288–292.[PubMedCentralPubMedGoogle Scholar](#)

44. 44.

Jaber, L. A., Pinelli, N. R., Brown, M. B., Funnell, M. M., Anderson, R., Hammad, A., et al. (2011). Feasibility of group lifestyle intervention for diabetes prevention in Arab Americans. *Diabetes Research and Clinical Practice*, 91(3), 307–315. doi: [10.1016/j.diabres.2010.11.032](https://doi.org/10.1016/j.diabres.2010.11.032).[PubMedCentralPubMedCrossRefGoogle Scholar](#)

45. 45.

CDC (Centers for Disease Control and Prevention) (2005e). *Behavioral Risk Factor Surveillance System Prevalence and Trends Data*. [Graph illustration of health care access/coverage for Michigan in 2005]. Retrieved from <http://apps.nccd.cdc.gov/brfss/display.asp?cat=HC&yr=2005&qkey=880&state=MI>.

CDC (Centers for Disease Control and Prevention). (2011b). *Behavioral Risk Factor Surveillance System Prevalence and Trends Data*. [Graph illustration of health care access/coverage for Michigan in 2011]. Retrieved from <http://apps.nccd.cdc.gov/brfss/display.asp?yr=2011&state=MI&qkey=8031&grp=0&SUBMIT3=Go>.

Garrison, R. J., Kannel, W. B., Stokes, J. I. I., & Castelli, W. P. (1987). Incidence and precursors of hypertension in young adults: The Framingham Offspring Study. *Preventive Medicine*, 16, 235–251. [PubMedCrossRefGoogle Scholar](#)

Donahue, R., Bloom, E., Abbott, R., Reed, D., & Yano, K. (1987). Central obesity and coronary heart disease in men. *The Lancet*, 329(8537), 821–824. [CrossRefGoogle Scholar](#)

Nyholm, M., Gullberg, B., Merlo, J., Lundqvist-Persson, C., Rastam, L., & Lindblad, U. (2007). The validity of obesity based on self-reported weight and height: Implications for population studies. *Obesity (Silver Spring)*, 15(1), 197–208. doi: [10.1038/oby.2007.536](https://doi.org/10.1038/oby.2007.536). [CrossRefGoogle Scholar](#)

Wen, M., & Kowaleski-Jones, L. (2012). Sex and ethnic differences in validity of self-reported adult height, weight and body mass index. *Ethnicity and Disease*, 22(1), 72–78. [PubMedCentralPubMedGoogle Scholar](#)

References

Haidar, Y. M., & Cosman, B. C. (2011). Obesity epidemiology. *Clinics in Colon and Rectal Surgery*, 24(4), 205–210. doi: [10.1055/s-0031-1295684](https://doi.org/10.1055/s-0031-1295684). [PubMedCentralPubMedCrossRefGoogle Scholar](#)

Haslam, D. W., & James, W. P. (2005). Obesity. *Lancet*, 366(9492), 1197–1209. doi: [10.1016/S0140-6736\(05\)67483-1](https://doi.org/10.1016/S0140-6736(05)67483-1). [PubMedCrossRefGoogle Scholar](#)

Madan, J. C., Davis, J. M., Craig, W. Y., Collins, M., Allan, W., Quinn, R., et al. (2009). Maternal obesity and markers of inflammation in pregnancy. *Cytokine*, 47(1), 61–64. doi: [10.1016/j.cyto.2009.05.004](https://doi.org/10.1016/j.cyto.2009.05.004). [PubMedCrossRefGoogle Scholar](#)

4. 4.

Wang, Y., Beydoun, M. A., Liang, L., Caballero, B., & Kumanyika, S. K. (2008). Will all Americans become overweight or obese? Estimating the progression and cost of the US obesity epidemic. *Obesity (Silver Spring)*, 16(10), 2323–2330. doi: [10.1038/oby.2008.351](https://doi.org/10.1038/oby.2008.351).[CrossRefGoogle Scholar](#)

5. 5.

Whitlock, G., Lewington, S., Sherliker, P., Clarke, R., Emberson, J., Halsey, J., et al. (2009). Body-mass index and cause-specific mortality in 900 000 adults: Collaborative analyses of 57 prospective studies. *Lancet*, 373(9669), 1083–1096. doi: [10.1016/S0140-6736\(09\)60318-4](https://doi.org/10.1016/S0140-6736(09)60318-4).[PubMedCrossRefGoogle Scholar](#)

6. 6.

CDC (Centers for Disease Control and Prevention). (2005a). *Behavioral Risk Factor Surveillance System Prevalence and Trends Data*. [Graph illustration of overweight and obesity for Michigan in 2005]. Retrieved from <http://apps.nccd.cdc.gov/BRFSS/display.asp?state=MI&cat=OB&yr=2005&qkey=4409&grp=0&SUBMIT4=Go>.

7. 7.

Paeratakul, S., Lovejoy, J. C., Ryan, D. H., & Bray, G. A. (2002). The relation of gender, race and socioeconomic status to obesity and obesity comorbidities in a sample of US adults. *International Journal of Obesity and Related Metabolic Disorders*, 26(9), 1205–1210. doi: [10.1038/sj.ijo.0802026](https://doi.org/10.1038/sj.ijo.0802026).[PubMedCrossRefGoogle Scholar](#)

8. 8.

Bowie, J. V., Juon, H. S., Cho, J., & Rodriguez, E. M. (2007). Factors associated with overweight and obesity among Mexican Americans and Central Americans: Results from the 2001 California Health Interview Survey. *Preventing Chronic Disease*, 4(1), A10.[PubMedCentralPubMedGoogle Scholar](#)

9. 9.

CDC (Centers for Disease Control and Prevention). (2011a). *Behavioral Risk Factor Surveillance System Prevalence and Trends Data*. [Graph illustration of overweight and obesity for the US in 2011 by race]. Retrieved from <http://apps.nccd.cdc.gov/BRFSS/race.asp?cat=OB&yr=2011&qkey=8261&state=US>.

10. 10.

CDC (Centers for Disease Control and Prevention). (2009). Differences in prevalence of obesity among black, white, and hispanic adults—United States, 2006–2008. *MMWR: Morbidity and Mortality Weekly Report*, 58(27), 740–744. Retrieved from <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5827a2.htm>.

11. 11.

U.S. Census Bureau. (2000a). *The Arab population: 2000. Census 2000 brief*. Retrieved from http://aems.us/files/US_Census_Data_2000.pdf.

12. 12.

U.S. Census Bureau (n.d.a) *About race*. Retrieved June 10, 2013 from <http://www.census.gov/population/race/about/>.

13. 13.

Kathleen, K. (Ed.). (2008). *Encyclopedia of obesity* (1st ed., pp. 116–117). Los Angeles, CA: Sage Publications.[Google Scholar](#)

14. 14.

Kumaraswamy, P. R. (2003). Problems of Studying Minorities in the Middle East. *Alternatives: Turkish Journal of International Relations*, 2(2), 244–264.[Google Scholar](#)

15. 15.

Al-Hazza, T., & Lucking, R. (2005). The minority of suspicion: Arab Americans. *Multicultural Review*, 14(3), 32–38.[Google Scholar](#)

16. 16.

Arab American National Museum. (n.d.). *Arab Americans-an integral part of American society* [Booklet]. Retrieved June 10, 2013 from http://www.arabamericanmuseum.org/umages/pdfs/resource_booklets/AANM-ArabAmericansBooklet-web.pdf.

17. 17.

CDC (Centers for Disease Control and Prevention). (2005b). *Behavioral Risk Factor Surveillance System Prevalence and Trends Data*. [Graph illustration of overweight and obesity for Michigan in 2005 by race]. Retrieved from <http://apps.nccd.cdc.gov/BRFSS/race.asp?cat=OB&yr=2005&qkey=4409&state=MI>.

18. 18.

CDC (Centers for Disease Control and Prevention). (2005c). Behavioral Risk Factor Surveillance System. *SMART: City and County Data* [Graph illustration of overweight and obesity for the Detroit-Livonia-Dearborn, MI Metropolitan Division in 2005]. Retrieved from <http://apps.nccd.cdc.gov/BRFSS-SMART/MMSARiskChart.asp?yr=2005&MMSA=26&cat=OB&qkey=4409&grp=0>.

19. 19.

U.S. Census Bureau (n.d.b). *State and county quickfacts*. Retrieved June 10, 2013 from <http://quickfacts.census.gov/qfd/states/26/2622000.html>.

20. 20.

U.S. Census Bureau. (2000b). *The white population: 2000. Census 2000 brief*. Retrieved from <http://www.census.gov/prod/2001pubs/c2kbr01-4.pdf>.

21. 21.

Chaldean American Chamber of Commerce. (2008). *The Chaldeans in Metropolitan Detroit-2008 household survey results*. Retrieved from <http://issuu.com/chaldeanchamber/docs/2008chaldeanhouseholdsurvey?mode=window&backgroundColor=%23222222>.

22. 22.

Dallo, F. J., & Borrell, L. N. (2006). Self-reported diabetes and hypertension among Arab Americans in the United States. *Ethnicity and Disease*, 16(3), 699–705. [PubMedGoogle Scholar](#)

23. 23.

Jamil, H., Fakhouri, M., Dallo, F., Templin, T., Khoury, R., & Fakhouri, H. (2008). Disparities in self-reported diabetes mellitus among Arab, Chaldean, and black Americans in Southeast Michigan. *Journal of Immigrant and Minority Health*, 10(5), 397–405. doi: [10.1007/s10903-007-9108-0](https://doi.org/10.1007/s10903-007-9108-0). [PubMedCrossRefGoogle Scholar](#)

24. 24.

Jaber, L. A., Brown, M. B., Hammad, A., Nowak, S. N., Zhu, Q., Ghafoor, A., et al. (2003). Epidemiology of diabetes among Arab Americans. *Diabetes Care*, 26(2), 308–313. [PubMedCrossRefGoogle Scholar](#)

25. 25.

Jamil, H., Raymond, D., Fakhouri, M., Templin, T., Khoury, R., Fakhouri, H., et al. (2011). Self-reported asthma in Chaldeans, Arabs, and African Americans: factors associated with asthma. *Journal of Immigrant and Minority Health*, 13(3), 568–575. doi: [10.1007/s10903-010-9390-0](https://doi.org/10.1007/s10903-010-9390-0). [PubMedCrossRefGoogle Scholar](#)

26. 26.

Jamil, H., Grzybowski, M., Hakim-Larson, J., Fakhouri, M., Sahutoglu, J., Khoury, R., et al. (2008). Factors associated with self-reported depression in Arab, Chaldean, and African Americans. *Ethnicity and Disease*, 18(4), 464–470. [PubMedGoogle Scholar](#)

27. 27.

Jamil, H., Fakhouri, M., Dallo, F., Templin, T., Khoury, R., & Fakhouri, H. (2008). Self-reported heart disease among Arab and Chaldean American women residing in southeast Michigan. *Ethnicity and Disease*, 18(1), 19–25. [PubMedGoogle Scholar](#)

28. 28.

Schwartz, K. L., Kulwicki, A., Weiss, L. K., Fakhouri, H., Sakr, W., Kau, G., et al. (2004). Cancer among Arab Americans in the metropolitan Detroit area. *Ethnicity and Disease*, 14(1), 141–146. [PubMedGoogle Scholar](#)

Gunaïd, A. A. (2012). Obesity, overweight and underweight among adults in an urban community in Yemen. *Eastern Mediterranean Health Journal*, 18(12), 1187–1193. [PubMedGoogle Scholar](#)

Haddad, F. G., Brax, H., Zein, E., & Abou, E. H. T. (2006). Obesity and related diseases in a Lebanese medical center. *Le Journal médical libanais. The Lebanese medical journal*, 54(3), 152–155. [PubMedGoogle Scholar](#)

Sabbah, I., Vuitton, D. A., Droubi, N., Sabbah, S., & Mercier, M. (2007). Morbidity and associated factors in rural and urban populations of South Lebanon: A cross-sectional community-based study of self-reported health in 2000. *Tropical Medicine and International Health*, 12(8), 907–919. doi: [10.1111/j.1365-3156.2007.01886.x](#). [PubMedCrossRefGoogle Scholar](#)

Al-Tawil, N. G., Abdulla, M. M., & Abdul Ameer, A. J. (2007). Prevalence of and factors associated with overweight and obesity among a group of Iraqi women. *Eastern Mediterranean Health Journal*, 13(2), 420–429. [PubMedGoogle Scholar](#)

Sibai, A. M., Hwalla, N., Adra, N., & Rahal, B. (2003). Prevalence and covariates of obesity in Lebanon: findings from the first epidemiological study. *Obesity Research*, 11(11), 1353–1361. doi: [10.1038/oby.2003.183](#). [PubMedCrossRefGoogle Scholar](#)

Naja, F., Nasreddine, L., Itani, L., Chamieh, M. C., Adra, N., Sibai, A. M., et al. (2011). Dietary patterns and their association with obesity and sociodemographic factors in a national sample of Lebanese adults. *Public Health Nutrition*, 14(9), 1570–1578. doi: [10.1017/S136898001100070X](#). [PubMedCrossRefGoogle Scholar](#)

Abdul-Rahim, H. F., Abu-Rmeileh, N. M., Hussein, A., Holmboe-Ottesen, G., Jervell, J., & Bjertness, E. (2001). Obesity and selected co-morbidities in an urban Palestinian population. *International Journal of Obesity and Related Metabolic Disorders*, 25(11), 1736–1740. doi: [10.1038/sj.ijo.0801799](#). [PubMedCrossRefGoogle Scholar](#)

Hatahet, W., Khosla, P., & Fungwe, T. V. (2002). Prevalence of risk factors to coronary heart disease in an Arab-American population in southeast Michigan. *International Journal of Food Sciences and Nutrition*, 53(4), 325–335. doi: [10.1080/09637480220138124](#). [PubMedCrossRefGoogle Scholar](#)

Yun, K., Hebrank, K., Graber, L. K., Sullivan, M. C., Chen, I., & Gupta, J. (2012). High prevalence of chronic non-communicable conditions among adult refugees: implications for practice and policy. *Journal of Community Health*, 37(5), 1110–1118. doi: [10.1007/s10900-012-9552-1](https://doi.org/10.1007/s10900-012-9552-1).[PubMedCrossRefGoogle Scholar](#)

CDC (Centers for Disease Control and Prevention). (2005d). *Behavioral Risk Factor Surveillance System Prevalence and Trends Data*. [Graph illustration of health care access/coverage for Michigan in 2005]. Retrieved from <http://apps.nccd.cdc.gov/brfss/display.asp?cat=HC&yr=2005&qkey=880&state=MI>.

U.S. Census Bureau. (2011). *American Community Survey*. Retrieved from http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_11_1YR_S1701&prodType=table.

Koebnick, C., Smith, N., Huang, K., Martinez, M. P., Clancy, H. A., & Kushi, L. H. (2012). The prevalence of obesity and obesity-related health conditions in a large, multiethnic cohort of young adults in California. *Annals of Epidemiology*, 22(9), 609–616. doi: [10.1016/j.annepidem.2012.05.006](https://doi.org/10.1016/j.annepidem.2012.05.006).[PubMedCentralPubMedCrossRefGoogle Scholar](#)

Smith, T. J., Marriott, B. P., Dotson, L., Bathalon, G. P., Funderburk, L., White, A., et al. (2012). Overweight and obesity in military personnel: sociodemographic predictors. *Obesity (Silver Spring)*, 20(7), 1534–1538. doi: [10.1038/oby.2012.25](https://doi.org/10.1038/oby.2012.25).[CrossRefGoogle Scholar](#)

Bleich, S. N., Thorpe, R. J, Jr, Sharif-Harris, H., Fesahazion, R., & Laveist, T. A. (2010). Social context explains race disparities in obesity among women. *Journal of Epidemiology and Community Health*, 64(5), 465–469. doi: [10.1136/jech.2009.096297](https://doi.org/10.1136/jech.2009.096297).[PubMedCentralPubMedCrossRefGoogle Scholar](#)

Link, C. L., & McKinlay, J. B. (2009). Disparities in the prevalence of diabetes: is it race/ethnicity or socioeconomic status? Results from the Boston Area Community Health (BACH) survey. *Ethnicity and Disease*, 19(3), 288–292.[PubMedCentralPubMedGoogle Scholar](#)

Jaber, L. A., Pinelli, N. R., Brown, M. B., Funnell, M. M., Anderson, R., Hammad, A., et al. (2011). Feasibility of group lifestyle intervention for diabetes prevention in Arab Americans. *Diabetes Research and Clinical Practice*, 91(3), 307–315.
doi: [10.1016/j.diabres.2010.11.032](https://doi.org/10.1016/j.diabres.2010.11.032).[PubMedCentralPubMedCrossRefGoogle Scholar](#)

45. 45.

CDC (Centers for Disease Control and Prevention) (2005e). *Behavioral Risk Factor Surveillance System Prevalence and Trends Data*. [Graph illustration of health care access/coverage for Michigan in 2005]. Retrieved from <http://apps.nccd.cdc.gov/brfss/display.asp?cat=HC&yr=2005&qkey=880&state=MI>.

46. 46.

CDC (Centers for Disease Control and Prevention). (2011b). *Behavioral Risk Factor Surveillance System Prevalence and Trends Data*. [Graph illustration of health care access/coverage for Michigan in 2011]. Retrieved from <http://apps.nccd.cdc.gov/brfss/display.asp?yr=2011&state=MI&qkey=8031&grp=0&SUBMIT3=Go>.

47. 47.

Garrison, R. J., Kannel, W. B., Stokes, J, I. I. I., & Castelli, W. P. (1987). Incidence and precursors of hypertension in young adults: The Framingham Offspring Study. *Preventive Medicine*, 16, 235–251.[PubMedCrossRefGoogle Scholar](#)

48. 48.

Donahue, R., Bloom, E., Abbott, R., Reed, D., & Yano, K. (1987). Central obesity and coronary heart disease in men. *The Lancet*, 329(8537), 821–824.[CrossRefGoogle Scholar](#)

49. 49.

Nyholm, M., Gullberg, B., Merlo, J., Lundqvist-Persson, C., Rastam, L., & Lindblad, U. (2007). The validity of obesity based on self-reported weight and height: Implications for population studies. *Obesity (Silver Spring)*, 15(1), 197–208.
doi: [10.1038/oby.2007.536](https://doi.org/10.1038/oby.2007.536).[CrossRefGoogle Scholar](#)

50. 50.

Wen, M., & Kowaleski-Jones, L. (2012). Sex and ethnic differences in validity of self-reported adult height, weight and body mass index. *Ethnicity and Disease*, 22(1), 72–78.[PubMedCentralPubMedGoogle Scholar](#)