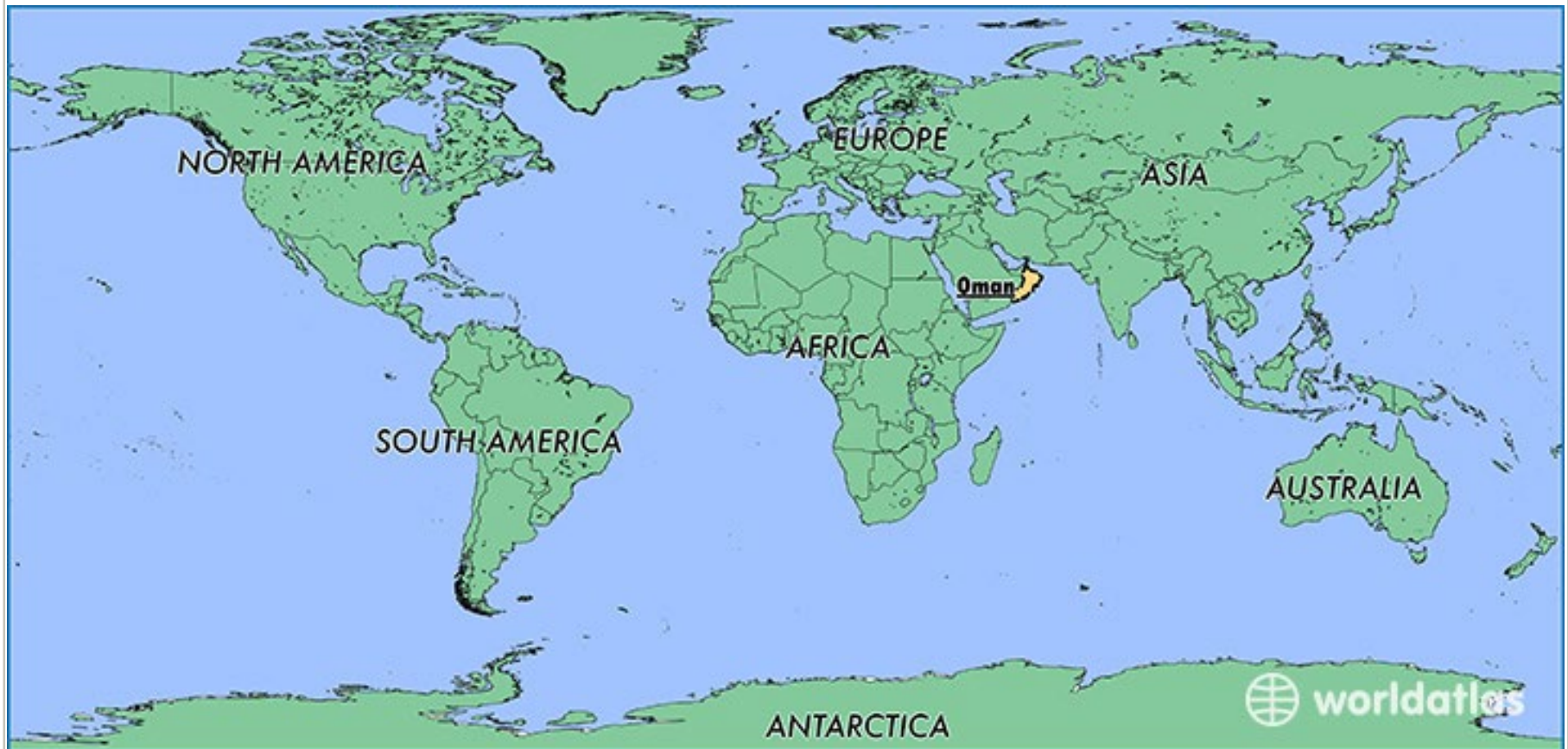


The Influence of the Family on Childhood Obesity in Oman

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Where is Oman?



Research Team

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Topics

- Introduction
- Methods
- Results
- Conclusion
- Future research and implications
- Limitations

Introduction

Why Childhood Obesity?

- Tracks into adulthood¹⁻³
- Decreases children's physical and psychosocial well-being^{1,3-7}
- Economic burden (0.7% to 2.8% of healthcare costs)⁸
- Worldwide (1980-2013): Increased by 47.1%⁹
- Oman (2012-2015): Increased 3.5% to 4.8% (1st), 12.8% to 15.5% (7th), 12.5% to 17.2% (10th)^{10,11}

Definition

- Abnormal or excessive adiposity accumulation³
- In children, BMI values are converted into percentiles or z-scores¹²
- CDC growth 2000 reference for children and adolescents age 2-19 years¹³
- 2007 WHO growth charts for children and adolescents age 5-19 years¹⁴

Etiology

Genetic

- Variations in fat mass and obesity-associated (FTO) gene¹⁵

Perinatal and postnatal

- Maternal & perinatal obesity, smoking, formula, cesarean section delivery, antibiotics during pregnancy & early in infant's life¹⁶⁻²⁰

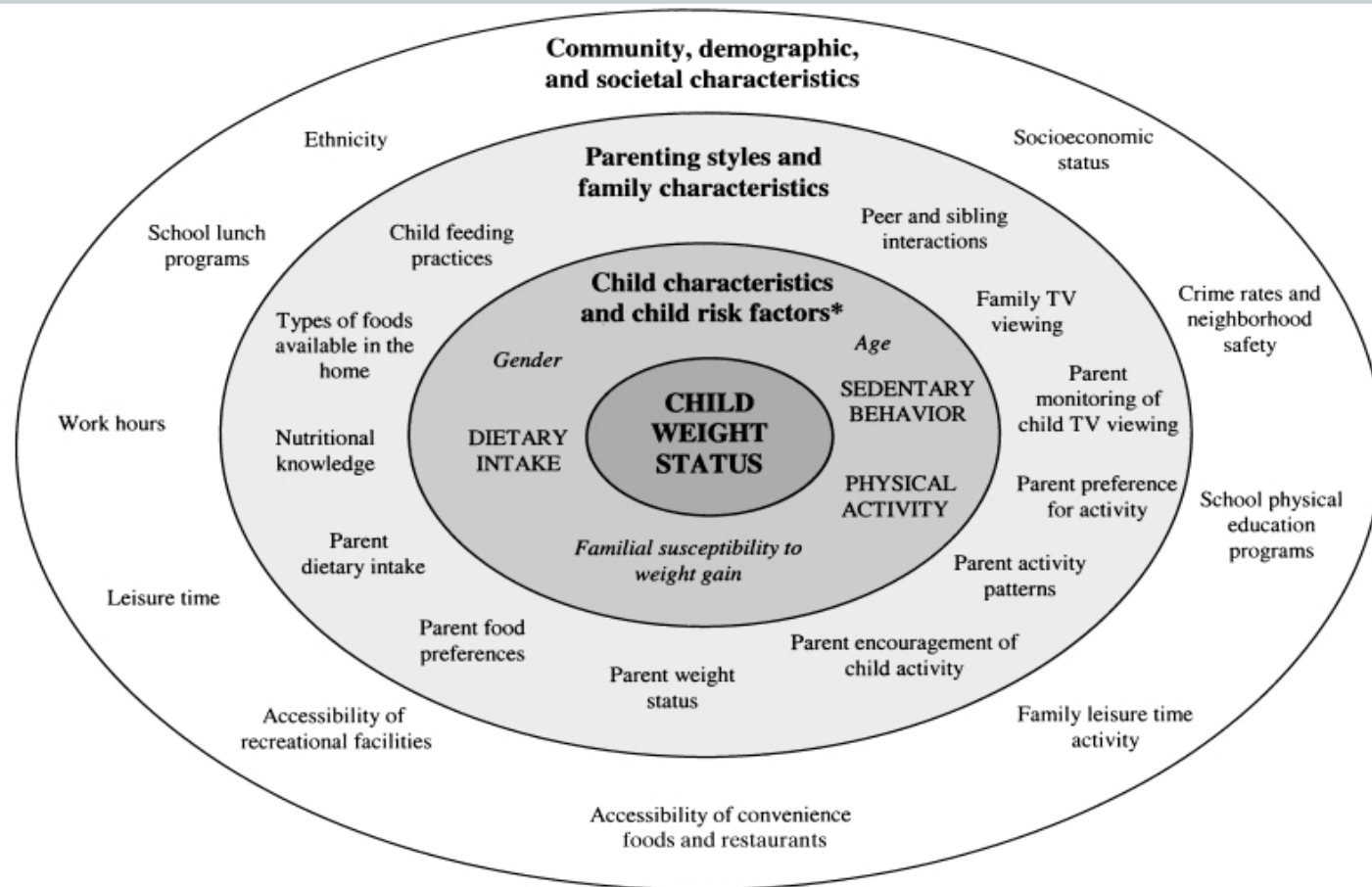
Environmental factors

- The imbalance between energy intake and energy expenditure^{21,22}
- A shift from a traditional healthy lifestyle into a less healthy lifestyle (urbanization²²⁻²⁶, social²⁷⁻²⁸)

Review of Literature

- Three main types of childhood obesity risk factors were identified (individual, familial, and lifestyle behavioral factors)
- No studies have examined the socio-demographic and/or behavioral family factors influencing childhood obesity in Oman
- There remains controversial Gulf Cooperation Council (GCC) countries literature related to the relationship between familial factors and childhood obesity

Conceptual Framework



Davison and Birch (2001) ecological model of predictors of childhood overweight

Purpose

Examine the relationship between the **BMI z- score** of 1st to 4th grade Omani children and maternal BMI, parental educational level, parental working status, family income, and family nutrition and physical activity patterns

Methods

Design

- A quantitative research design (cross-sectional)
 - Anthropometrics, self-reported questionnaire
 - Ethically approved
1. Institutional Review Board (IRB) at the University of North Carolina at Chapel Hill, North Carolina, United States
 2. The research ethical committee at the Technical Office for Research and Development at the Ministry of Education in Oman

Participants

- 204 dyads (mother with a child)
- Convenience sample
- Mothers consented and children assented
- Children's mean age was 7.74 years (± 1.161)
- 52.6% were female

Anthropometrics

- **Weight (kg):** SECA 877 Class III. Measured twice, nearest 0.01 kg, minimal clothing
- **Height (cm):** SECA 213. Measured twice, nearest 0.1 cm, rear position, no shoes or head cap



Self-reported Questionnaire

Arabic Version of Family Nutrition and Physical Activity (FNPA) Behaviorally Anchored Rating (BAR) Scale

- 10 items Likert scale
- Scores: 10 to 40
- Higher scores healthier choice
- Acceptable reliability ($r = .80$, Cronbach's $\alpha = .58-.59$) and content validity among 25 Arab mothers of children aged 6 - 12 years²⁹

Continued..

Variables tested:

1. Family meals
2. Family eating practices
3. Food choices
4. Beverage choices
5. Restriction/reward
6. Screen time
7. Healthy environment
8. Family activity
9. Child activity
10. Family schedule/sleep routine

FNPA Behaviorally Anchored Rating (BAR) Scales

	1	2	3	4
1 .	My child rarely eats breakfast and we don't typically eat together as a family.	My child does not regularly eat breakfast but we eat together as a family on most days of the week	My child eats breakfast on most days but we don't typically eat together as a family.	My child eats breakfast on most days and we typically eat together as a family.
2 .	Our family regularly eats fast food and we tend to snack between meals on a regular basis and eat while watching TV.	Our family regularly eats fast food but we don't snack much between meals or eat while watching TV.	Our family rarely eats fast food but we tend to snack between meals and eat while watching TV.	Our family rarely eats fast food and we don't snack much between meals or eat while watching TV.

Data Collection

- December 11th , 2017 – January 24th , 2018 , Monday through Thursday (2 day intervals)
- 3 research assistants (RA's): Baccalaureate degree in nutrition
- Invitation message (WhatsApp)/ letters through school children
- 5 provinces in Oman (Al-Seeb, Bawsher, Bidbid, Nizwa, and Ibra)
- 3 settings: Public “cycle one” schools (n=5), female community centers (n=7), homes (n=6)
- Incentives: symbolic gift/ stationary tool

Consent and assent



Refreshments and incentives



Questionnaire



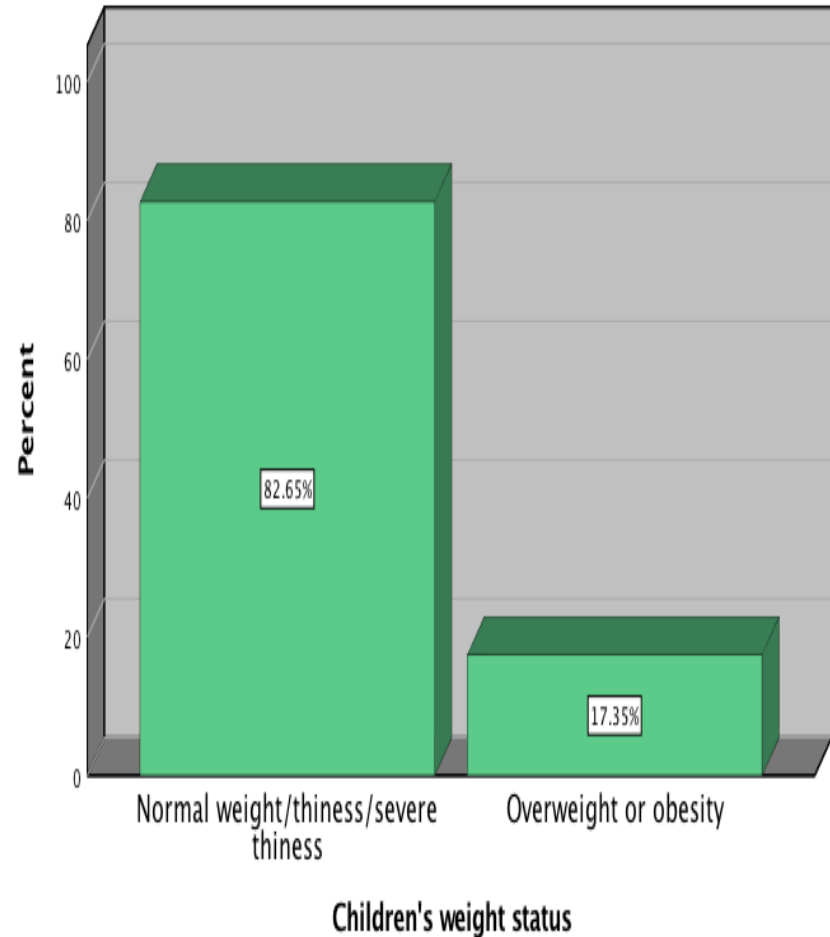
Data Analysis

- IBM SPSS statistics (version 25)
- 197 dyads included in analysis
- .05 significance level
- Categorical variables → Binary variables
- Univariate, bivariate (correlations, independent t-test, chi-square), and regression (linear multiple & binary logistic) analysis

Results

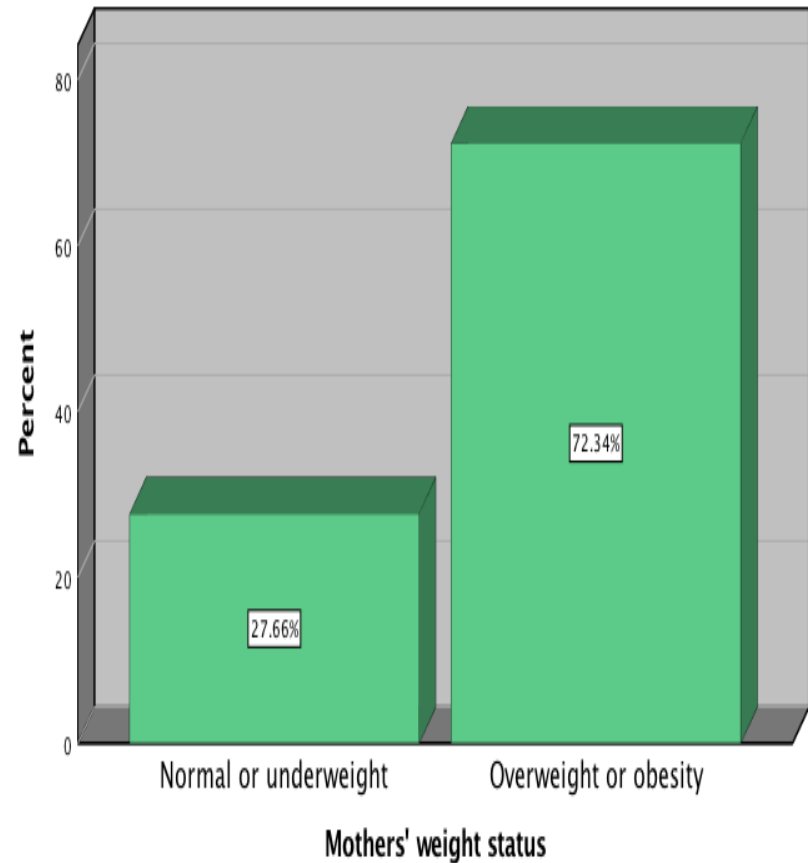
Children's BMI z-scores (n = 196)

- Range = -5.72 - 3.87
- Mean = -.22 (± 1.47)
- 17.4% of children were classified as overweight or obese based on 2007 WHO growth charts¹⁴
- Saudi Arabia: 20.7%³⁰,
Emirates: 16.5%²⁶ based on IOTF



Mothers' BMI (n = 188)

- Range = 16.13 - 44.42
- Mean = 28.71 (± 5.52)
- 72.3% of mothers were classified as overweight or obese based on WHO international classification of adult weight category³⁵⁻³⁷
- 62.6% Omani adults were overweight or obese³¹



Family Characteristics

Family characteristics	Statistics
Married parents	▪ 98.5%
Parental education level	▪ 35.2% mothers hold a bachelors degree or higher ▪ 46.9% fathers hold a bachelors degree or higher
Parental working status	▪ 44.9% mothers were working ▪ 93.3% fathers were working
Family income	▪ 52.8% > 1000 OMR/month
FNPA score	▪ 33.3 (SD \pm 3.6)

**Relationship Between the BMI z- scores of 1st
to 4th Grade Omani children and Maternal
BMI, Parental Educational Level, Parental
Working Status, Family Income, and Family
Nutrition and Physical Activity Patterns**

Maternal BMI

	Bivariate Analysis	Regression Analysis
Maternal BMI	Maternal BMI positively associated with BMI z-scores ($p = .001$) and overweight or obesity ($p = .001$)	One unit increase in maternal BMI was a significant predictor for <u>increase</u> in BMI z-score ($p = .001$) and <u>more</u> overweight or obesity among children ($p = .001$)

Maternal BMI..continued

- Significant ($p < .001$) association between maternal BMI and children's BMI percentile³²
- Mothers with overweight or obesity was identified as one of the significant risk factor to childhood obesity ($p < 0.0001$)³³
- Genetic link
- ? socioeconomic and environmental factors

Parental Education Level

	Bivariate Analysis	Regression Analysis
Mothers' education level	Children of mothers with higher education level had <u>higher</u> BMI z-scores ($p = .02$) and overweight or obesity percentage ($p = .006$)	Mothers' higher education level was a significant predictor for <u>increase</u> in BMI z-score ($p = .02$) and <u>more</u> overweight or obesity among children ($p = .02$)
Fathers' education level	Children of fathers with higher education level had <u>higher</u> BMI z-scores ($p = .02$)	-

Parental Education Level

..continued

- 4,752 children from 12 countries, a positive relationship between maternal education level and children overweight in Colombia and Kenya and a negative relationship between paternal education level and children overweight in countries such as Brazil and the U.S.³⁴
- ? moderated by social or cultural factors

Parental Working Status

Family Factor	Bivariate Analysis	Regression Analysis
Mothers' working status	-	-
Fathers' working status	-	-

- No significant relationship between maternal employment status and children's overweight and obesity status³⁵

Family Income

Family Factor	Bivariate Analysis	Regression Analysis
Family income	-	-

- Mixed findings in the GCC literature^{30,32,40-41}
- Family income has been linked to childhood obesity in the GCC region²⁷
- In U.S., children from low-income families are more susceptible to obesity than children from high-income families³⁶

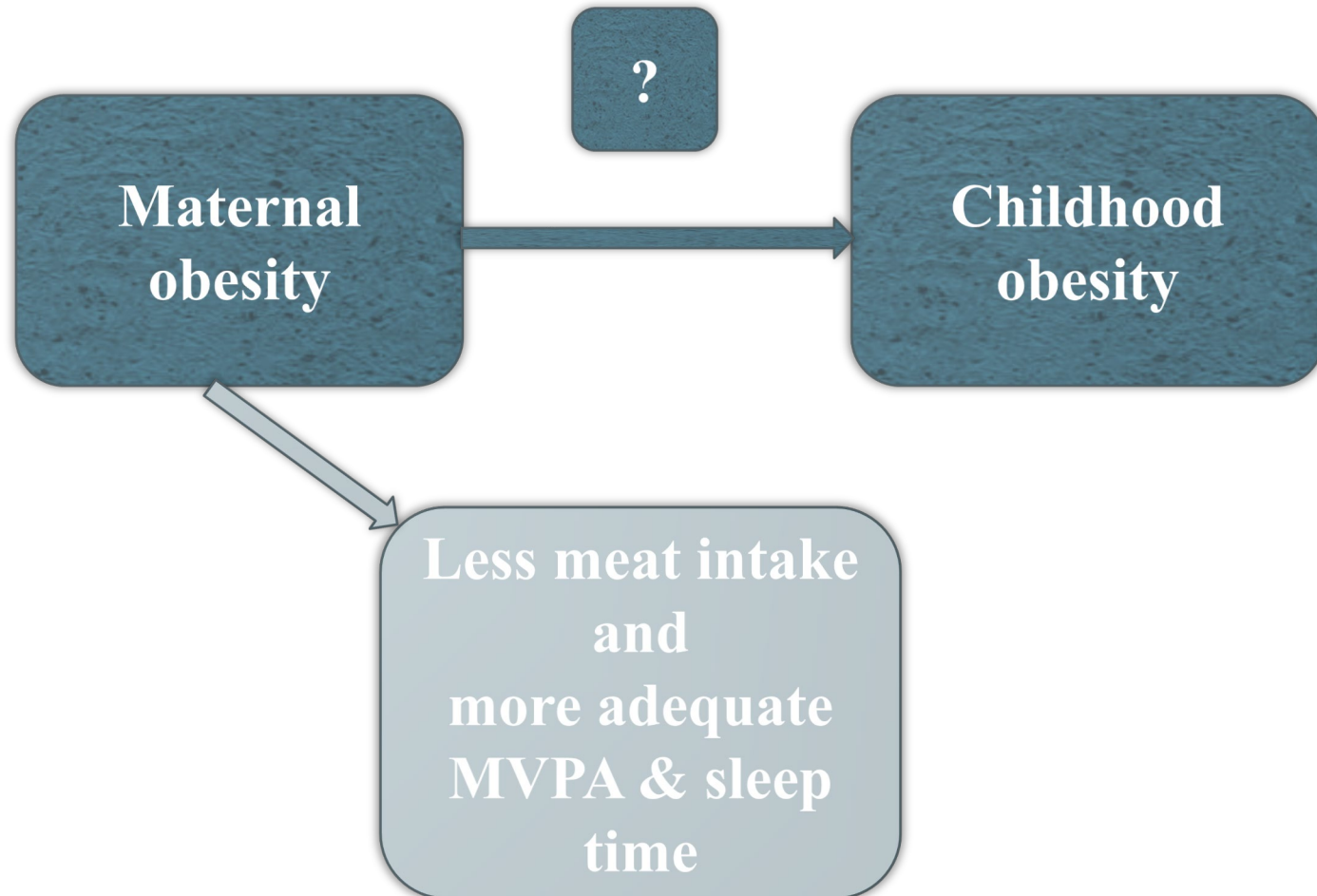
Family Nutrition and Physical Activity Pattern

	Bivariate Analysis	Regression Analysis
FNPA score	-	-

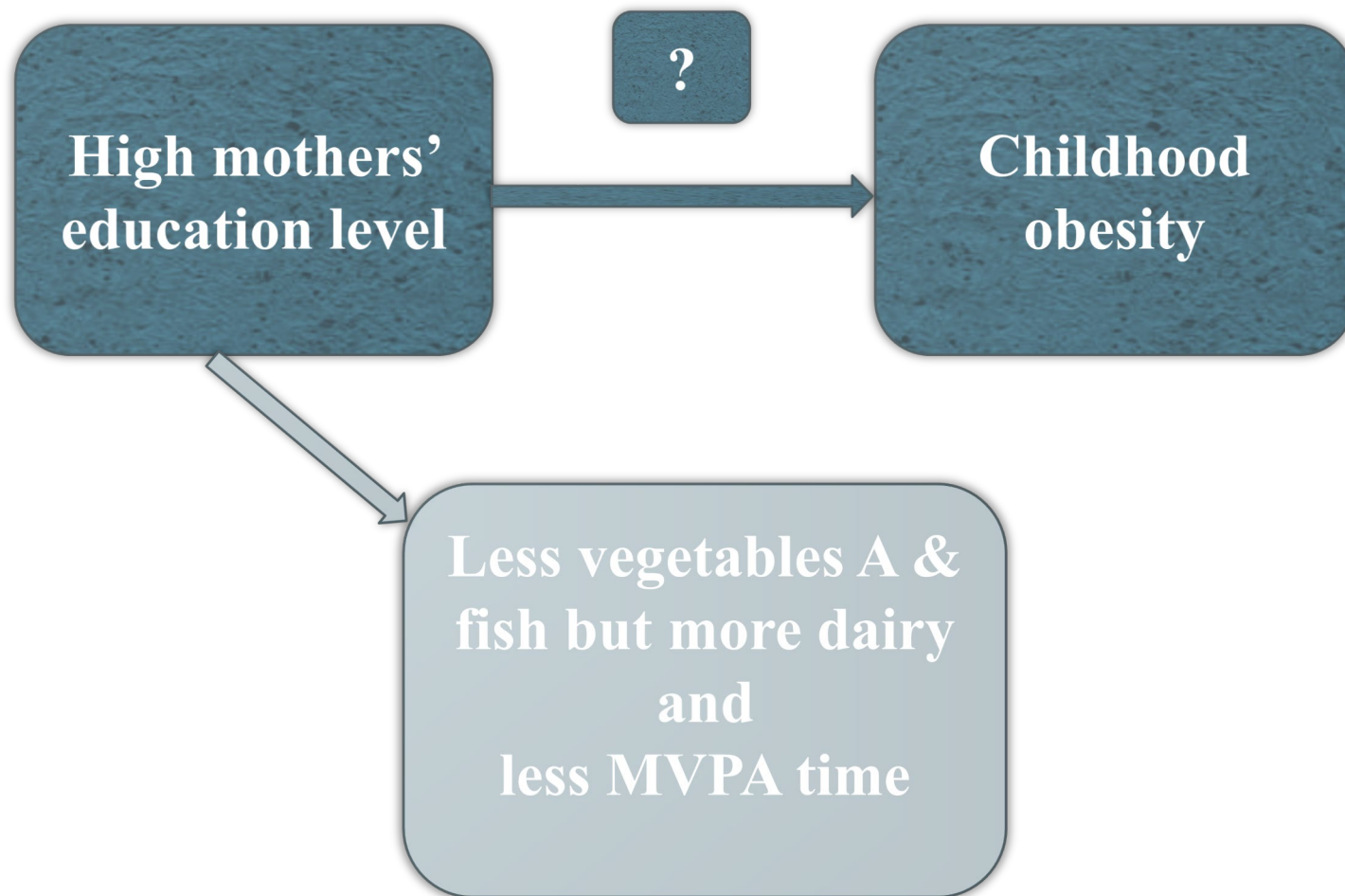
- Home physical activity environment negatively associated with children's BMI ($p < 0.001$), while the home diet environment was not significantly associated with children's BMI³⁷
- Researchers from the U.S. examined the association between the FNPA and childhood obesity with two different groups during two different periods and found inconsistent data³⁸⁻³⁹
- ? moderated by cultural and environmental factors

Conclusion

How Childhood Obesity is Influenced by Family?



How Childhood Obesity is Influenced by Family?



Future Research

- Poor association between family nutrition and physical activity patterns and childhood obesity ?FNPA

Future: culturally tailored assessment tools

- A strong links between childhood obesity and maternal obesity and mothers' education level were found in this study

Future: Intervention study involving children's mothers

- This study examined childhood obesity from the family level

Future: Examine childhood obesity from the community level and how family characteristics are influenced by the community

Policy Implications

- Regular comprehensive health care and follow-up with families actively involved is needed
- Investing in preventive health care services through well-structured and scientific-based **school-health programs** holds promise in promoting children's general health

Limitations

- Limited generalizability
- Self-reported questionnaire ?added bias

References

1. Kelsey, M. M., Zaepfel, A., Bjornstad, P., & Nadeau, K. J. (2014). Age-related consequences of childhood obesity. *Gerontology*, 60(3), 222-228. doi:10.1159/000356023
2. Li, S., Chen, W., Sun, D., Fernandez, C., Li, J., Kelly, T., . . . Whelton, P. K. (2015). Variability and rapid increase in body mass index during childhood are associated with adult obesity. *Int J Epidemiol*, 44(6), 1943-1950. doi:10.1093/ije/dyv202
3. World Health Organization. (2014). *Facts and figures on childhood obesity*. Retrieved on December 14th 2015 from <http://www.who.int/end-childhood-obesity/facts/en/>
4. ÖNSÜZ, F. M., & Demir, F. (2015). Prevalence of hypertension and its association with obesity among schoolchildren aged 6-15 living in Sakarya Province in Turkey. *Turkish journal of medical sciences*, 45(4), 907-912.
5. Park, M., Falconer, C., Viner, R. a., & Kinra, S. (2012). The impact of childhood obesity on morbidity and mortality in adulthood: a systematic review. *Obesity reviews*, 13(11), 985-1000. doi: 10.1111/j.1467-789X.2012.01015.x.
6. Pulgaron, E. R. (2013). Childhood obesity: a review of increased risk for physical and psychological comorbidities. *Clin Ther*, 35(1), A18-32. doi:10.1016/j.clinthera.2012.12.014
7. Sahoo, K., Sahoo, B., Choudhury, A. K., Sofi, N. Y., Kumar, R., & Bhadoria, A. S. (2015). Childhood obesity: causes and consequences. *J Family Med Prim Care*, 4(2), 187-192. doi:10.4103/2249-4863.154628
8. Withrow, D., & Alter, D. (2011). The economic burden of obesity worldwide: a systematic review of the direct costs of obesity. *Obesity reviews*, 12(2), 131-141. doi: 10.1111/j.1467-789X.2009.00712.x.
9. Ng, M., Fleming, T., Robinson, M., Thomson, B., Graetz, N., Margono, C., . . . Abera, S. F. (2014). Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013. *The lancet*, 384(9945), 766-781. [https://doi.org/10.1016/S0140-6736\(14\)60460-8](https://doi.org/10.1016/S0140-6736(14)60460-8)
9. Ministry of Health, Oman. (2012). *Oman Health Annual Report (Health Domain, Chapter Eight)*. Retrieved from <https://www.moh.gov.om/documents/274609/275098/CH08Y12.pdf/1156f97d-e9e3-40f3-84ec-a9004c264c11>
10. Ministry of Health, Oman. (2015b). *Oman Health Annual Report (Health Domain, Chapter Eight)*. Retrieved from <https://www.moh.gov.om/documents/274609/275102/CH08Y13.pdf/e9e79527-9c65-471c-9b07-8e7951e19830>
11. Flegal, K. M., & Ogden, C. L. (2011). Childhood Obesity: Are We All Speaking the Same Language? *Advances in Nutrition: An International Review Journal*, 2(2), 159S-166S. doi:10.3945/an.111.000307

12. Kuczmarski, R. J., Ogden, C. L., Grummer-Strawn, L. M., Flegal, K. M., Guo, S. S., Wei, R., . . . Johnson, C. L. (2000). CDC growth charts: United States. *Adv Data* (314), 1-27.
13. de Onis, M., Onyango, A. W., Borghi, E., Siyam, A., Nishida, C., & Siekmann, J. (2007). Development of a WHO growth reference for school-aged children and adolescents. *Bull World Health Organ*, 85(9), 660-667.
14. Granot, E. (2015). Childhood Obesity: New Paradigms on Susceptibility, Co-morbidities, and Interventions. In *Preventive Nutrition* (pp. 321-334): Springer.
15. Portela, D. S., Vieira, T. O., Matos, S. M., de Oliveira, N. F., & Vieira, G. O. (2015). Maternal obesity, environmental factors, cesarean delivery and breastfeeding as determinants of overweight and obesity in children: results from a cohort. *BMC pregnancy and childbirth*, 15(1), 94. doi: 10.1186/s12884-015-0518-z.
16. Trandafir, L., & Temneanu, O. (2016). Pre and post-natal risk and determination of factors for child obesity. *Journal of medicine and life*, 9(4), 386. doi:10.22336/jml.2016.0412
17. Ziyab, A. H., Karmaus, W., Kurukulaaratchy, R. J., Zhang, H., & Arshad, S. H. (2014). Developmental trajectories of Body Mass Index from infancy to 18 years of age: prenatal determinants and health consequences. *J Epidemiol Community Health*, 68(10), 934-941. doi:10.1136/jech-2014-203808
18. Ajslev, T., Andersen, C., Gamborg, M., Sørensen, T., & Jess, T. (2011). Childhood overweight after establishment of the gut microbiota: the role of delivery mode, pre-pregnancy weight and early administration of antibiotics. *International Journal of Obesity*, 35(4), 522. doi: 10.1038/ijo.2011.27
19. Song, S. J., Dominguez-Bello, M. G., & Knight, R. (2013). How delivery mode and feeding can shape the bacterial community in the infant gut. *Canadian Medical Association Journal*, 185(5), 373-374. doi: 10.1503/cmaj.130147.
20. Harpaz, E., Tamir, S., Weinstein, A., & Weinstein, Y. (2017). The effect of caffeine on energy balance. *J Basic Clin Physiol Pharmacol*, 28(1), 1-10. doi:10.1515/jbcpp-2016-0090
21. Razina, A. O., Runenko, S. D., & Achkasov, E. E. (2016). Obesity: Current Global and Russian Trends. *Vestn Ross Akad Med Nauk*(2), 154-159.
22. Abdul-Rasoul, M. M. (2012). Obesity in children and adolescents in Gulf countries: Facts and solutions. *Avances en Diabetología*, 28(3), 64-69. doi:10.1016/j.avdiab.2012.04.001
23. Mena, N. Z., Gorman, K., Dickin, K., Greene, G., & Tovar, A. (2015). Contextual and Cultural Influences on Parental Feeding Practices and Involvement in Child Care Centers among Hispanic Parents. *Childhood obesity*, 11(4), 347-354. doi: 10.1089/chi.2014.0118
24. Musaiger, A. O. (2004). Overweight and obesity in the Eastern Mediterranean Region: can we control it?. *East Mediterr Health J*, 10(6), 789-793.
25. Musaiger, A. O. (2011). Overweight and obesity in eastern mediterranean region: prevalence and possible causes. *J Obes*, 2011, 407237. doi:10.1155/2011/407237
26. Ng, S. W., Zaghoul, S., Ali, H., Harrison, G., Yeatts, K., El Sadig, M., & Popkin, B. M. (2011). Nutrition transition in the United Arab Emirates. *Eur J Clin Nutr*, 65(12), 1328-1337. doi:10.1038/ejcn.2011.135

27. Badran, M., & Laher, I. (2011). Obesity in Arabic-speaking countries. *Journal of Obesity*, 2011. doi: 10.1155/2011/686430 31
28. Serour, M., Alqhenaei, H., Al-Saqabi, S., Mustafa, A. R., & Ben-Nakhi, A. (2007). Cultural factors and patients' adherence to lifestyle measures. *Br J Gen Pract*, 57(537), 291-295.
29. Tami, S. H., Reed, D. B., Trejos, E., Boylan, M., & Wang, S. (2015). Pilot Study: Survey Tools for Assessing Parenting Styles and Family Contributors to the Development of Obesity in Arab Children Ages 6 to 12 Years. *Ethn Dis*, 25(4), 463-468. doi:10.18865/ed.25.4.463
30. Al-Muhaimeed, A. A., Dandash, K., Ismail, M. S., & Saquib, N. (2015). Prevalence and correlates of overweight status among Saudi school children. *Ann Saudi Med*, 35(4), 275-281. doi:10.5144/0256-4947.2015.275
31. World Health Organization. (2017). Global Health Observatory. (<http://www.who.int/gho/en/>). Retrieved from http://www.who.int/gho/ncd/risk_factors/overweight/en/
32. Al-Junaibi, A., Abdulle, A., Sabri, S., Hag-Ali, M., & Nagelkerke, N. (2013). The prevalence and potential determinants of obesity among school children and adolescents in Abu Dhabi, United Arab Emirates. *Int J Obes (Lond)*, 37(1), 68-74. doi:10.1038/ijo.2012.131
33. Parrino, C., Vinciguerra, F., La Spina, N., Romeo, L., Tumminia, A., Baratta, R., . . . Frittitta, L. (2016). Influence of early-life and parental factors on childhood overweight and obesity. *J Endocrinol Invest*, 39(11), 1315-1321. doi:10.1007/s40618-016-0501-1
34. Muthuri, S. K., Onywera, V. O., Tremblay, M. S., Broyles, S. T., Chaput, J. P., Fogelholm, M., . . . Group, I. R. (2016). Relationships between Parental Education and Overweight with Childhood Overweight and Physical Activity in 9-11 Year Old Children: Results from a 12-Country Study. *PloS one*, 11(8), e0147746. doi:10.1371/journal.pone.0147746
35. Taylor, A. W., Winefield, H., Kettler, L., Roberts, R., & Gill, T. K. (2012). A population study of 5 to 15 year olds: full time maternal employment not associated with high BMI. The importance of screen-based activity, reading for pleasure and sleep duration in children's BMI. *Matern Child Health J*, 16(3), 587-599. doi:10.1007/s10995-011-0792-y
36. Jo, Y. (2014). What money can buy: family income and childhood obesity. *Econ Hum Biol*, 15, 1-12. doi:10.1016/j.ehb.2014.05.002
37. Haddad, J., Ullah, S., Bell, L., Leslie, E., & Magarey, A. (2018). The Influence of Home and School Environments on Children's Diet and Physical Activity, and Body Mass Index: A Structural Equation Modelling Approach. *Matern Child Health J*, 22(3), 364-375. doi:10.1007/s10995-017-2386-9
38. Yee, K. E., Eisenmann, J. C., Carlson, J. J., & Pfeiffer, K. A. (2011). Association between The Family Nutrition and Physical Activity Screening Tool and cardiovascular disease risk factors in 10-year old children. *International Journal of Pediatric Obesity*, 6(3-4), 314-320.
39. Yee, K. E., Pfeiffer, K. A., Turek, K., Bakhoya, M., Carlson, J. J., Sharman, M., . . . Eisenmann, J. C. (2015). Association of the Family Nutrition and Physical Activity Screening Tool with Weight Status, Percent Body Fat, and Acanthosis Nigricans in Children from a Low Socioeconomic, Urban Community. *Ethn Dis*, 25(4), 399-404. doi:10.18865/ed.25.4.399

40. Al-Alwan, I., Al-Fattani, A., & Longford, N. (2013). The effect of parental socioeconomic class on children's body mass indices. *J Clin Res Pediatr Endocrinol*, 5(2), 110-115. doi:10.4274/Jcrpe.898
41. El-Bayoumy, I., Shady, I., & Lotfy, H. (2009). Prevalence of obesity among adolescents (10 to 14 years) in Kuwait. *Asia Pac J Public Health*, 21(2), 153-159. doi:10.1177/1010539509331786

Questions