**Development, Reproducibility and Validity of the Modified Mediterranean Prime Screen Among Women of Reproductive Age in Lebanon**

**Supplementary Material**

Table S1: Modified Mediterranean Prime Screener

We are interested to have an overview of your dietary patterns. Please try to recall the last 3 months, and indicate the frequency of consumption of the listed food categories.

|  |  |  |  |
| --- | --- | --- | --- |
| **Food item** | **Exchange size** | **Exchange numbers** | **Frequency of consumption** |
| **Daily** | **Weekly** | **Monthly** | **Never** |
| 1. Dark green leafy vegetables

[examples: Lettuce, spinach, Jew’s mallow (moloukhieh), Swiss chard (sillek), Rocket leaves, parsley, chicory, dandelion green (hindbeh), mint, kale, etc.]  | 1 cup cooked2 cups raw  |  |  |  |  |  |
| 1. Starchy vegetables (examples: potato, corn, beet, green peas, etc.)
 | 1 cup boiled, cooked  |  |  |  |  |  |
| Fried Potato 20#1 small chips bag (40 grams) |  |  |  |  |  |
| 1. Other vegetables (examples: tomato, carrot, artichoke, okra, green beans, broccoli, cabbage, cauliflower, squash, garlic, onion, mushroom, etc.)
 | 1 cup raw½ cup cooked |  |  |  |  |  |
| 1. Stuffed vegetables (Mahashi)
 | 3 medium pieces of stuffed Zucchini & eggplant6 medium pieces of stuffed cabbage15# vine leaves |  |  |  |  |  |
| 1. Beans (examples: fava, broad, chickpeas, lentils)
 | 1 cup cooked1/3 cup hommos Tahineh |  |  |  |  |  |
| 1. Citrus fruits (examples: orange, tangerine, grapefruit, pomello, lemon, etc.)
 | 1 cup raw |  |  |  |  |  |
| 1. Other fruits (examples: apple, banana, apricot, grapes, berries, melon, peach, pear, plum, pomegranate, dried fruits, etc.)
 | 1 cup raw2 tbsps dried  |  |  |  |  |  |
| 1. Juices (fresh or packaged) or canned fruit
 | 1 cup |  |  |  |  |  |
| 1. Whole milk products including those used in cooking (examples: milk, yoghurt, milk based puddings, etc.)
 | 1 cup |  |  |  |  |  |
| 1. Low fat or skimmed milk products (examples: milk, yoghurt, labneh, etc.)
 | 1 cup6 tbsps labneh |  |  |  |  |  |
| 1. Full fat Cheeses (examples: Kashkawan, Halloum, Feta, Cheddar, French cheeses, etc.)
 | 30 grams cheese (two thumbs) |  |  |  |  |  |
| 1. Medium fat cheeses (examples: halloum light, Akkawi, double cream cheese, arisheh, shanklish, etc.)
 | 30 grams cheese (two thumbs)4 tbsps arisheh 2 tbsps shanklish |  |  |  |  |  |
| 1. Eggs
 | 1 # |  |  |  |  |  |
| 1. Olive oil
 | 1 tsp olive oil |  |  |  |  |  |
| 1. Olives
 | 8 small olives |  |  |  |  |  |
| 1. Nuts (walnuts, almonds, etc.) & seeds
 | ¼ cup nuts or pumpkin seeds |  |  |  |  |  |
| 1. Other unsaturated fats [examples: oils except for olive oil, avocado, sesame paste, peanut butter, etc.]
 |  1 tsp other vegetable oil1/8 avocado2 tsps sesame paste (tahini) or peanut butter |  |  |  |  |  |
| 1. Saturated fats (examples: butter, ghee, heavy cream, etc.)
 | 1 tsp butter/ghee1/3 cup heavy cream |  |  |  |  |  |
| 1. Whole Grain Foods (examples: brown bread, brown rice, whole grain pasta, burghul, freekeh, oats, quinoa, bran flakes, etc.)
 | 1/2 medium whole wheat/oat Arabic loaf1/3 whole wheat/ multi cereal baguette1 whole Wheat/ multi cereal toasts (pain de mie)1/3 cup cooked whole rice, pasta, bulghur, freekeh, quinoa½ cup bran flakes, oats |  |  |  |  |  |
| 1. Grains (white bread, pasta, white Rice, noodles, moghrabiyeh, cereal bar, cereals, kaak, rice cakes etc.)
 | 1/2 medium Arabic loaf1/3 white baguette 1/4 large markouk loaf1 white toast1 pain au lait1/3 cup cooked white rice, pasta, moghrabiyeh1 cereal bar¾ cup cereals1 kaak finger / 6 round kaak2 rice cakes |  |  |  |  |  |
| 1. Manaesh , fatayer, pizza, croissant, shishbarak
 | ¼ medium manoush (zaatar, cheese, kishk, meat)1 fatayer (cheese, meat, spinach)½ slice small pizza½ medium croissant4# shishbarak |  |  |  |  |  |
| 1. Sweets & desserts (cookie, cake, doughnut, ice cream, knefeh, mafroukeh, Nutella, chocolate, baklava, maamoul, biscuit, halva, etc.)
 | 6# plain or light biscuits3# filled biscuits2 cookies1 medium cake piece 1 doughnut2 scoops ice cream½ piece of knefeh ½ piece of mafroukeh2 tbsps Nutella1 chocolate bar1 piece baklava1 small maamoul or ½ big one4 tbsps Halva |  |  |  |  |  |
| 1. Meats, high fat (beef or lamb meat, shawarma, kibbeh)
 | 90 grams cooked beef or lamb (palm sized) 6 pieces meat6 tbsps ground meat6 tbsps shawarma 1/2 medium piece of kibbeh  |  |  |  |  |  |
| 1. Meats, Medium fat (veal, beef, ground meat)
 | 90 grams cooked veal, low fat beef (palm sized)6 tbsps ground meat low fat |  |  |  |  |  |
| 1. Processed meats (mortadella, bacon, turkey, hot dog, makanek)
 | 2 slices Mortadella/bacon2 slices smoked turkey1 hot dog2 sausages (makanek)  |  |  |  |  |  |
| 1. Fish or tuna or sardine
 | 90 grams cooked fish (palm sized)1 small can of tuna or Sardines  |  |  |  |  |  |
| 1. Chicken, turkey or tawouk
 | 90 grams of cooked chicken or turkey (1 large leg or ¾ breast) 9 pieces of tawouk  |  |  |  |  |  |
| 1. Sugar, jam, molasses, coffee creamer, sweetened condensed milk
 | 1 tbsp sugars, jams, molasses, coffee creamer, condensed milk1 sachet instant coffee or Cappuccino  |  |  |  |  |  |
| 1. Soft and energy drinks
 | 1 cup  |  |  |  |  |  |
| 1. Diet beverages and diet energy drinks (examples: diet soft drink, diet powdered juices)
 | 1 cup |  |  |  |  |  |
| 1. Sweeteners (examples: saccharin, Acesulfame K, sucralose, etc.)
 | 1 tsp 6 tablets |  |  |  |  |  |
| 1. Alcoholic beverages
 | 140 mL wine |  |  |  |  |  |
| 40 mL spirits (whiskey, vodka, etc.)330 mL Beer |  |  |  |  |  |

1 cup= 250mls, tsp= tea spoon, tbsp= tablespoon

Table S2: Baseline characteristics of participants who dropped out after visit 1 compared to those who completed the study

|  |  |  |  |
| --- | --- | --- | --- |
|  | Subjects who completed the study (N=143) | Subjects who dropped out after V1 (N=57) | P-value  |
| Maternal age (years), mean ± SD \* | 31.5 ± 4.6 | 30.7 ± 6.8 | 0.519 |
| Maternal BMI (kg/m2), mean ± SD | 24.2 ± 4.0 | 25.9 ± 5.5 | 0.044 |
| Infant age (years), mean ± SD | 0.72 ± 0.44 | 0.75 ± 0.51 | 0.727 |
| Parity, n (%) PrimiparousMultiparous | 63 (44)80 (56) | 24 (43)32 (57) | 0.224 |
| GravidaPrimigravidaMultigravida | 49 (34)94 (66) | 16 (30)38 (70) | 0.733 |
| Current Marital Status, n (%)MarriedDivorced | 142 (99)1 (0.7) | 57 (100)0 (0) | 0.715 |
| Education, n (%)UniversitySecondaryIntermediate ElementaryIlliterate | 124 (87)8 (5.6)9 (6.3)2 (1.4)0 | 43 (75)3 (5.3)6 (10.5)4 (7)1 (1.8) | 0.101 |
| Work Status, n (%) Full TimePart Time Unemployed  | 62 (43)\*10 (7)71 (50)\* | 16 (28)2 (3.5)39 (68.4) | 0.051 |
| Medical History, n (%) | 31 (22) | 7 (12.5) | 0.163 |
| Food security, n (%) |  |  |  |
| Secure Moderately insecure Severely insecure | 90 (91)7 (7.1)2 (2) | 29 (93.5)2 (6.5)0 | 0.720 |
| Physical Activity level, n (%) |  |  |  |
| Sedentary/No activity Low Moderate High  | 38 (38)39 (39)19 (19)3 (3) | 10 (31)10 (33)12 (37.5)0 | 0.211 |

\* p value<0.05

Table S3: Intraclass correlation of daily nutrient intake assessed using the Food Frequency Questionnaire (FFQ) administered face to face

|  |  |  |  |
| --- | --- | --- | --- |
|  | FFQ1(N=36) | FFQ2(N=36) | Correlations[95% Confidence Interval] |
| Nutrient | **Mean ± SD** | **ICC****Unadjusted** | **ICC****Adjusted** |
| Obesogenic Nutrients  |  |  |  |  |
|  Protein (g/day) | 79.4 ± 33 | 73.9 ± 25 | 0.750 [0.51-0.87] | 0.629 [0.14-0.83] |
|  Carbohydrates (g/day) | 258 ± 106 | 243 ± 94 | 0.595 [0.20-0.79] | 0.424 [-0.09-0.70] |
|  Fiber (g/day) | 26.8 ± 14 | 24.5 ± 8.4 | 0.548 [0.11-0.77] | 0.493 [0.05-0.74] |
|  Sugar (g/day) | 94.4 ± 49 | 82.6 ± 41 | 0.590 [0.20-0.79] | 0.259 [-0.33-0.60] |
|  Fat (g/day) | 107 ± 50 | 97.5 ± 36 | 0.696 [0.40-0.85] | 0.369 [-0.16-0.67] |
|  SFA (g/day)  | 32.3 ± 18 | 27.4 ± 13 | 0.658 [0.34-0.82] | 0.537 [-0.07-0.79] |
|  MUFA (g/day) | 26.7 ± 14 | 27.5 ± 11 | 0.687 [0.39-0.84] | 0.628 [0.26-0.81] |
|  PUFA (g/day) | 10.8 ± 5 | 10.6 ± 4.3 | 0.744 [0.50-0.87] | 0.565 [0.16-0.78] |
|  TFA (g/day) | 1.83 ± 0.9 | 1.80 ± 1.1 | 0.590 [0.20-0.79] | 0.720 [0.46-0.86] |
|  Cholesterol (mg/d)  | 250 ± 151 | 218 ± 110 | 0.806 [0.62-0.90] | 0.722 [0.45-0.86] |
|  Energy (Kcal/g) | 2286 ± 959 | 2126 ± 726 | 0.656 [0.32-0.83] | - |

Table S4: Intraclass correlation of daily nutrient intake assessed using the Food Frequency Questionnaire (FFQ) administered via phone

|  |  |  |  |
| --- | --- | --- | --- |
|  | FFQ1(N=34) | FFQ2(N=34) | Correlations[95% Confidence Interval] |
|  Nutrient | **Mean ± SD** | **ICC****Unadjusted** | **ICC****Adjusted** |
| Obesogenic Nutrients  |  |  |  |  |
|  Protein (g/day) | 67.5 ± 21 | 66.8 ± 22 | 0.530 [0.46-0.77] | 0.583 [0.19-0.79] |
|  Carbohydrates (g/day) | 214 ± 67 | 198 ± 77 | 0.699 [0.41-0.85] | 0.441 [-0.12-0.77] |
|  Fiber (g/day) | 22.7 ± 7.4 | 23.1 ± 9.5 | 0.800 [0.60-0.90] | 0.574 [0.17-0.78] |
|  Sugar (g/day) | 70 ± 31 | 65.7 ± 30 | 0.610 [0.23-0.80] | 0.185 [-0.55-0.58] |
|  Fat (g/day) | 93.2 ± 35 | 89.1 ± 32 | 0.655 [0.31-0.83] | 0.455 [-0.07-0.73] |
|  SFA (g/day)  | 26 ± 11 | 24.2 ± 8.6 | 0.525 [0.05-0.76] | 0.500 [0.03-0.75] |
|  MUFA (g/day) | 26.5 ± 14 | 24.47 ± 12 | 0.698 [0.40-0.85]  | 0.682 [0.38-0.84] |
|  PUFA (g/day) | 9.73 ± 4.4 | 8.71 ± 3.7 | 0.698 [0.40-0.85] | 0.708 [0.28-0.87] |
|  TFA (g/day) | 1.61 ± 0.8 | 1.59 ± 0.9 | 0.594 [0.18-0.80] | 0.563 [0.13-0.78] |
|  Cholesterol (mg/d)  | 211 ± 92 | 201 ± 93 | 0.625 [0.25-0.81] | 0.608 [0.23-0.80] |
|  Energy (Kcal/g) | 1950 ± 602 | 1848 ± 649 | 0.691 [0.39-0.85] | - |

Table S5: Intraclass correlation of daily nutrient intake assessed using the Modified Mediterranean Prime Screen (MMPS) administered face to face

|  |  |  |  |
| --- | --- | --- | --- |
|  | MMPS1(N=36) | MMPS2(N=36) | Correlations[95% Confidence Interval] |
| Nutrient | **Mean ± SD** | **ICC****Unadjusted**  | **ICC****Adjusted**  |
| Obesogenic Nutrients  |  |  |  |  |
|  Protein (g/day) | 78.6 ± 30 | 76.7 ± 27 | 0.663 [0.33-0.83] | 0.682 [0.36-0.84] |
|  Carbohydrates (g/day) | 235± 89 | 240 ± 102 | 0.414 [-0.16-0.70] | 0.635 [0.29-0.81] |
|  Fiber (g/day) | 26.2 ± 8.4 | 27 ± 9.5 | 0.200 [-0.6-0.59] | 0.455 [-0.06-0.72] |
|  Sugar (g/day) | 94.2 ± 43 | 89.9 ± 41 | 0.632 [0.27-0.81] | 0.676 [0.38-0.83] |
|  Fat (g/day) | 101 ± 41 | 98.5 ± 38 | 0.624 [0.26-0.81] | 0.462 [-0.004-0.72] |
|  SFA (g/day)  | 31.6 ± 14 | 28.4 ± 13 | 0.705 [0.43-0.85] | 0.346 [-0.15-0.65] |
|  MUFA (g/day) | 33.7 ± 16 | 33.5 ± 14 | 0.627 [0.26-0.81] | 0.564 [0.15-0.78] |
|  PUFA (g/day) | 15.6 ± 7.3 | 15.4 ± 6.7 | 0.748 [0.50-0.87] | 0.777 [0.56-0.89] |
|  TFA (g/day) | 2.1 ± 0.8 | 2.2 ± 1.1 | 0.607 [0.22-0.80] | 0.648 [0.32-0.82] |
|  Cholesterol (mg/d)  | 261 ± 156 | 229 ± 107 | 0.795 [0.60-0.89] | 0.734 [0.46-0.87] |
|  Energy (Kcal/day) | 2133 ± 773 | 2123 ± 773 | 0.481 [-0.03-0.74] | - |

Table S6: Intraclass correlation of daily nutrient intake assessed using the Modified Mediterranean Prime Screen (MMPS) administered via phone

|  |  |  |  |
| --- | --- | --- | --- |
|  | MMPS1(N=34) | MMPS2(N=34) | Correlations[95% Confidence Interval] |
| Nutrient | **Mean ± SD** | **ICC****Unadjusted**  | **ICC****Adjusted**  |
| Obesogenic Nutrients  |  |  |  |  |
|  Protein (g/day) | 71.8 ± 24 | 68.4 ± 26 | 0.737 [0.74-0.48] | 0.619 [0.24-0.81] |
|  Carbohydrates (g/day) | 213 ± 75 | 197 ± 89 | 0.737 [0.48-0.87] | 0.594 [0.21-0.79] |
|  Fiber (g/day) | 24.6 ± 8.5 | 22.2 ± 8.9 | 0.776 [0.54-0.89] | 0.354 [-0.20-0.66] |
|  Sugar (g/day) | 78.7 ± 27 | 74.5 ± 36 | 0.683 [0.38-0.84] | 0.278 [-0.44-0.64] |
|  Fat (g/day) | 101 ± 41 | 90.8 ± 38 | 0.672 [0.36-0.84] | 0.572 [0.13-0.79] |
|  SFA (g/day)  | 30.9 ± 14 | 27 ± 13 | 0.648 [0.31-0.82] | 0.486 [0.02-0.74] |
|  MUFA (g/day) | 33.5 ± 17 | 31.4 ± 14 | 0.663 [0.32-0.83] | 0.700 [0.40-0.85] |
|  PUFA (g/day) | 15.4 ± 6.4 | 13.7 ± 5.7 | 0.692 [0.39-0.85] | 0.572 [0.16-0.78] |
|  TFA (g/day) | 2.2 ± 1.1 | 1.67 ± 0.8 | 0.631 [0.27-0.82] | 0.355 [-0.16-0.66] |
|  Cholesterol (mg/d)  | 233 ± 94 | 223 ± 104 | 0.649 [0.29-0.83] | 0.584 [0.16-0.79] |
|  Energy (Kcal/day) | 2027 ± 674 | 1859 ± 745 | 0.749 [0.50-0.87] | - |

Table S7: Energy adjusted and unadjusted Pearson correlation coefficients of the mean nutrients intake assessed via Food Frequency Questionnaire and the Modified Mediterranean Prime Screen (MMPS), administered face to face

|  |  |  |  |
| --- | --- | --- | --- |
|  | FFQ(N=143) | MMPS(N=143) | Pearson correlations[95% Confidence Interval] |
|  | **Mean ± SD** | **Unadjusted**  | **Energy** **Adjusted** |
| Obesogenic Nutrients  |  |  |  |  |
|  Protein (g/day) | 76.6 ± 26 | 77.7 ± 24 | 0.907 [0.82-0.96] | 0.808 [0.70-0.90] |
|  Carbohydrates (g/day) | 251 ± 84 | 237 ± 74 | 0.851 [0.72-0.92] | 0.825 [0.68-0.92] |
|  Fiber (g/day) | 25.7 ± 9.2 | 26.6 ± 6.7 | 0.711 [0.50-0.84] | 0.579 [0.34-0.77] |
|  Sugar (g/day) | 88.5 ± 37 | 92.2 ± 40 | 0.947 [0.87-0.98] | 0.734 [0.58-0.87] |
|  Fat (g/day) | 102 ± 38 | 99.9 ± 34 | 0.879 [0.77-0.94] | 0.719 [0.48-0.87] |
|  SFA (g/day)  | 29.8 ± 13 | 30 ± 12 | 0.921 [0.81-0.97] | 0.757 [0.42-0.89] |
|  MUFA (g/day) | 27.1 ± 11 | 33.6 ± 13 | 0.853 [0.76-0.92] | 0.784 [0.61-0.89] |
|  PUFA (g/day) | 10.7 ± 4.2 | 15.5 ± 6.3 | 0.735 [0.56-0.85] | 0.440 [0.09-0.68] |
|  TFA (g/day) | 1.82 ± 0.8 | 2.2 ± 0.8 | 0.484 [0.14-0.75] | 0.421 [0.09-0.72] |
|  Cholesterol (mg/d)  | 234 ± 120 | 245 ± 119 | 0.946 [0.91-0.98] | 0.921 [0.86-0.96] |
|  Energy (Kcal/day) | 2206 ± 732 | 2128 ± 626 | 0.899 [0.81-0.95] |  |

Table S8: Energy adjusted and unadjusted Pearson correlation coefficients of the mean intake nutrients assessed via Food Frequency Questionnaire and the Modified Mediterranean Prime Screen (MMPS), administered via phone

|  |  |  |  |
| --- | --- | --- | --- |
|  | FFQ(N=34) | PS2(N=34) | Pearson correlation [95% Confidence Interval] |
|  | **Mean ± SD** | **Unadjusted**  | **Energy****Adjusted** |
| Obesogenic Nutrients  |  |  |  |  |
|  Protein (g/day) | 67.1 ± 18 | 70.1 ± 22 | 0.828 [0.69-0.91] | 0.828 [0.69-0.91] |
|  Carbohydrates (g/day) | 206 ± 63.8 | 205 ± 75 | 0.763 [0.54-0.89] | 0.763 [0.54-0.89] |
|  Fiber (g/day) | 22.9 ± 7.9 | 23.4 ± 7.9 | 0.605 [0.42-0.75] | 0.605 [0.42-0.75] |
|  Sugar (g/day) | 67.8 ± 26 | 72.3 ± 29 | 0.802 [0.61-0.91] | 0.802 [0.61-0.91] |
|  Fat (g/day) | 91.2 ± 29 | 96 ± 34.6 | 0.763 [0.49-0.89] | 0.763 [0.49-0.89] |
|  SFA (g/day)  | 25.1 ± 8 | 28.9 ± 12 | 0.643 [0.43-0.82] | 0.643 [0.43-0.82] |
|  MUFA (g/day) | 25.6 ± 11 | 32.5 ± 13 | 0.821 [0.55-0.93] | 0.821 [0.55-0.93] |
|  PUFA (g/day) | 9.2 ± 3.5 | 14.5 ± 5.3 | 0.603 [0.34-0.80] | 0.603 [0.34-0.80] |
|  TFA (g/day) | 1.6 ± 0.7 | 1.9 ± 0.8 | 0.490 [0.09-0.77] | 0.490 [0.09-0.77] |
|  Cholesterol (mg/d)  | 206 ± 78 | 228 ± 86 | 0.800 [0.66-0.90] | 0.800 [0.66-0.90] |
|  Energy (Kcal/day) | 1899 ± 549 | 1943.1 ± 638 |  |  |

*Table S9: Correction parameters for obesogenic nutrients*

|  |  |  |
| --- | --- | --- |
| Energy Adjusted Nutrient Intake  | Intercept (a) | Slope (b) |
| Energy (Kcal/day) | 1.24 | 0.83 |
| Protein (g/day) | 17.4 | 0.76 |
| Carbohydrates (g/day) | 38.7 | 0.78 |
| Fiber (g/day) | 14.8 | 0.45 |
| Sugar (g/day) | 11.9 | 0.9 |
| Fat (g/day) | 27.8 | 0.72 |
| SFA (g/day) | 13.1 | 0.6 |
| MUFA (g/day) | 14.2 | 0.75 |
| PUFA (g/day) | 12.1 | 0.37 |
| TFA (g/day) | 1.8 | 0.23 |
| Cholesterol (mg/day) | 52.3 | 0.86 |

Correction factors for the energy adjusted nutrient intake that can be used to correct for measurement errors when estimating the true intake

*Figure S1: Bland Altman Plots showing the difference between FFQ and MMPS vs the mean of FFQ and MMPS for total energy adjusted macronutrients. The dashed lines show the limits of agreements ±2SD; solid line shows the mean difference in intake between FFQ and MMPS*

**a**



 **b**



 **c**



 **d**



**e**



 **f**



**g**



MUFA: Monounsaturated Fatty Acids, PUFA: Polyunsaturated Fatty Acids, SFA: Saturated Fatty Acids, TFA: Trans Fatty Acids.