Spectrum of Overweight and Obesity in School Going Population of Nepal: A Meta-analysis

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Background and Objectives

- Nepal has nearly 8 million school going population (NDHS 2016).
- Government of Nepal has focused mainly on undernutrition and food supplementation in school going population.
- However, the spectrum of overnutrition including overweight and obesity is frequently under looked.
- Overweight and obesity at young age has been proven as an important risk of cardiovascular illness in adult life.
- So, this review aims to analyze the prevalence of overweight and obesity in school going population of Nepal.

Methodology

Search Strategy

- Electronic database of Embase, PubMed, Google Scholar, Scopus, and Web of Science were searched till September 1st, 2024 to find the potential articles.
- Search terms were "Nepal", "School going population", "Overweight", "Obesity", "Childhood obesity", "Children" with suitable Boolean operators "AND"/"OR" in between.

Inclusion Criteria

 Cross-sectional studies conducted either in school based or community-based settings that analyze the prevalence of overweight, obesity, or both among school going population in Nepal.

Exclusion Criteria

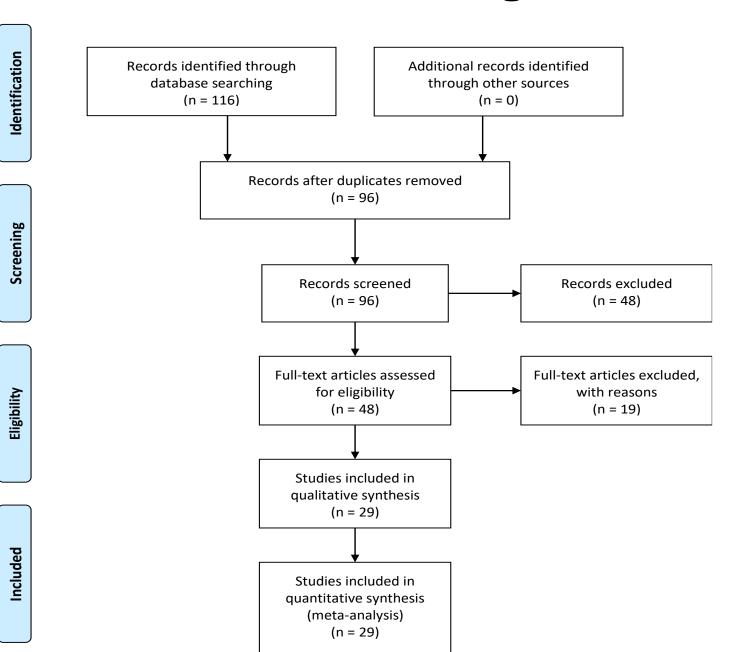
- Studies on specific cohorts of children such as male or female only, particular age groups, specific ethnicity, and disabled children.
- Studies conducted among preschool children.
- Studies with no cross-sectional design.
- Studies conducted among children with different dietary practices compared to the norm.

Statistical Analysis

- All basic calculations were performed in Microsoft Excel 2016 (Microsoft Corp., Redmond, WA, USA).
- For further analysis, data from the Excel sheet were extracted using STATA version 17.0 (Stata Corp., College Station, TX, USA).
- Random effect model with 95% confidence interval (CI) was used to calculate the prevalence of overweight and obesity.
- Substantial heterogeneity was measured for a value of I² >75%.
- All analysis was two-tailed with a significance level set to <0.05.

Results

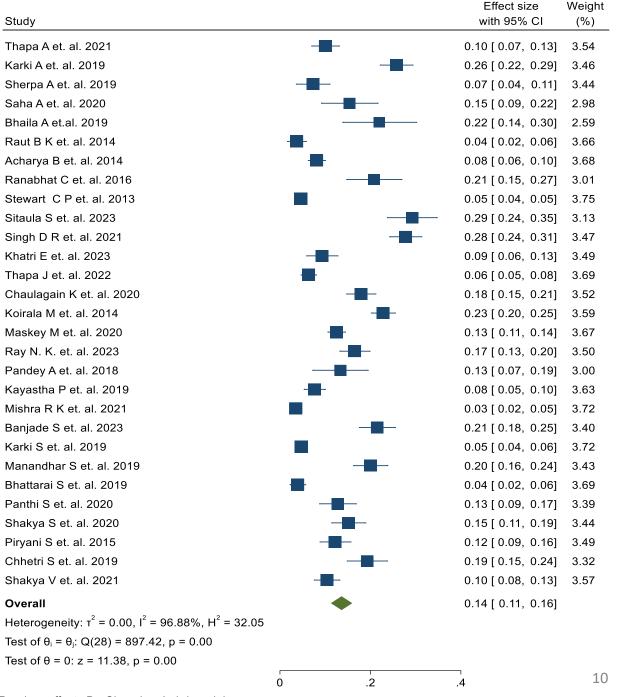
PRISMA Flow Diagram



Result Contd

- Altogether, 29 studies with a total of 18325 school going population were included in the meta-analysis.
- The students were of age 5 to 23 years and were studying upto grade twelve.
- The pooled prevalence of overweight/obesity was 14% (95% CI: 0.11-0.16, I²=96.88%, p<0.001).
- Similarly, by pooling the data from 25 studies, prevalence of overweight was 10% (95% CI: 0.08-0.12, I^2 =94.97%, p<0.001); prevalence of obesity from 23 studies was 3% (95% CI: 0.03-0.04, I^2 =92.92%, p<0.001).

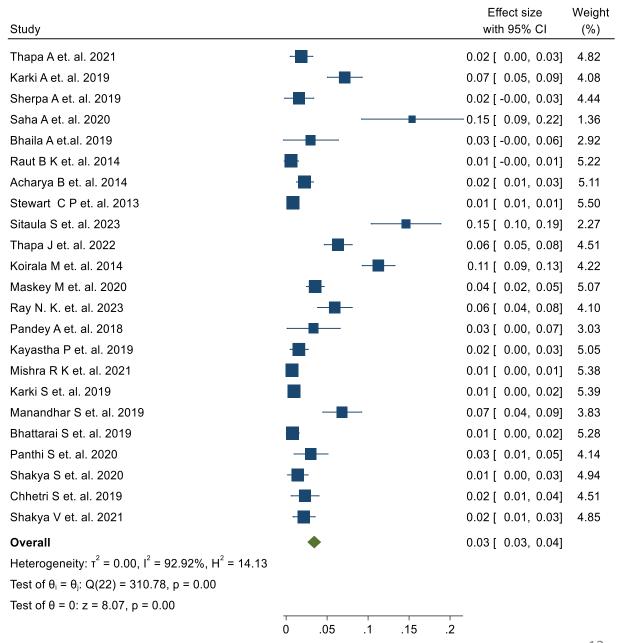
Forest plot showing pooled prevalence of overweight and obesity



Forest plot showing pooled prevalence of overweight from 25 studies

Study	Effect size with 95% CI	Weight (%)
Thapa A et. al. 2021	0.08 [0.05, 0.11]	4.11
Karki A et. al. 2019	0.19 [0.15, 0.22]	3.97
Sherpa A et. al. 2019	0.06 [0.02, 0.09]	3.94
Bhaila A et.al. 2019	0.19 [0.11, 0.27]	2.43
Raut B K et. al. 2014	0.03 [0.01, 0.05]	4.34
Acharya B et. al. 2014	0.06 [0.04, 0.07]	4.40
Stewart C P et. al. 2013	0.04 [0.03, 0.04]	4.55
Sitaula S et. al. 2023 —	0.15 [0.10, 0.19]	3.61
Khatri E et. al. 2023	- 0.09 [0.06, 0.13]	3.90
Chaulagain K et. al. 2020	0.18 [0.15, 0.21]	3.97
Koirala M et. al. 2014	0.12 [0.10, 0.14]	4.31
Maskey M et. al. 2020	0.09 [0.07, 0.11]	4.39
Ray N. K. et. al. 2023	0.11 [0.08, 0.13]	4.11
Pandey A et. al. 2018	0.10 [0.05, 0.15]	3.20
Kayastha P et. al. 2019	0.06 [0.04, 0.08]	4.29
Mishra R K et. al. 2021	0.03 [0.02, 0.04]	4.49
Banjade S et. al. 2023	0.21 [0.18, 0.25]	3.71
Karki S et. al. 2019	0.04 [0.03, 0.05]	4.49
Manandhar S et. al. 2019 —	0.13 [0.10, 0.16]	3.98
Bhattarai S et. al. 2019	0.03 [0.02, 0.05]	4.42
Panthi S et. al. 2020	0.10 [0.06, 0.13]	3.84
Shakya S et. al. 2020 —	0.14 [0.10, 0.17]	3.84
Piryani S et. al. 2015 —	0.12 [0.09, 0.16]	3.91
Chhetri S et. al. 2019	0.17 [0.13, 0.21]	3.62
Shakya V et. al. 2021	0.08 [0.06, 0.11]	4.18
Overall	0.10 [0.08, 0.12]	
Heterogeneity: $\tau^2 = 0.00$, $I^2 = 94.97\%$, $H^2 = 19.90$	-	
Test of $\theta_i = \theta_j$: Q(24) = 477.53, p = 0.00		
Test of $\theta = 0$: $z = 11.09$, $p = 0.00$		
0 .1	.2 .3	
Random-effects DerSimonian–Laird model		11

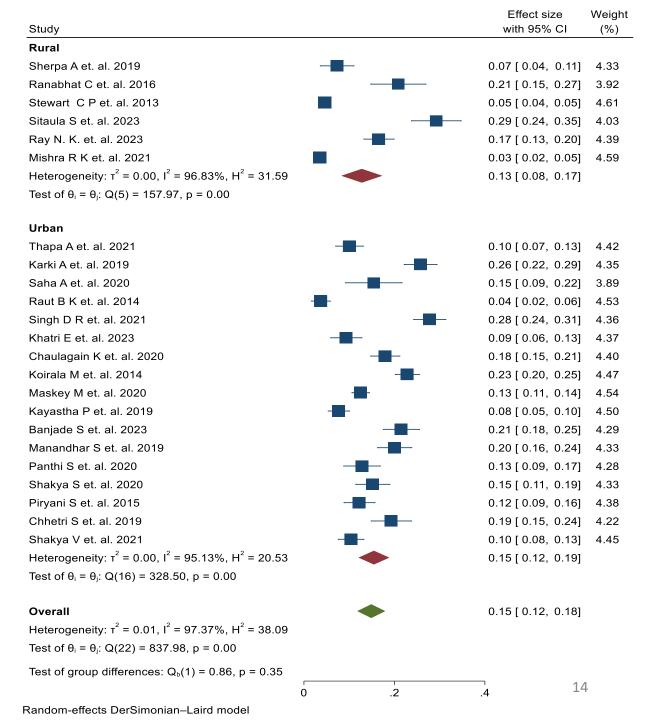
Forest plot showing pooled prevalence of obesity from 23 studies



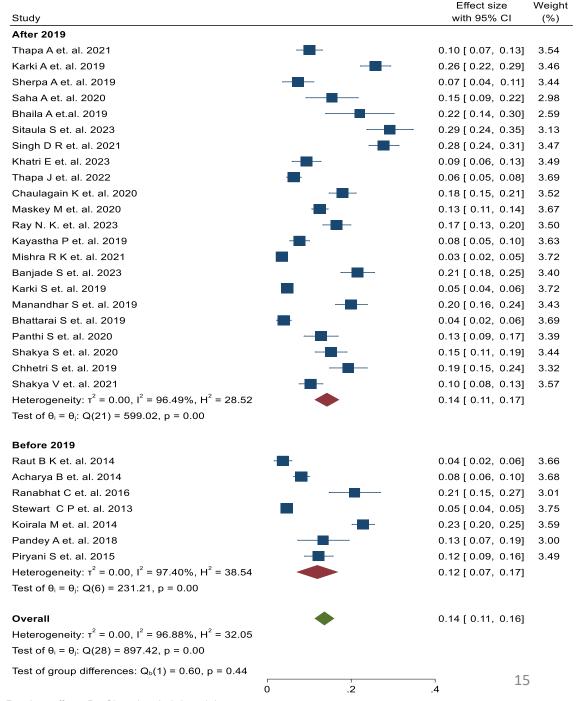
Subgroup Analysis

- From subgroup analysis, the prevalence of overweight/obesity was higher in urban areas 15% (95% CI: 0.12-0.19, I²=95.13%) compared to rural areas 13% (95% CI: 0.08-0.17, I²=96.88%).
- Furthermore, overweight/obesity was in rising trend after 2019 compared to previous years; 15% (95% CI: 0.11-0.19, I^2 =96.38%) vs 13% (95% CI: 0.10-0.16, I^2 =96.96%) respectively.

Rural vs Urban Forest plot



Time-trend Forest plot



Random-effects DerSimonian-Laird model

Limitations

- Body mass index was utilized to define overweight and obesity, though it has its own limitations.
- Region-wise/province wise subgroup analysis could not be done due to clustering of studies from few districts.
- High degree of heterogeneity suggest cautious interpretation of the study findings.

Conclusions

- This meta-analysis showed that the burden of overweight/obesity is significant (14%) in school going population of Nepal and is in rising trend since COVID-19 pandemic.
- To address this issue, school curricula should emphasize healthy eating habits, physical activity, and educate young individuals about the long-term consequences of overweight and obesity in adulthood.
- This research opens door for key stakeholders for conducting nationwide studies focusing on non communicable diseases in young population of Nepal.

About the Presenter



Dr. Pashupati Pokharel is a recent MBBS graduate from Institute of Medicine, Tribhuvan University. He is currently working as a medical officer at Bangalachuli Hospital, Dang serving the rural communities of Nepal.

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Queries? Suggestions??

Thank You