

ASSOCIATION BETWEEN ULTRA-PROCESSED FOOD CONSUMPTION AND RISK OF COLORECTAL CANCER - A SYSTEMATIC REVIEW

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INTRODUCTION & BACKGROUND

- Colorectal cancer (CRC) stands as the third most diagnosed cancer globally and the second leading cause of cancer-related deaths (Sung et.al 2021).
- CRC accounts for a significant portion of annual cancer cases and fatalities, with a rising incidence, particularly in countries like China (Zhou et.al 2021).
- Existing literature emphasises diet as a pivotal modifiable risk factor in CRC development (Bradbury et.al 2020,katsidizira et.al 2018).

- Although associations between UPF intake and adverse health outcomes such as overweight and obesity have been explored, the specific relationship between UPF consumption and CRC risk remains a gap in current research (Askari et.al 2020 ,Monteiro et.al 2011).
- The NOVA food classification system categorises ultra-processed foods (UPFs) based on high energy density, added sugars, salt, and unhealthy fats (Monteiro et.al 2013, Monteiro et.al 2011).



RATIONALE OF THE STUDY

- The study aims to address the gap in current research by conducting a comprehensive analysis of the association between UPF intake and CRC risk (Monteiro et.al 2011)
- This study is crucial because CRC poses a significant global health challenge, and understanding the potential impact of UPFs on CRC risk is paramount (Keum et.al 2019).
- Existing literature and statistics will be integrated to underscore the urgency and importance of exploring the association between UPF consumption and CRC risk (Siegel et.al 2020,keum et .al 2019).

- The research problem is framed within the broader context of public health, emphasising the need for evidence-based insights to inform targeted strategies, treatment improvements, and healthcare policies aimed at reducing CRC incidence.
- The comparative analysis between developing and developed nations provides a nuanced perspective, considering diverse socio-economic, cultural, and health system factors, and contributes essential insights for tailoring effective public health strategies (Baker et.al 2020 ,Vieira et.al 2017, Sung et.al 2021).



AIM

To comprehensively examine existing scientific literature to determine the association between ultra-processed food consumption and the risk of colorectal cancer.

RESEARCH QUESTION

What is the association between the consumption of ultra-processed foods and the risk of developing colorectal cancer, and how can this knowledge contribute to improving healthcare services, treatment, and informing public health policies?



OBJECTIVES

- To systematically review and analyse available studies on the relationship between ultra-processed food consumption and colorectal cancer risk.
- To assess the dose-response relationship between the level of ultra-processed food consumption and colorectal cancer risk'
- To investigate potential variations in this association based on age, gender, and geographic factors
- To provide evidence-based recommendations for enhancing healthcare services, treatment approaches, and informing public health policies aimed at reducing CRC incidence

RESEARCH METHODOLOGY

RESEARCH DESIGN

- This will be a systematic review
- The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines will be used (Moher et.al 2009).

SEARCH STRATEGY

A systematic electronic search will be performed on health based literature

Databases : PubMed/MEDLINE, Web of Science, EMBASE, CNKI, and Wan fang.

SEARCH CRITERIA

- The search criteria will be refined to specifically address the impact of ultra-processed food consumption on individuals.
- Search terms will include
 - Fast food ,processed food ,ultra-processed food ,processed meat ,hamburger ,salami .
 - Bacon ,sausage ,luncheon meats ,colorectal cancer ,colorectal neoplasia
 - Colorectal adenomas ,rectum cancer ,rectal cancer ,colon cancer.
- Boolean operators; AND/OR will be used as Boolean operators when combine keywords during search

DATA COLLECTION

Criteria	Inclusion	Exclusion
Study Design	Observational studies (cross-sectional, cohort, case–control)	Non-observational studies (reviews, editorials, case reports)
Article Type	Full-text articles	Articles with out full-text
Language	Published in English	Published in languages other than English
Publication Period	Published between 2018 and 2022	Published before 2018 and after 2022
Food Classification System	Studies must classify UPF according to the NOVA system	Studies not classified according to the NOVA system
Study Population	Humans of age 18 years or older	Studies conducted in animals and humans below 18 years
Geographic Location	Worldwide	Excludes studies with mixed countries
Participants' Sex	Both men and women included	Not applicable

QUALITY EVALUATION

- The validity and reliability of this study will be established using standard review protocols (Nussbaumer-Streit et al., 2016).
- The PICO framework was used in framing the research question and objectives.
- A systematic search strategy will be developed using the PRISMA statement and Cochrane handbook for interventional Reviews protocols (Higgins, et.al 2019).
- The Newcastle–Ottawa Quality Assessment Scale (NOS) will be used for the screening and Quality Assessment of selected studies (Stang . 2010)

DATA EXTRACTION

- Information will collect using pre made extraction form containing (author, year, country, design, subjects, no of cases etc.).



STATISTICAL ANALYSIS

- The study will employ STATA version 14.0 for robust data analysis.
- Both fixed-effects and random-effects models will be considered to evaluate the influence of UPF consumption on colorectal cancer risk.
- Heterogeneity will be assessed through the I² statistic and Q-test, providing insights into the consistency of findings across studies (Kolaski et al 2023)
- UPF consumption will be analysed as both a continuous and categorical variable, offering a comprehensive perspective on its correlation with colorectal cancer risk.



IMPLICATION OF STUDY

- **Influencing Future Policies:** The research findings will play a pivotal role in shaping future public health policies, providing concrete evidence on the link between ultra-processed food (UPF) consumption and colorectal cancer risk.
- **Informed Decision-Making for Policymakers:** Policymakers will be empowered to make informed decisions by incorporating the study results into considerations for dietary guidelines, nutrition education, and targeted interventions aimed at reducing UPF consumption
- **Tailored Interventions in High-Risk Regions:** The study's outcomes will guide the development of tailored interventions, particularly in regions witnessing high UPF consumption and an increase in colorectal cancer rates.

TIMELINE OF THE STUDY										
	WEEK 1	WEEK 2-3	WEEK 4-5	WEEK 6-7	WEEK 8	WEEK 9	WEEK 10	WEEK 11	WEEK12-14	WEEK 15-16
APPROVAL OF RESEARCH PROPOSAL										
LITERATURE REVIEW										
DATA COLLECTION										
DATA ANALYSIS										
VERIFICATION OF DATA ANAYSIS OUTCOMES										
INTEGRATION OF DATA										
COMPARISON OF DATA RESULT										
WRITING OF RESULTS										
WRITING OF CHAPTERS 1-6										
WRITING DISCUSSION										



REFERENCES

- Askari, M., Heshmati, J., Shahinfar, H., Tripathi, N., & Daneshzad, E. (2020). Ultra-processed food and the risk of overweight and obesity: a systematic review and meta-analysis of observational studies. *Int J Obes.*, 44, 2080–91. doi: 10.1038/s41366-020-00650-z Available at: www.training.cochrane.org/handbook (Accessed date: 5 Nov. 2023).
- Baker, P., Machado, P., Santos, T., Sievert, K., Backholer, K., Hadjidakou, M., et al. (2020). Ultra-processed foods and the nutrition transition: global, regional and national trends, food systems transformations and political economy drivers. *Obes Rev.*, 21, e13126. doi: 10.1111/obr.13126
- Bradbury, K. E., Murphy, N., & Key, T. J. (2020). Diet and colorectal cancer in UK biobank: a prospective study. *Int J Epidemiol*, 49, 246–258. doi: 10.1093/ije/dyz064
- Dekker, E., Tanis, P. J., Vleugels, J. L. A., Kasi, P. M., & Wallace, M. B. (2019). Colorectal cancer. *Lancet*, 394, 1467–1480. doi: 10.1016/S0140-6736(19)32319-0
- Feng, Y. L., Shu, L., Zheng, P. F., Zhang, X. Y., Si, C. J., Yu, X. L., et al. (2017). Dietary patterns and colorectal cancer risk: a meta-analysis. *Eur J Cancer Prev*, 26, 201–211. doi: 10.1097/CEJ.0000000000000245

- Fiolet, T., Srour, B., Sellem, L., Kesse-Guyot, E., Allès, B., Méjean, C., et al. (2018). Consumption of ultra-processed foods and cancer risk: results from NutriNet-Santé prospective cohort. *BMJ*, 360, k322. doi: 10.1136/bmj.k322
- Higgins, J. P. T., Thomas, J., Chandler, J., Cumpston, M., Li, T., Page, M. J. and Welch, V. A. eds. (2019) *Cochrane Handbook for Systematic Reviews of Interventions* version 6.0 (updated July 2019).
- Katsidzira, L., Laubscher, R., Gangaidzo, I. T., Swart, R., Makunike-Mutasa, R., Manyanga, T., et al. (2018). Dietary patterns and colorectal cancer risk in Zimbabwe: a population-based case-control study. *Cancer Epidemiol.*, 57, 33–8. doi: 10.1016/j.canep.2018.09.005
- Keum, N., & Giovannucci, E. (2019). Global burden of colorectal cancer: emerging trends, risk factors and prevention strategies. *Nat Rev Gastroenterol Hepatol*, 16, 713–732. doi: 10.1038/s41575-019-0189-8
- Kim, H., Hu, E. A., & Rebholz, C. M. (2019). Ultra-processed food intake and mortality in the USA: results from the Third National Health and Nutrition Examination Survey (NHANES III, 1988-1994). *Public Health Nutrition*, 22(10), 1777–1785. doi: 10.1017/S1368980018003890.



- Kolaski, K., Logan, L.R. and Ioannidis, J.P.A. (2023) Guidance to best tools and practices for systematic reviews – BioMed Central. Available at: <https://systematicreviewsjournal.biomedcentral.com/articles/10.1186/s13643-023-02255-9> (Accessed: 13 November 2023).
- Levy, R. B., Rauber, F., Chang, K., Louzada, M. L. D. C., Monteiro, C. A., Millett, C., et al. (2021). Ultra-processed food consumption and type 2 diabetes incidence: a prospective cohort study. *Clinical Nutrition*, 40(6), 3608–3614. doi: 10.1016/j.clnu.2020.12.018
- Li, M., & Shi, Z. (2022). Ultra-processed food consumption associated with incident hypertension among Chinese adults-results from China Health and Nutrition Survey 1997-2015. *Nutrients*, 14(22), 4783. doi: 10.3390/nu14224783
- Liberati, A., Altman, D.F., Tetzlaff, J., Tetzlaff, J.F., Mulrow, C., Mulrow, C F. and Moher, D. (2009) 'The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: Explanation and elaboration', *Journal of Clinical Epidemiology*, 62, pp. e1-e31
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G., PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *BMJ.*, 339, b2535. doi: 10.1136/bmj.b2535.



- Monteiro, C. A., Levy, R. B., Claro, R. M., de Castro, I. R., & Cannon, G. (2011). Increasing consumption of ultra-processed foods and likely impact on human health: evidence from Brazil. *Public Health Nutr.*, 14, 5–13. doi: 10.1017/S1368980010003241
- Monteiro, C. A., Moubarac, J. C., Cannon, G., Ng, S. W., & Popkin, B. (2013). Ultra-processed products are becoming dominant in the global food system. *Obes Rev.*, 14, 21–8. doi: 10.1111/obr.12107
- Nussbaumer-Streit, B., Klerings, I., Wagner, G., Titscher, V. and Gartlehner, G. (2016) ‘Assessing the validity of abbreviated literature searches for rapid reviews: protocol of a non-inferiority and metaepidemiologic
- Rauber, F., Chang, K., Vamos, E. P., da Costa Louzada, M. L., Monteiro, C. A., Millett, C., et al. (2021). Ultra-processed food consumption and risk of obesity: a prospective cohort study of UK Biobank. *European Journal of Nutrition*, 60(4), 2169–2180. doi: 10.1007/s00394-020-02367-1
- Siegel, R. L., Miller, K. D., & Jemal, A. (2020). Cancer statistics, 2020. *CA Cancer J Clin*, 70, 7–30. doi: 10.3322/caac.21590
- Souza, T. N., Andrade, G. C., Rauber, F., Levy, R. B., & da Costa Louzada, M. L. (2022). Consumption of ultra-processed foods and the eating location: can they be associated? *British Journal of Nutrition*, 128(9), 1587–1594. doi: 10.1017/S0007114521004992

- Srour, B., Fezeu, L. K., Kesse-Guyot, E., Allès, B., Méjean, C., Andrianasolo, R. M., et al. (2019). Ultra-processed food intake and risk of cardiovascular disease: prospective cohort study (NutriNet-Santé). *BMJ*, 365, l1451. doi: 10.1136/bmj.l1451
- Stang, A. (2010). Critical evaluation of the Newcastle-Ottawa scale for the assessment of the quality of nonrandomized studies in meta-analyses. *Eur J Epidemiol.*, 25, 603–5. doi: 10.1007/s10654-010-9491-z
- Steck, S. E., Ginter, M., Zheng, J., & Thomson, C. A. (2015). Index-based dietary patterns and colorectal cancer risk: a systematic review. *Adv Nutr.*, 6, 763–73. doi: 10.3945/an.115.009746 study', *Systematic Reviews*, 5, pp. 97. doi; 10.1186/s13643-016-0380-8.
- Sung, H., Ferlay, J., Siegel, R. L., Laversanne, M., Soerjomataram, I., Jemal, A., et al. (2021). Global Cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: A Cancer Journal for Clinicians*, 71(3), 209–249. doi: 10.3322/caac.21660.
- Thanikachalam, K., & Khan, G. (2019). Colorectal Cancer and nutrition. *Nutrients*, 11, 164. doi: 10.3390/nu11010164



- Vieira, A. R., Abar, L., Chan, D. S. M., Vingeliene, S., Polemiti, E., Stevens, C., et al. (2017). Foods and beverages and colorectal cancer risk: a systematic review and meta-analysis of cohort studies, an update of the evidence of the WCRF-AICR continuous update project. *Ann Oncol.*, 28, 1788–802. doi: 10.1093/annonc/mdx171
- Wang L, Du M, Wang K, Khandpur N, Rossato SL, Drouin-Chartier JP, Steele EM, Giovannucci E, Song M, Zhang FF. (2022) Association of ultra-processed food consumption with colorectal cancer risk among men and women: Results from three prospective US cohort studies, *The BMJ*. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9430376/> (Accessed: 13 November 2023).
- Wolf, A. M. D., Fontham, E. T. H., Church, T. R., Flowers, C. R., Guerra, C. E., LaMonte, S. J., et al. (2018). Colorectal cancer screening for average-risk adults: 2018 guideline update from the American Cancer Society. *CA Cancer J Clin.*, 68, 250–81. doi: 10.3322/caac.21457
- Zhou, J., Zheng, R., Zhang, S., Zeng, H., Wang, S., Chen, R., et al. (2021). Colorectal cancer burden and trends: comparison between China and major burden countries in the world. *Chin J Cancer Res*, 33, 1–10. doi: 10.21147/j.issn.1000-9604.2021.01.01



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