RECRUS Research Newsletter HPUPM
November 2021
Vol. 1 Issues 9
Page 60

BREAKING NEWS

The new standard operating procedures (SOP) from JKEUPM dated 10 June 2021.

For research conducted in facilities other than in UPM and has been approved by other ethic committees, approval from JKEUPM is not necessary. The approval needs only to be submitted to the Deputy Dean of Research office of each faculty (PTJ) for its record keeping. This is to ensure that the office will be aware that its faculty staff has obtained ethics approval from Institutional Review Board (IRB) other than JKEUPM. However, UPM students who conducts research projects abroad will need to obtain ethics approval from JKEUPM. Full version of the newly updated SOP can be accessed [here].

The JKEUPM was established under the authority of the Senate of Universiti Putra Malaysia on September 2011. The JKEUPM reviews research conducted by members of the faculty, students and employees of UPM. In Jun 2021 JKEUPM has published their latest SOP.

CLINICAL EPIDEMIOLOGY

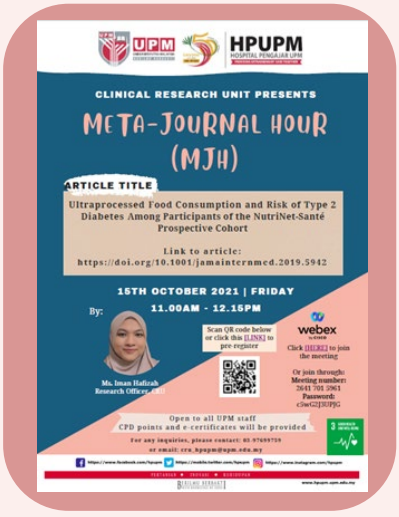
Appraisals in Meta-Journal Hour 2

By: Nurul Iman Hafizah[1], Aazifah Ilham[1], Boon-How Chew[1,2]
[1]Clinical Research Unit, Hospital Pengajar Universiti Putra Malaysia (HPUPM Teaching Hospital), Persiaran Mardi-UPM, 43400 Serdang, Malaysia
[2]Department of Family Medicine, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Selangor, Malaysia.

The Paper: Ultraprocessed Food Consumption and Risk of Type 2 Diabetes Among Participants of the NutriNet-Sante Prospective Cohort. doi: 10.1001/jamainternmed.2019.5942

Why was this study conducted?

The consumption of ultra-processed food (UPF) is widespread in Western diets and linked to all-cause mortality and numerous chronic diseases such as cancer, cardiovascular disease, hypertension and dyslipidaemia. There was no prior prospective epidemiology study that evaluated association of UPF with type 2 diabetes (T2D) risk. Thus, the aim of this study was to assess the associations between consumption of UPF and the risk of T2D.



How was it done?

Study Population and Data Collection

The NutriNet-Santé is a large, web-based cohort launched in 2009 in France scheduled for a follow-up of 10 years. Participants were adults aged ≥18 years old recruited among French general population. Informed consent and data collection processes were obtained and conducted electronically using a dedicated **web interface**. At baseline, participants were required to complete a set of 5 questionnaires related to sociodemographic and lifestyle characteristic, anthropometry, physical activities, health status and dietary intake. Blood specimens were also collected among volunteered participants at designated centres. For additional reading on the full study protocol, please click **here** [1].

Dietary Data and Food Processing Categorization

Participants were instructed to complete a series of 3 non-consecutive, validated web-based 24 hours dietary records at baseline and every 6 months, randomly assigned over 2-week period (2 weekdays and 1 weekend) to vary dietary intake. Corresponding nutrient intakes were then calculated using the NutriNet-Santé food composition database. Mean dietary intake from the 24-hour dietary records available during the first 2 years of each participant's follow up were averaged and considered as baseline usual dietary intake. All food and beverage items were further categorized into 1 of the 4 NOVA categories (unprocessed/minimally processed foods/ processed food/ ultra-processed food) based on the extend and purpose of food processing.

Case Ascertainment

To identify cases of T2D, participants were asked to declare major health events, medications and treatments through the yearly health questionnaire, through a specific health check-up every 3 months, or at any time on the study website. The data is linked to medico-administrative database of the SNIIRAM providing detailed information on reimbursement of medication and medical consultation. In addition, mortality cases were identified using a linkage to CépiDC, the French national mortality registry.

Statistical Analysis

The proportions of UPF in the total weight of food and/or beverage consumed (grams per day) was computed by calculating a weight ratio of UPF intake with total food and/beverage intake rather than an energy ratio to take into account UPF that do not provide energy. Multiple imputation for missing data was performed using the multivariate imputation by chained equations (MICE) method.

Unadjusted means of the proportion of UPF in the diet were calculated using appropriate unpaired, 2- tailed *t* tests or analysis of variance for assessing the differences between groups. Regression analysis was performed to assess the association between nutrient and food intakes and UPF proportion adjusted for sex, age, and total energy intake. Cause-specific Cox model were performed to evaluate the association between the proportion of UPF in the diet and the incident of T2D whereby the outcomes of T2D and death during follow up were handled as competing events. Cause-specific hazard ratio (HR) and 95% CIs were computed. There were 5 adjusted Cox model proposed in the study:

Model 1	Adjusted for age, sex, educational level, body mass index, physical activities level, smoking status, alcohol intake, number of 24 hours dietary records, energy intake, FSAm-NPS DI score and a family history of T2D.
Model 2	Model 1 unadjusted for FSAm-NPS DI but adjusted instead for saturated fatty acid intake, sodium intake, sugar intake, dietary fibre intake.
Model 3	Model 1 unadjusted for FSAm-NPS DI but adjusted instead for intakes of red and processed meat, sugary drinks, fruits and vegetables, whole grains, nuts and yogurt
Model 4	Model 1 and adjustments for prevalence of dyslipidemia and hypertension and treatments for these conditions.
Model 5	Model 1 and percentage of weight change.

What was the finding?

A total of 104 707 participants (21800 (20.8%) men and 82907(79.2%) women) were included. Mean (SD) baseline age of participants was 42.7(14.5) years. The mean weight contributions to UPF is 17.3%. Overall, UPF were higher in younger participants, obese individuals, those with lower physical activity levels and current smoker. Higher consumption of UPF was associated with higher FSAmNPS DI scores (reflecting a poorer nutritional quality of the diet), higher intakes of fibre and alcohol, higher consumptions of sugary drinks and red and processed meats, and lower consumptions of whole grains, yogurt, nuts and fruits and vegetable. During the follow up, 821 incident T2D were detected. The incident of T2D is increasing with increment consumption of UPF. The absolute incidence rates for T2D in whole population is 132 per 100000-person years: age and sex corrected absolute rates were 113, 125, 143 and 166 per 100 000-person years in the first quarter (lowest consumers), second, third and fourth quarter (highest consumers). UPF intake was associated with an increased T2D even after adjustment of covariates. Model 1: HR 1.15 (1.06-1.25), Model 2: 1.19 (1.09-1.25), Model 3: 1.14 (1.04 – 1.25), Model 4 :1.13 (1.03-1.23), Model 5 1.13 (1.01-1.27).

How much can we take out from this research/ paper?

The food consumption was captured over 3 days in 2 weeks, 6-monthly over 2 years and some proportion of the participants were further interviewed to verify the reported data. The amount of food in grams were then averaged and scored of the dietary quality index using a validated measure. This appeared to be more robust than many other dietary studies but recall bias and personal estimation of amount of the food consumed could not be ruled out. Another robustness of the study design was the adjudication of the food categories and classification of UPF by a committee of researchers and experts. Do check out the supplementary material for description on methods for deriving dietary patterns. This strict handling of the food classification was warranted knowing the importance of this variable as the main exposures. The outcome variable of incident T2D was based on self-report physician diagnosis and medication use. Although this was subjected to lack of accuracy compared to biochemical and recommended diagnostic criteria but this seems to be a feasible alternative in the large population-based study. This was properly discussed under the limitation and it could be underestimating the UPF effect on T2D as under-reporting or under-diagnosis of T2D in France was up to 20%. The competing outcome of death was appropriately ascertained through linking the participants to national death registry.

The statistical analysis was most amicably planned and done with multiple models and sensitivity analyses and the results were essentially similar. Multiple imputation was carried out and salvaging near to 100 T2D cases). However, the categorisation of the UPF into 10-point was not explained as whether it was standardised by converting the proportion of percentages (measured in weight) by dividing it by 10 (Table 2 and 3, and in the text) or regrouped into deciles. The reason 5 modelling were conducted was not given. The results from the research paper has to be read by the point estimate and 95% confidence interval and judged of the effect size to own local context and population because all p values were 'highly significant' by the sheer of sample size of the study (Table 1).

The study sample was found not to be representative of the French population at large [2]. This may affect the interpretation of the study results in the descriptive parts on the UPF proportions and similarly so the adjusted HRs from multivariable Cox models where the different sociodemographic characteristics were adjusted for but not weighted prior. Additionally, the healthy participants effect or selection bias is real as the authors pointed out that the T2D incident rate of the study sample (186 cases per 100 000 person-years after standardization) was found to be lower that the French population (289 per 100 000 in the French population). This means the effects of UPF intake on T2D could be higher that estimated in this study. Therefore, the interpretation and application of the HRs have to bear in mind of the sample characteristics as well as the modelling fulfilled the statistical test assumptions. The latter is believed to be of less issue as shown by the report of on the assumption but the association between the exposure and the outcome was not linear but cubic spline of the Ln(HR) on UPF. This observation was not explained of its implication on the effect sizes. Another point to take note is the UPF by definition is for all types taken as a whole and effect of different UPF cannot be inferred without further analysis.

All the models showed an increased T2D risk of 11-15% for a 10-point increment in the percentage of UPF in the diet. If this is understood as 10% increment, then it means a diet with 10% of UPF would increase the risk of T2D up to 15% in median follow-up of 6 years disregards of the other confounding factors that have been adjusted for in the models. In the same order, 20% UPF would increase the risk to 30%. This risk could be underestimated if those covariates such as BMI and weight change might have some intermediate effects between the UPF and incident T2D. Other potential confounders that the study missed include life event, emotional disorders, certain diabetogenic medication, supplements, etc. However, these are to be assessed of their relevancy to the context of the study population and their modifying effect on the causal relationship might be small in addition to already many covariates in the models.

References

1. Hercberg S, Castetbon K, Czernichow S, et al. The Nutrinet-Sante Study: A Web-based Prospective Study on the Relationship between Nutrition and Health and Determinants of Dietary Patterns and Nutritional Status. BMC Public Health. 2010. 10:242. doi: 10.1186/1471-2458-10-242.
2. Andreeva VA, Deschamps V, Salanave B, et al. Comparison of Dietary Intakes Between a Large Online Cohort Study (Etude NutriNet-Santé) and a Nationally Representative Cross-Sectional Study (Etude Nationale Nutrition Santé) in France: Addressing the Issue of Generalizability in E-Epidemiology. Am J Epidemiol. 2016 Nov 1;184(9):660-669. doi: 10.1093/aje/kww016. Epub 2016 Oct 15. PMID: 27744386; PMCID: PMC5101865.