Micronutrient Intake Profile of Egyptian Women in Reproductive Ages

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ABSTRACT

Women in low-and middle-income nations face major public health issues related to micronutrient deficiencies. From every region of Egypt, samples of women of fertile age who were neither pregnant nor lactating were chosen at random in several governorates. 4694 women between the ages of 18 and less than 50 years old participated in this study from 2015-2020. Using data from the participant's social relationships, daily consumption, and anthropometric measures, the micronutrient nutritional status was assessed. The results showed that most of the sample participants were between the ages of 25 and 35. In upper Egypt districts women made up 75.1% of university graduates. The frontier regions had the highest numbers of illiteracies, whereas Lower Egypt had the lowest. The highest percentages of professionals working were found in urban areas (37.1%) and upper Egypt (32.4%). Female unemployment was the highest in frontier areas (58.2%). The sample was overweight (29.1%) and obese (49.0%). Females consumed more minerals than they needed, such as sodium and copper. While intake of potassium, calcium, and magnesium fell below 50% of the reference daily intake (RDI). Furthermore, the utilization of phosphorus, iron, and zinc fell within the permissible ranges of 77-81%, 77-84%, and 92-105%, respectively. Upper Egypt regions were found to have the lowest vitamin A intake (51%) while the frontier region had the highest rate (122%). All water-soluble vitamins, with the exception of vitamin B1, were above 75% of RDI. This study indicated present poor dietary practices among women and their need for additional nutrition education.

Keywords: *Egyptian governorates- women- Micronutrient intake- National Egypt intake 2020*

INTRODUCTION

Micronutrient deficiencies (MNDs) are significant public health issues that affect a significant portion of global citizens **(Manjeru and Others 2017).** They are prevalent worldwide, with the largest danger being too expectant mothers and their young children under the age of five **(Bailey and else searchers 2015).** Around the world, there are over 800 million malnourished persons and 1.5 to 2 billion individuals who have one or more chronic MNDs. Notable mineral and vitamin deficiencies include those of calcium, iodine, iron, zinc, selenium, and vitamin A and folate **(Beal et al., 2017; FAO 2020; Kumssa and Another's 2015; WHO and UNICEF 2017).** Deficits in any one of these micronutrients can cause major issues like greater sensitivity to diseases, congenital disabilities, blindness, stunting, mental impairment, subpar academic and professional performance, and even mortality **(Petry et al., 2016; Black, 2003; Zimmermann 2009; Roth and Others 2018; van Hagen et al., 2017)**. Young children, pregnant and lactating women, adolescent girls, and women of fertile age are more susceptible to the effects of micronutrient insufficiency because of their high requirements. It has been demonstrated that improving diets, fortifying staple foods and condiments, and biofortification, and supplementing populations with increased needs to raise their intake of micronutrients can reduce mother and infant illness, cognitive impairment, and death **(Bhutta et al., 2008; Bhutta et al., 2013; Keats et al., 2021).**

However, it is difficult to estimate the prevalence and population of people who are micronutrient deficient globally. This is partly because most micronutrient deficiencies go untreated since they have vague symptoms, which is why they are frequently referred to as hidden hunger. Additionally, population-based surveys rarely contain biomarkers for micronutrient status, leaving a significant knowledge gap regarding the burden of micronutrient deficiency both nationally and globally **(Brown et al., 2021**). Based on the anticipated number of anemic individuals, the nutrition community has reported for more than three decades that 2 billion people worldwide suffer from micronutrient deficiencies **(WHO, 1991).** To determine financing and programming priorities and to support advocacy activities to advance these interests, reliable and well-documented global and regional estimates of persons suffering from micronutrient deficiencies are necessary **(Haddad et al., 2015).** There are still few population-representative markers for micronutrient status, and studies that are not representative are not very useful for calculating burden. For preschool-aged children (aged 6-59 months) and **non-pregnant women of reproductive age**, there are few and frequently out-of-date statistics available, but very few population-representative surveys include data on school-aged children, adolescent males, pregnant women, men, and older persons **(WHO,2020).**

This study seeks to offer a distinctive perspective on the food and micronutrient intake of a sizable cohort of Egyptian women who are of reproductive age. The study goals were to (1) describe these women's micronutrient intakes, (2) evaluate the sufficiency of those intakes in comparison to references, and (3) pinpoint significant dietary sources of micronutrients.

Study design: Cross section study was employed in this study.

Sample size: This study was carried out on 4694 women, whose ages ranged from 18 to 50 years old. This study was undertaken as part of a study of the national survey done by the National Nutrition Institute (NNI) in Egypt for updating food consumption patterns among different population groups during the period from 2015 to 2020. Egypt was divided into four geographical areas as follows: Urban, Lower, Upper, and Frontier Egypt. The following governorates were selected randomly from each geographical area Urban (Cairo, Alexandria, Suez, and Port Said), while Lower Egypt (Ismailia, Minofyia, Kafr El-Shiekh, Damietta, Qalyubia, Sharkia, Dakahlia, Beheira, and Gharbia), Upper Egypt (Giza, Minya, Sohag, Assuit, Qena, Fayoum, Beni surf, Aswan and Luxor) and Frontier (North Sinai, Matrouh, Red Sea, New Valley, and South Sinai). The sample was selected from the nominated governorates randomly as follows: -The districts were selected randomly. Each studied governorate except Cairo and Alexandria was divided into urban and rural sampling units. All residence areas had different socioeconomic classes.

Exclusion criteria: Samples with specific nutritional problems and specific dietary recommendations (vegetarian, pregnant, lactating, Diabetes, chronic renal diseases, chronic liver diseases).

Study tools: The tools of this study consisted of structured inter-viewing questionnaires. This consists of three parts: The first is to elicit the socioeconomic characteristics of women including information about their age, educational levels, and occupation **(Park and Park, 1979).** The second is to collect daily food intake by using the 24-hour recall method and food frequency. The third recorded anthropometric measurements of studied women.

Ethical considerations: the permission of the ministry of health and population research ethics committee.

METHODOLOGY:

- **Dietary intake of nutrients:** The sample weighting procedure and the 24-hour recall to record the daily intake. On the day before the interview day, the field team acquired oral reports about the meals and drinks the target participants ingested at each dining event. It started with the first meal consumed after waking up and continued with each successive meal until sleep. Utilizing a dietitian's kit of utensils with known weights and supported by weighing comparable portions of what was consumed, amounts of foods and beverages were calculated. the nutritive value of the intake was determent using food compo-sition tables for Egypt **(NNI, 2006) and** compared with the per capita RDI used by **FDA (2020**) according to age and physical state.
- **Dietary habits: '' Food Frequency Questionnaire'':** This method was used to collect qualitative data about the habitual food and beverage consumption habits of the family members per week (daily, less than 3 times per week, or equal to or more than 3 times per week) and monthly.
- **Anthropometric measures:** According to **WHO (2006)** guidelines, anthropometric data, include length, body weight, and body mass index (BMI).
- **Statistical analysis:** The SPSS version 20 program was used to analyze the data. Data were expressed in numbers and percentages for qualitative nonparametric variables the median

percentiles were used while in quantitative parametric data, the mean ± standard deviation (SD) was used. The Chi-square test also was used for qualitative variables to determine the *P*-values and confidence interval (CI), T-test, ANOVA, and the Pearson correlation test was also used. Significant statistical correlations between different variables were detected by using the Chi-square test. The statistical significance correlation reaches if the *P*-value is less than 0.05 according to **Levesque (2007).**

- **Dietary data analysis:** Data from 24-hour recall was analyzed using the food analyzing program (using Egyptian food composition 2006 as the database) in the Statistics Unit at the National Nutrition Institute. The result for each subject was concentrated on the amount of micronutrient intake consumed on this day. Data obtained from this program was then first compared to the RDI to check for the adequacy of intake and then the intake of each group was compared to the others using an independent sample t-test or one-way ANOVA test.

RESULTS and DISCUSSION

Characteristics of the Participants:

In Figure (1) the participants in the survey samples examined the 4 main demographic areas, which included 4694 Egyptian women of reproductive age. In Lower Egypt, there are more samples (1714). The majority of the sample's women had the ages 25-35 years **(figure 2).** Among the four demographic groups, there was a considerable variation in the education of women **in figure (3**). Women had the highest percentage of university graduates showed in upper Egypt areas (75.1%), while the lowest percentage was found in frontier and lower Egypt areas (3.4% and 8.3%) respectively. Despite this, lower Egypt had the lowest percentage of illiteracy and the frontier regions had the highest. The majority of the sample were attending secondary education. Relating to women's employment, the 4 demographic areas differed significantly from one to another. Urban regions and upper Egypt had the largest proportions of professionals working, with 37.8%

and 37.6%, respectively. However, just 5.9% of professional occupations were found in frontier areas, which is the lowest rate. Frontier areas had the highest ratio of female unemployment (58.2%), whereas lower Egypt had the lowest percentage (28.4%), their results showed in **(figure 4).**

The perchance distribution of women's BMI correlated with geographic dispersion, was shown **in Table (1).** According to BMI calculations, the majority of the sample representatives had obese (49%), and (0.77%) were underweight. On the report of the data, there is no relationship between urban and rural areas with women's BMIs an (X^2 value equal (0.215). Rural areas had a higher percentage of underweight to normal weight than urban areas did. An indication of poor nutritional habits among women of that age and the need for more women's nutrition education programs is the fact that around 49% of Egyptian women and 29.1% are overweight.

From the food frequency questionnaire, **Figure 5** demonstrated the mean food groups intake of households (per capita) in urban, lower, and upper Egypt and frontier regions. Cereals and tubers revealed the highest daily item intake (380.5g and 94.6g), as a good source of calories. Extra calories are deposited as fat throughout the body. Adipose tissue with excessive amounts of fat cells can harm health, and an energy imbalance between calories ingested and calories burned is what leads to obesity and overweight **(WHO, 2014).**

The participants' dietary intake of vitamins and minerals

The importance of micronutrient consumption by women of reproductive age non-pregnant and lactated was highlighted by this study. The data seen **in the table (2)** indicated that, for the majority of participants from different areas, mean sodium intake was more than three times higher than the requirements, exceeding the recommended daily intake of 2.3 g /day **(FDA, 2020).** It is commonly recognized that consuming more salt causes high blood pressure, which in turn causes heart disease, stroke, and kidney damage **(Cappuccio, 2013).** In the Nordic cohorts of Europe, an independent relationship between sodium intake and the risk of coronary heart disease has been described.

Higher salt intake of 100 mmol was associated with 51% higher death from coronary heart disease, 45% higher mortality from cardiovascular disease, and 26% higher mortality from all causes. **(Tuomilehto et al., 2001).** Since too much sodium is linked to elevated blood pressure, stroke, and body water retention, sodium consumption should be restricted to a maximum of requirements. The use of cheese and meat products like sausages may be to blame for the study participants' higher sodium intake. These goods often contain more than 1 g of salt per 100 g of the item, which is a large quantity of salt (and thus sodium) **(Farquhar et al., 2015**). Conversely, the average daily intake of sodium is still 4.0 g or more in many regions **(Hyseni, et al., 2017; Vasara, et al., 2017)**. Population-based prospective studies reveal that the risk of cardiovascular disease rises by 18% for every daily increase of 1000 mg in salt excretion **(Ma et al., 2022).** Therefore, the **WHO (2013)** recommends a 30% reduction in salt intake in the Global Action Plan for the Prevention and Control of Noncommunicable Diseases NCDs. Planning and evaluating the success of national salt reduction strategies requires an evaluation of the population's salt consumption **(WHO, 2020)**. In the current population-based investi-gation, salt intake was significantly higher than advised. The critical need for coordinated action to address salt consumption is reiterated by this in Egypt.

For the study samples, the computed potassium consumption was less than half of the daily dose of 4700 mg advised by the **FDA (2020).** However, plant-based food items like fresh and dried fruits, legumes, green leafy vegetables, etc. are easy to consume for potassium, studies from the United States (**Pratt, et al., 2014)** and Poland **(Bzikowska-Jura et al., 2018)** have found that in lactating women's potassium intake is lower than that advised by the national nutrition guidelines. In order to decrease the risk of CVDs in adults, such as hypertension, coronary heart disease, and stroke, the WHO also suggests increasing potassium consumption from meals **(WHO, 2012, 2014; D’Elia, et al., 2011).** However, the risk of CVD can be predicted more accurately by the sodium-to-potassium ratio in 24-hour urine collections rather than by dietary consumption alone **(Stone et al, 2016).** A combination of low sodium and high potassium intake may be a more accurate indicator of the risk of cardiovascular disease than sodium and potassium intake separately, therefore measuring the ratio is crucial. The ideal Na/K ratio when adhering to recommended intakes is roughly one, according to the **WHO (2012).**

Table (2) showed that the main Egyptian demographic groups varied significantly in their calcium intake. Lower Egypt was found to have the highest calcium intake, while frontier regions had the lowest calcium intake. The amount of calcium consumed in this trial was only a third of the RDI of "1300 mg." According to the frequency questionnaire, women consumed less than half a cup of milk daily. Adults' bone health may be negatively impacted by low calcium consumption. To create national programs to maximize consumption, it is vital to acknowledge the existence of low calcium intake **(Balk et al, 2017).** According to the available data, greater dietary calcium consumption is linked to lower body weight, BMI, and obesity. The activation of lipolysis and suppression of lipogenesis may be the mechanism through which dietary calcium reduces body fat **(DeJongh et al., 2006).** These notes are shown in the study's sample. It has been demonstrated that dietary salt intake increases urine calcium loss and consequently increases calcium requirements in those with high-sodium diets.

In all of the selected regions, women's phosphorus (P) usage ranged from 77 to 81% of RDI; this ratio was satisfactory. Additionally, they had significantly lower mean calcium and phosphorus levels, both of which are crucial for maintaining strong bones **(Alshammari et al., 2017).** By changing cytokine levels, increased dietary phosphorus consumption may have an impact on inflammatory illness. Phosphates are linked to a number of diseases, including premature aging and vascular calcification; this association may be due to an augmented inflammatory response **(Goodson et al., 2019).** Despite the fact that phosphate insufficiency is probably uncommon, there is some weak evidence that it can be caused by dietary deficiencies. In fact, average dietary intakes of P and magnesium (Mg) are typically far higher than their biological needs, and if not, enhanced absorption is the result **(Waterlow, 2006)**.

According to **FDA (2020),** the average amount of Mg consumed was 40% of the RDI (420 mg). Mg is a critical dietary component for people since it is engaged in important biological processes. Neuromuscular conduction abnormalities, clinical hypocalcemia, and illnesses affecting the metabolism of the muscles and bones, such as osteoporosis and loss of muscle mass, are all linked to hypomagnesemia. A national survey of 4497 American adults found that higher levels of systemic inflammation were linked to reduced magnesium intake **(Kim et al., 2010).** A meta-analysis of 32,918 adults found that elevated serum C-reactive protein (CRP) levels were linked to poor magnesium intake **(Dibaba et al., 2014).** Numerous adult cross-sectional research found links between magnesium consumption and increased muscle size and strength. **(Welch et al., 2016; Hayhoe et al., 2019).** Magnesium and calcium compete for binding on calcium-sensing receptors, which lowers serum parathyroid hormone (PTH) levels **(Mazur et al., 2007).** Chronically elevated serum PTH is linked to muscle loss by negatively affecting muscular energy metabolism, which reduces the generation of amino acids and protein synthesis **(Garber 1983).** The insulin signaling pathways may also play a role in how magnesium consumption controls inflammation and muscle mass. It is crucial for appropriate insulin secretion and activity, as well as for the best performance of numerous enzymes involved in glucose and energy metabolism, to keep serum Mg^{2+} concentrations within the reference range. Insulin resistance is correlated with low serum magnesium levels **(Chutia and Lynrah, 2015)**. Mg^{+2} can control pancreatic beta cells' release of insulin **(Kostov 2019).**

Table 2 also indicated that the urban area had the lowest iron intake but that Upper Egypt had the highest. With a variance of 77–84%, women's consumption of iron is lower than their RDI. Women are prone to issues including fatigue as well as a variety of micronutrient deficiencies as a result of the poor diet brought on by meals high in calories but low in nutrients **(Daniels et al., 2005).** Low dietary consumption in developing nations is related to both the diet's poor iron bioavailability as well as its low iron content. Chronic inflame-mation, inflammatory bowel disease (IBD), congestive heart failure, chronic renal disease, obesity, cancer, and rheumatoid arthritis all interfere with iron absorption **(Gilreath, et al., 2014; Lopez, et al., 2016).** It is well-accepted that the incidence of iron insufficiency is widespread in poor nations due to low intakes of animal products and diets rich in phytates, which prevent iron absorption **(de Benoist, et al., 2007).** The primary contributor to micronutrient deficiency is a diet heavy in staple foods and deficient in animal sources **(Bouis, 2003).** A deficiency is brought on by excessive loss or insufficient iron absorption. Depending on the individual's iron level, the type of iron, and other dietary parameters, absorption is strictly controlled in the intestines **(Beard 2007).**

Lower Egypt and urban regions had the lowest zinc intake (92%) of RDI, whereas upper and frontier Egypt reported the highest zinc capacity (100–150% of RDI). Many essential metalloenzymes in the body, such as carbonic anhydrase and alkaline phos-phatase, have zinc as an essential component of their catalytic site. The structural differentiation of numerous organs, including the skin, highly depends on zinc finger proteins, such as those found in retinoic acid and vitamin D receptors. Additionally, zinc functions as an ionic signal that controls gene expression. It is abundant in foods high in protein, particularly those high in animal protein. Phytates and iron diminish their bioavailability **(Maverakis et al., 2007).**

According to **FDA (2020),** lower Egypt had the highest reported copper intake at 153% of the RDI (0.9 mg/day), followed by urban and higher Egypt at 131%. Nuts, organs meat, fish, legumes, dried fruit, particularly cashews, and vegetables are the main dietary sources of copper. A significant source of copper aside from diet is water, albeit the metallic content of water varies greatly. The concentration of copper in water is determined by elements such as natural mineral content, pH, and plumbing system **(National Research Council, US 2000).** High copper concentrations have been reported in numerous nations, including Europe. When the concentrations have been measured multiple times, there is significant variation between the recorded amounts even within the same sources. The maximum permissible level of copper in water for human consumption in the European Union (EU) is 2 mg/L **(EFSA, 2015).** The primary function of copper is the formation of oxidases, which transport electrons to reduce molecular oxygen. As a result, copper is essential for energy metabolism at the cellular level **(Kubiak, et al., 2010).** Additionally, the presence of copper promotes mesenchymal stem cells' development into the osteogenic pathway. **(Ding, et al., 2014).**

Table 3 demonstrated that there were notable variations in vitamin A intake among Egypt's main demographic groups. The districts in upper Egypt had the lowest vitamin A intake. In the frontier region, the RDI percentage reached its greatest point at 122%. Immune system health, cellular communication, growth, and development, also male and female reproduction are all impacted by vitamin A **(Blaner, 2020).** Supporting cell growth and differentiation, vitamin A is essential for the healthy development and upkeep of the heart, lungs, eyes, and other organs **(Ross, 2014).** Because it supports the appropriate differentiation and operation of the conjunctival membranes and cornea, as well as being a necessary component of rhodopsin, the light-sensitive protein in the retina that reacts to light entering the eye, vitamin A is also vital for vision **(Carazo et al., 2021).** Infection risk and intensity are increased by vitamin A deficiency (VAD) **(Stevens, et al., 2015).** One of the leading causes of preventable childhood blindness is vitamin A deficiency **(Bailey et al., 2015).** Additionally, a chronic vitamin A deficit has been linked to incorrect lung development, respiratory conditions, a higher risk of anemia, and even mortality **(Wiseman et al., 2017; Timoneda et al., 2018).** The body retains excess vitamin A because it is fat soluble, particularly in the liver, where levels can build up. After taking one or more very high doses of vitamin A (usually more than 100 times the RDA), a person will have acute vitamin A toxicity, also known as hypervitaminosis A, within days to weeks **(NIDDKD, 2020)**. Severe headaches, blurred vision, nausea, dizziness, aching muscles, and difficulties with coordination are frequently the resulting signs and symptoms. When conditions are extreme, an increase in cerebral spinal fluid pressure can cause drowsiness, eventually a coma, and even death **(NIDDKD, 2020**). Chronic hypervitaminosis A (consumption of excessive dosages of vitamin A on a regular basis) can result in abnormal liver test results as well as dry skin, sore muscles and joints, weariness, and depression. **(NIDDKD, 2020)**.

Table 3 showed that different regions had vitamin C intake that was between 61% and

92% of the RDI (90 mg/day). Vitamin C plays a role in protein metabolism as well as being necessary for the manufacture of collagen, L-carnitine, and certain neurotransmitters **(Li and Schellhorn, 2007**). Collagen is a crucial component of connective tissue, which is crucial for the healing of wounds. Vitamin C is also a vital physiological antioxidant **(Frei et al., 1989),** is crucial for immune system health **(Jacob and Sotoudeh, 2002),** and enhances nonheme iron absorption **(Gershoff, 1993)**. Data in table 3 also showed that vitamin B1 is consumed more than RDI in Upper Egypt and equal RDI in lower Egypt, while the frontier area was 96% and the urban was 95%. Humans store thiamin primarily in the liver, but in very small amounts. The vitamin has a short half-life, so people require a continuous supply of it from their diet **(Bemeur and Butterworth 2014).**

Between the main demographic groups in Egypt, there were no appreciable differences in B2 consumption, and it was within the acceptable range of >75% from RDI (1.2mg/day). Blood homocysteine levels are kept at normal levels with the aid of riboflavin B2 **(Rivlin, 2010).** only little levels of riboflavin in the kidneys, liver, and heart. If too much is taken, it either isn't absorbed or the little that is absorbed is eliminated in urine **(IMFNB, 1998).** The quantity of free riboflavin that the large intestine can absorb depends on the diet and is produced by bacteria there. After consuming foods with a vegetable base rather than a meat base, more riboflavin is created **(Said and Ross 2014).**

The prevalence of obesity and rising vitamin intake may be positively correlated **(Zhou and Zhou, 2014)**. Because B vitamins can enhance fat synthesis **(McHenry and Gavin, 1941),** research has shown that higher B vitamin intake (B1, B2, and niacin) is closely connected with the prevalence of obesity and diabetes (**Zhou et al., 2010).**

CONCLUSION

The education levels of the study sample were different with 39.2%, females had the highest secondary education rate, and roughly a quarter of females were litterateurs. Urban areas had the highest proportion of residents with a university degree. Frontier regions had a greater rate of illiteracy. In terms of employment status, (68%) of the ladies were unemployed. Most adult females consumed insufficient amounts of potassium, calcium, magnesium, vitamin A, and other minerals. All adult females received enough vitamin C to meet their needs. The intake of sodium, copper, and vitamin B1 exceeded the needs. While consumption of potassium, calcium, and magnesium fell below 50% of the recommended daily amounts. Furthermore, the utilization of phosphorus, iron, and zinc fell within the permissible ranges of 77-81%, 77-84%, and 92-105%, respectively.

RECOMMENDATION

Many of these nutritional deficits can be avoided by learning about nutrition and eating a healthy, balanced diet that includes a variety of food types that are sufficient for each nutrient. When it comes to factors that affect food intake and dietary practices, such as eating habits, food purchasing, food preparation, food safety, and environmental factors, nutrition education has the power to improve dietary behavior and nutritional status. For nations afflicted by globalization, urbanization, and a risky dietary shift toward inexpensive processed foods high in sugar, fat, and salt, proper nutrition education is essential.

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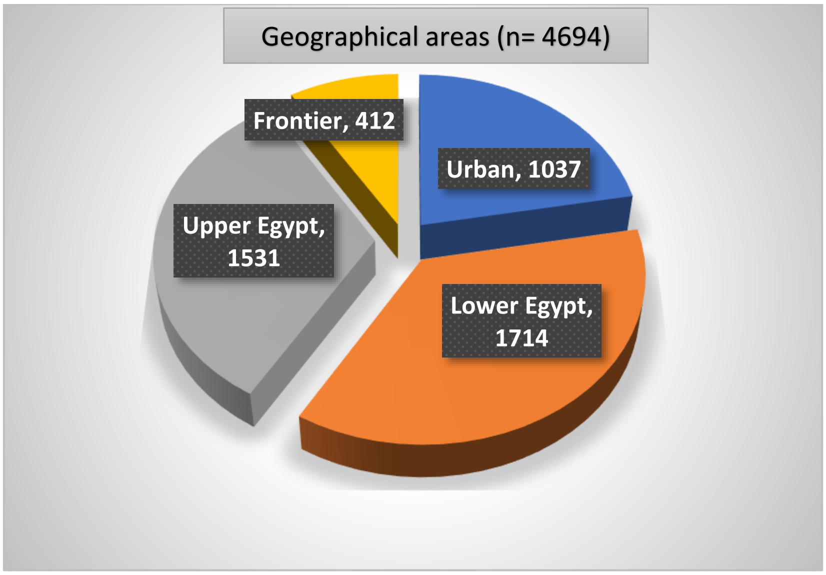


Figure 1: Distribution of studied women according to demographic areas

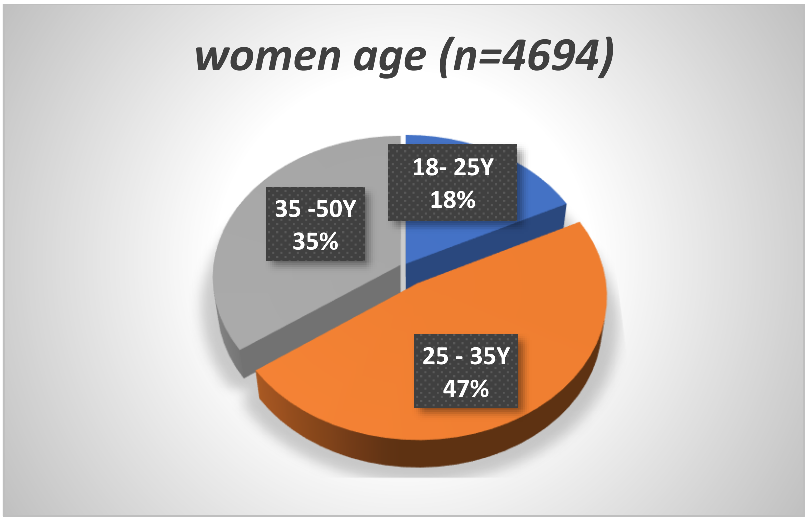
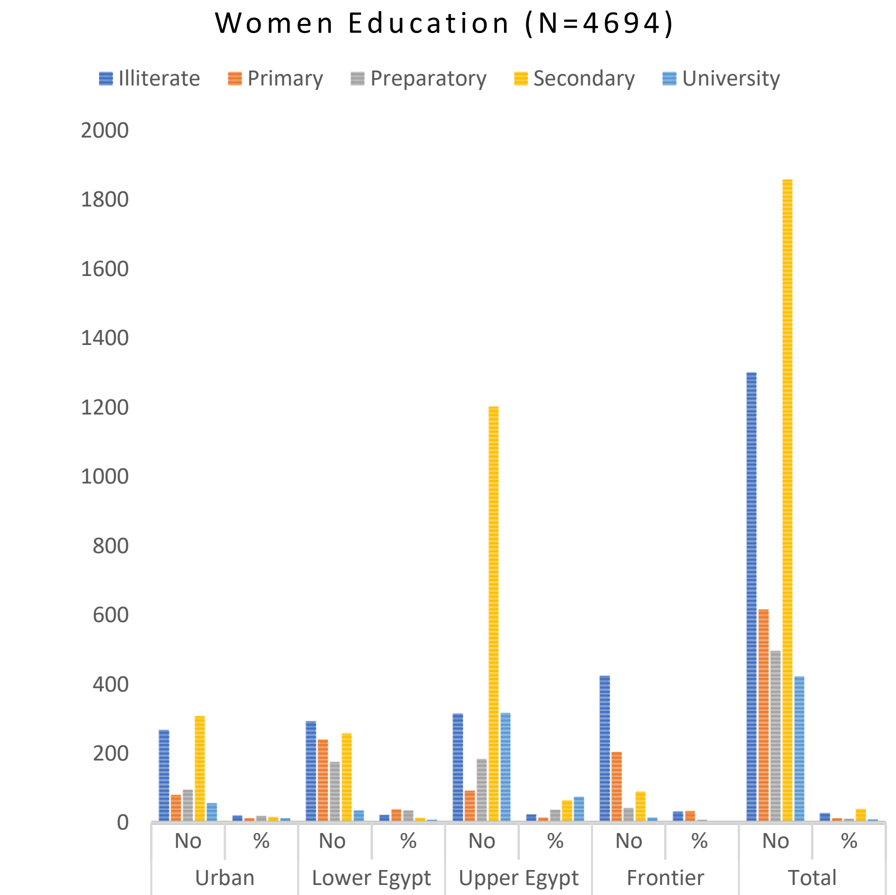


Figure 2: Distribution of women according to age



	Urban		Lower Egypt		Upper Egypt		Frontier		Total	
	No	%	No	%	No	%	No	%	No	%
Illiterate	268	20.6	293	22.5	315	24.2	424	32.7	1300	27.7
Primary	80	13	240	39	92	15	204	33	616	13.1
Preparatory	95	19.2	176	35.5	184	37	42	8.3	497	10.6
Secondary	308	16.6	258	13.9	1202	64.7	90	4.8	1858	39.6
University	56	13.2	35	8.3	317	75.1	15	3.4	423	9

Figure 3: The Percentage Distribution of women's social data according to the level of education

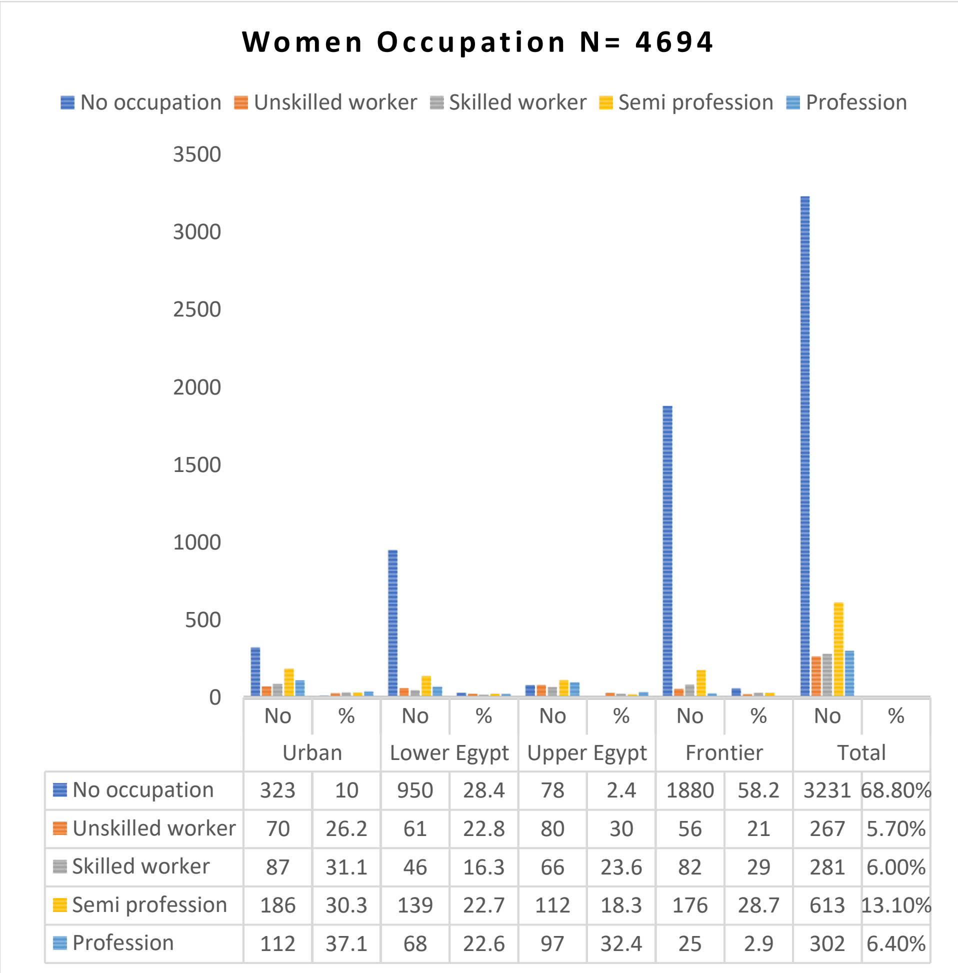


Figure 4: The Percentage Distribution of women's social data according to the level of Occupation.

Table (1): Distribution of women's BMI related to geographic distribution (n= 4694)

Sample	**Underweight**		**Normal**		**Overweight**		**Obese**		**X²**	***P*** *value*
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**		
Urban (2282)	14	0.6	438	19.2	671	29.4	1159	50.8	0.215	0.016
Rural (2412)	22	0.9	552	22.9	695	28.8	1143	47.4		
Total (4694)	36	0.8	990	21.2	1366	29.1%	2302	49.0		

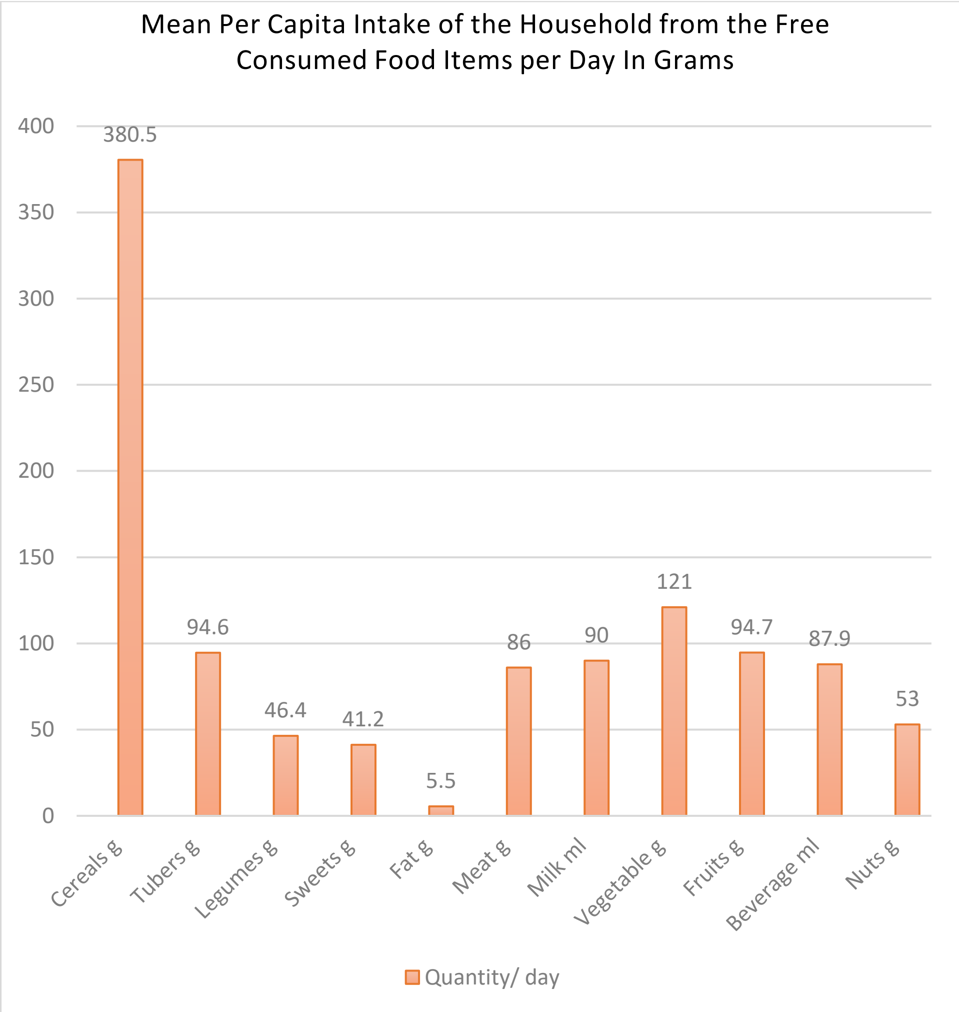


Fig (5): household intake of consumed food items per day in gram

Table (2) Mineral consumption in the household/capita according to RDI of FDA in the studied sample

Minerals	Urban	Lower Egypt	Upper Egypt	Frontier	*P* value
	mean	mean	mean	mean	
Sodium mg	7240.0	7682.0	7068.0	7356. 0	**0.000**
D.V.	**2300 mg**				
% Of D.V.	315	334	307	320	
Potassium	1992.0	2156.0	2119.0	1942.0	**0.001**
D.V.	**4700 mg**				
% Of D.V.	42	46	45	41	
Calcium	**427.0**	**469.0**	**445.0**	**439.0**	**0.059**
D.V.	**1300 mg**				
% Of D.V.	33	36	34.2	33.8	
Phosphorus	965.0	1008.0	957.0	1011.0	**0.063**
RDV	**1250 mg**				
% Of D.V.	77	81	76.6	81	
Magnesium	163.0	182.0	167.5	165.0	**0.064**
D.V.	**420 mg**				
% Of D.V.	39	43	40	39	
Iron	13.9	14. 5	14.6	15.2	**0.048**
D.V.	**18 mg**				
% Of D.V.	77	81	81	84	
Zinc	10.1	10.1	11.0	11.5	**0.057**
D.V.	**11mg**				
% Of D.V.	92	92	100	105	
Copper	1.19	1.38	1.18	1.07	**0.005**
D.V.	**0.9 mg**				
% Of D.V.	132	153	131	119	

Reference of Recommended Daly value (D.V.) of (FDA, 2020)

Table 3: Vitamins consumption in households/capita according to RDI of FDA in the studied sample

Vitamins	Urban	lower Egypt	upper Egypt	Frontier	*P* value
	Mean	Mean	Mean	Mean	
Vit. (A) mcg	784.0	579.8	456.2	1096.3	0.001
D.V.	900 mcg				
% Of D.V.	87	64	51	122	
Vit. (C) mg	67.7	83.1	68.8	55.2	0.000
D.V.	90mg				
% Of D.V.	75	92	76	61	
Vit.(B1) mg	1.24	1.30	1.41	1.25	0.000
D.V.	1.3 mg				
% Of D.V.	95	100	108	96	
Vit.B2 mg	0.98	0.98	0.95	1.02	0.594
D.V.	1.2 mg				
% Of D.V.	82	82	79	85	

Reference of Recommended Daly value (D.V.) of (FDA, 2020)

لمحة عن تناول المغذيات الدقيقة لدى السيدات المصرية في سن الإنجاب

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الملخص العربي

تواجه النساء في الدول منخفضة ومتوسطة الدخل قضايا صحية عامة رئيسية تتعلق بنقص المغذيات الدقيقة. من كل منطقة في مصر ، تم اختيار عينات من النساء في سن الإنجاب من غير الحوامل أو المرضعات بشكل عشوائي في عدة محافظات. شاركت 4694 امرأة تتراوح أعمارهن بين 18 و 50 عامًا في هذه الدراسة بين عامي 2015 و 2020. تم تقييم الحالة التغذوية للمغذيات الدقيقة باستخدام بيانات من العلاقات الاجتماعية للمشاركين ، والأطعمة اليومية المتناولة ، ومقاييس الجسم لهن. أظهرت النتائج أن معظم المشاركين في العينة تتراوح أعمارهم بين 25 و 35 عامًا. في مصر العليا ، شكلت النساء ما يقرب من 75.1٪ من خريجي الجامعات. سجلت المناطق الحدودية أعلى نسبة للأمية ، في حين سجلت مصر السفلى أدنى نسبة. تم العثور على أعلى نسب المهنيين العاملين في المناطق الحضرية والوجه القبلي. كانت بطالة الإناث هي الأعلى في المناطق الحدودية. وجد ايضا أن المصريات يعانين من زيادة الوزن(29.1%) والسمنة (49.0%). تستهلك الإناث معادن أكثر مما تحتاج إليه ، مثل الصوديوم والنحاس. بينما انخفض تناول البوتاسيوم والكالسيوم والمغنيسيوم إلى أقل من 50٪ من الكميات اليومية الموصى بها. علاوة على ذلك ، انخفض استهلاك الفوسفور 77-81٪ والحديد 77-84٪ أما الزنك 92-105٪ ضمن النطاقات المسموح بها. وجد أن مناطق مصر العليا لديها أقل نسبة من فيتامين (أ) (51٪) في حين سجلت المنطقة الحدودية أعلى نسبة (122٪). كانت جميع الفيتامينات القابلة للذوبان في الماء ، باستثناء فيتامين ب $_1$ ، أعلى من 75٪ من المدخول اليومي الموصى به. اظهرت النتائج وجود قصور في تناول المغذيات الدقيقة لدى السيدات المصريات وحاجتهن إلى مزيد من التثقيف التغذوي.

الكلمات المفتاحية: المحافظات المصرية - النساء - المغذيات الدقيقة