

## **Association between Sociodemographic Factors and Nutritional Knowledge among Working Mothers in Terengganu**

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### **Abstract**

Nutrition knowledge can be defined as understanding the concepts and the processes in nutrition and health, such as diet and health, diet and disease, main nutrient sources, and dietary guidelines and recommendations. It is well documented that nutrition knowledge is influenced by age, sex, and socio-economic factors. This study aims to determine the association between sociodemographic factors (age, educational level, marital status, salary income, location, type of job, and family members) and nutritional knowledge among working mothers in Terengganu. This cross-sectional study collected sociodemographic information and nutritional knowledge using the General Nutrition Knowledge Questionnaire among 281 working mothers aged 19 to 60 years old. The results show the majority of the participants (70%) had good scores, 23.8% had excellent scores, 6.4% had an average score and 0.4% had poor scores on general nutrition knowledge respectively. The prevalence of nutritional knowledge among working mothers in Terengganu was excellent as 93.2% of participants scored for high nutritional knowledge, and only 6.8% scored for low nutritional knowledge. There was a significant association between sociodemographic factors (age, educational level, marital status, and salary income) with nutritional knowledge among working mothers in Terengganu. This study suggests the importance of having good nutrition knowledge among working mothers as this matter could enhance the child outcomes Terengganu.

### **Keywords**

Sociodemographic, working mothers, working women, nutrition knowledge, General Nutritional Knowledge Questionnaire (GNKQ)

### **Introduction**

In Malaysia, women comprise 50% of the workforce, and 70% of them are married. Working mothers are common nowadays as more women get higher education as well as having the desire to increase the economic status of their families and the desire for self-actualization [1]. There was an increment in the participation rate of the female labour force from 39.3% in 1980 to 46.1 % in 2010, as a result of

educational advancement [2]. At home, the mother is usually the one who prepares the food for the family, and having mother-and-child interaction is very important for the child's development.

One of the many elements that impact nutritional awareness is the level of education. Nutritional knowledge and attitude are linked, and both play important roles in determining nutritional behaviour. It is pivotal to obtain a comprehensive understanding of population-based knowledge of food and changing behavioural patterns, both of which increase the risk of chronic illness development, particularly in those of working age. This understanding will make it easier to implement interventions that are important in disease prevention or decrease illness development in the future [3].

Nutritional understanding could be one of the factors influencing the nutritional practice such as in meal selection. Given the several dietary options available, a person would require a certain level of knowledge to make a healthy choice [4]. A lack of nutritional awareness can result in the development of unhealthy food habits and result in different health problems in an individual. It is critical to evaluate differences in groups with varied socio-demographic characteristics, as well as the factors influencing them when determining the state of health and nutrition in the population. Study shows that women and people with higher educational levels were more relevant to the topic of healthy eating and more willing to change than males and people with lower educational levels [5].

Another factor that affects an individual's lifestyle is marital status. Married people transitioned their lifestyle to a more regular lifestyle, which transforms in a good way and is reflected in their health and nutrition behaviors and habits [6]. Apart from that, nutritional knowledge and practices improve with age, and also in line with a previous study discovered that the educational status of the participants is a factor that influences nutritional knowledge score [7]. As educational level increases, individuals' rate of involvement in working life increases as well [5]. Therefore, the aim of this study was to determine the association between sociodemographic factors (age, educational level, marital status, salary income, location, type of job, and family members) with the nutritional knowledge among working mothers in Terengganu.

## **Methods**

### *Study design*

This study used an observational study design which was a cross-sectional study. The participants were asked to answer the self-administered questionnaires through a Google form. The study involved 281 working mothers in Terengganu.

### *Ethical statement*

The study was reviewed and approved by the UNISZA (Universiti Sultan Zainal Abidin) Human Research and Ethics Committee (UHREC) (UNISZA/UHREC/2021/267). The subjects were recruited for the study after obtaining informed consent.

### *Inclusion and Exclusion criteria*

This study's participants were 281 working mothers in Terengganu. The inclusion and exclusion criteria were as follows: i) working mothers aged 19 to 60 years old, ii) any working mother, regardless of their job, iii) participants who complete the consent form, iv) Malaysian, and v) able to read, and communicate either in Bahasa Malaysia or English. The working mother with the following criteria was excluded: i) working mothers below 19 years old, more than 60 years old, ii) non-Malaysian, iii) a participant with learning disability such as being unable to read, and an incomplete questionnaire.

## Data collection

### *Sociodemographic Details*

The online questionnaire can be divided into socio-demographic details and General Nutrition Knowledge Questionnaire (GNKQ). Socio-demographic details that were asked were age, gender, educational level, marital status, salary income, location, nationality, district, place of work, type of job, and the number of family members.

### *General Nutrition Knowledge Questionnaire*

The General Nutrition Knowledge Questionnaire was developed in the 1990s and then was revised and known as GNKQ- revised (GNKQ-R). The GNKQ-R is consisted of 88 items and divided into four sections [8]. The GNKQ-R questionnaire was modified to be validated to be used in this study. The validity and reliability of the questionnaires were determined and the Cronbach's Alpha value of the questionnaire was 0.832.

The GNKQ-R questionnaire is divided into four sections where each section assesses a different aspect of nutrition knowledge as shown in Table 1. The first section contains sixteen questions on dietary recommendations. The second section contains thirty-four questions on food groups, the third section contains nine questions on healthy food choices and diet, and the fourth section contains twenty-one questions on diet, disease, and weight management. Each question carries 1 mark.

**Table 1: The category of General Nutritional Knowledge based on the overall scoring**

Category of General Nutritional Knowledge	Scoring
Poor knowledge	0-20
Average knowledge	21-40
Good knowledge	41-60
Excellent knowledge	61-80

### *Statistical Analysis*

All statistical analysis was conducted using IBM SPSS Statistics for Windows version 21.0 (IBM Corp, Armonk, New York, USA). Proportions are presented for categorical variables, while mean and standard deviation (SD) were calculated for continuous variables. Descriptive test was applied to determine the sociodemographic factors, the score and prevalence of nutritional knowledge among participants. Normality of the data was assessed by using the Kolmogorov-Smirnov test. The Pearson Chi-square test was applied to determine the association between the socio-demographic data and the general nutrition knowledge of the participants.

## Result

### *Sociodemographic Factor of Participants (n=281)*

Table 2 shows the socio-demographic details of the participants. A total of 281 working mothers were included in this study. The majority of the study participants aged between 31-40 years old (55.5%), studied at tertiary level (77.2%), married (94.7%), had a monthly income more than RM2501.00 (51.6%), live in semi-urban area (53.0%), currently residing in district Kuala Nerus district (41.6%), work area in Kuala Nerus (40.6%), working as government servants (43.8%) and have 3-5 family members (83.6%).

**Table 2: The sociodemographic details of the participants**

Characteristics	Frequency (n= 281)	Percentage (%)
<b>Age (years old)</b>		
19-30	68	24.2
31-40	156	55.5
41-50	48	17.1
51-60	9	3.2
<b>Educational level</b>		
Primary	10	3.6
Secondary	54	19.2
Tertiary	217	77.2
<b>Marital status</b>		
Married	266	94.7
Divorced	15	5.3
<b>Monthly income (RM)</b>		
≤1000.00	19	6.8
1,001.00 – RM 2,500.00	117	41.6
≥2501.00	145	51.6
<b>Location</b>		
Rural	28	10.0
Semi-Urban	149	53.0
Urban	104	37.0
<b>Districts</b>		
Besut	11	3.9
Dungun	21	7.5
Hulu Terengganu	10	3.6
Kemaman	17	6.0
Kuala Nerus	117	41.6
Kuala Terengganu	79	28.1
Marang	20	7.1
Setiu	6	2.1
<b>Districts</b>		
Besut	12	4.3
Dungun	23	8.2
Hulu Terengganu	9	3.2
Kemaman	17	6.0
Kuala Nerus	114	40.6
Kuala Terengganu	83	29.5
Marang	18	6.4
Setiu	5	1.8
<b>Type of job</b>		
Government servants	123	43.8
Statutory bodies	12	4.3
Private sectors	100	35.6
Others /state	46	16.4
<b>Number of family members</b>		
3-5	235	83.6
6-8	45	16.0
≥9	1	0.4

### ***The Score of Nutritional Knowledge among Working Mothers in Terengganu (n=281)***

Table 3 shows the mean score (SD) of nutritional knowledge among participants. Participants shows the highest mean score (SD) of 23.28(4.29) for Section 2 (Food Groups), followed by 14.43(2.6) for Section 4 (Diet, disease, and weight management), 12.41 (2.07) for Section 1 (Dietary Recommendations) and 4.80 (1.34) for Section 3(Healthy Food Choices) respectively.

Table 3: The score of nutritional knowledge among working mothers in Terengganu

<b>Score of knowledge (n=281)</b>	
<b>Section</b>	<b>Mean score (SD)</b>
Section 1- Dietary Recommendations	12.41(2.07)
Section 2 – Food groups	23.28(4.29)
Section 3- Healthy Food Choices	4.80(1.34)
Section 4 - Diet, disease, and weight management	14.43(2.60)

### ***The Overall Score of Nutritional Knowledge among Working Mothers in Terengganu (n=281)***

Table 4 shows the frequency (%) of participants and mean score (SD) for each category of nutritional knowledge. The majority of the subjects (69.4%) shows good nutritional knowledge, 23.84% of participants had excellent nutritional knowledge, 6.41% of participants shows average and only 0.35% of participants showed poor nutritional knowledge respectively. The mean score (SD) of participants in poor category of nutritional knowledge was  $11.0 \pm 0.00$ . The mean score (SD) of participants in average category of nutritional knowledge was  $34.94 \pm 4.88$ . The mean score (SD) of participants in good category of nutritional knowledge was  $54.14 \pm 5.07$ , followed the mean score (SD) of participants in excellent category of nutritional knowledge was  $63.22 \pm 2.12$  respectively.

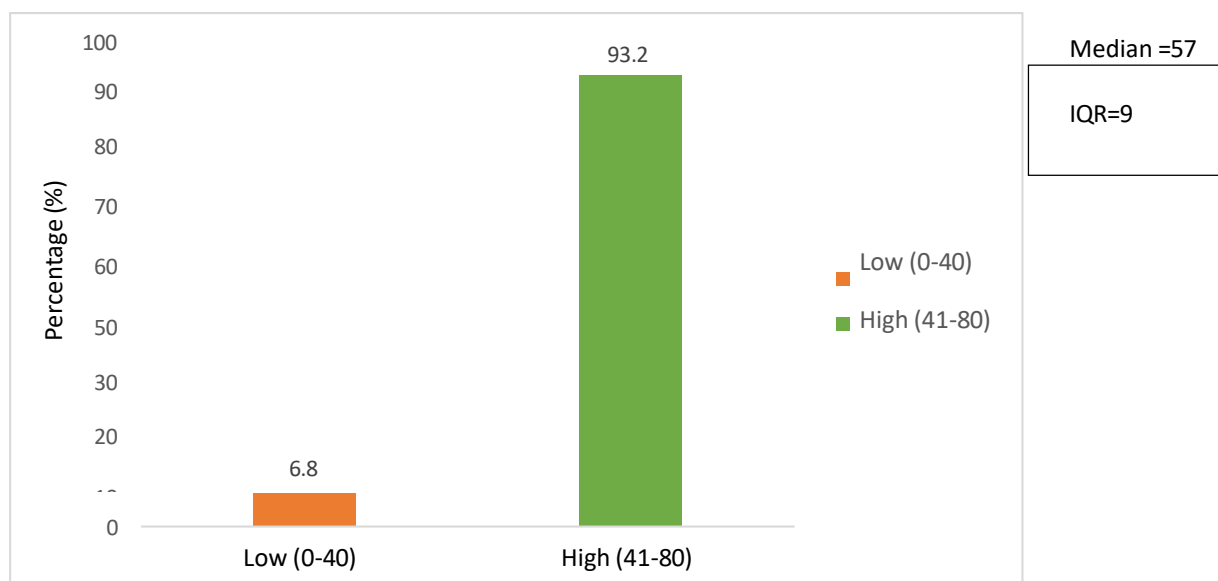
Table 4: Category of nutritional knowledge among working mothers in Terengganu

<b>Category of nutritional knowledge</b>	<b>n(%)</b>	<b>Mean(SD)</b>
Poor	1(0.35)	11.00(0.00)
Average	18(6.41)	34.94(4.88)
Good	195(69.40)	54.14(5.07)
Excellent	67(23.84)	63.22(2.12)

\*Score: Poor=0-20, Average=21-40, Good=41-60, Excellent=61-80

### ***The Prevalence of Nutritional Knowledge among Working Mothers in Terengganu (n=281)***

Figure 1 shows the prevalence of nutritional knowledge among working mothers in Terengganu. Majority of the participants (93.2%) have high nutritional knowledge while 6.8% of participants have low nutritional knowledge respectively.



**Figure 1: The prevalence of nutritional knowledge among participants**

***Association between sociodemographic with Nutritional Knowledge among Working Mothers in Terengganu (n=281)***

Table 5 illustrates the association between socio-demographic factors between working mothers with low and high nutritional knowledge level. There were significant associations between age, educational level, marital status, and monthly income with nutritional knowledge level respectively. However, there was no significant association between nutrition knowledge level among working mother with location of living, type of job, and number of family members.

**Table 5: The association between sociodemographic factors with nutritional knowledge level among working mothers in Terengganu**

Variables	Nutritional Knowledge Level		x <sup>2</sup>	p-value
	Low nutritional knowledge (n=19)	High nutritional knowledge (n=262)		
	n (%)	n (%)		
<b>Age (Years old)</b>				
19-30	6 (31.57)	62 (23.66)	12.558	<0.006
31-40	4 (21.05)	152 (58.02)		
41-50	8 (42.11)	40 (15.27)		
51-60	1 (5.26)	8 (3.05)		
<b>Educational level</b>				
Primary	5(26.32)	5(1.91)	34.530	<0.001
Secondary	6(31.58)	48 (18.32)		
Tertiary	8(42.11)	209 (79.77)		
<b>Marital status</b>				
Married	16 (84.21)	250 (95.42)	4.405	<0.036
Divorced	3 (15.79)	12 (4.58)		

<b>Monthly income (RM)</b>				
<1000.00	6 (31.57)	13 (4.96)	21.088	<0.001
1,001.00 – 2,500.00	8 (42.11)	109 (41.60)		
≥2501.00	5 (26.32)	140 (53.44)		
<b>Living of location</b>				
Rural	4 (21.05)	24 (9.16)	2.800	<0.247
Semi-Urban	9 (47.39)	140 (53.44)		
Urban	6 (31.57)	98 (37.40)		
<b>Type of job</b>				
Government servants	8 (42.11)	115 (43.89)	4.149	<0.246
Statutory bodies	1 (5.26)	11 (4.20)		
Private sectors	4 (21.05)	96 (36.64)		
Others /state	6 (31.58)	40 (15.27)		
<b>Family members (people)</b>				
3-5	15 (78.95)	220 (83.97)	0.449	<0.799
6-8	4 (21.05)	41 (15.65)		
≥9	0(0)	1 (0.38)		

\* chi-square was applied

## Discussion

### *Nutritional knowledge among study participants*

Based on the results, there was 93.2% of working mothers with high nutritional knowledge. Individuals will adjust their diets correctly if they receive reliable information about what they should eat and are aware of the impacts of food consumption on health [9]. Several researchers looked at the impact of knowledge on dietary intake and a wide range of food-related consumer traits and behaviours, such as attitudes, perceptions, and choices [10]. Individuals' food knowledge and self-perceptions of the value of balanced meals influence their food choices and nutritional consumption. Nutritional awareness directly impacts diet quality and is linked to socioeconomic characteristics such as education and income, which influences the relationship between nutritional awareness and diet quality [11].

Consumer knowledge was used in nutrition policy because public education and dietary standards influence people's behaviour and help them make better choices. Nutrition knowledge (NK) is one of the elements influencing food intake among the drivers of individual food choices. One of the studies that have been done in Italy stated GNKQ was designed and validated by [12] to explore the influence of the NK effect, and now it has been widely utilized in a variety of populations and situations. The twenty-five NK Questionnaire assesses three areas of knowledge which were four questions on dietary expert recommendations, eighteen questions on calorie or nutrient content of specific foods, and three questions on dietary risk factors for diseases. The result obtained was the number of correct nutrition knowledge responses was 46%, with the highest percentage in the expert recommendation part at 59 % [12].

### *Association between sociodemographic factors and nutritional knowledge among study participants*

#### *Association between age and nutritional knowledge among study participants*

Nutrition knowledge is one of the factors that affect the nutritional status and nutritional habits of individuals, families, and societies. The findings from our study reported that 31-40 years old participants had the highest nutritional knowledge (97.4%) followed by 19-30 years old (91.2%), 41-50 years old (83.3%), and 51-60 years old 88.9%) among the total study of the participants. The same relationship was exposed in a study that measured the association between age and nutritional knowledge among women



in Mauritius<sup>[13]</sup>. The majority of participants in all three age groups demonstrated a solid understanding of nutrition (65.8% young women (18-25 years old), 63.8% women reaching middle age (26-44 years old), and 62.0% middle-aged women (46-55 years old). Younger women and almost middle-aged women had higher average nutritional knowledge scores than middle-aged women. It is proven that age was a statistically significant influence on nutritional knowledge.

According to <sup>[5]</sup> young adults, in particular, avoid eating for fear they would be disliked and exhibit some behaviours of unhealthy nutrition for the sake of losing weight. Yet, individuals become more aware of the importance of health through experience. Besides, a study from Taiwan stated that more than 50% of the older people surveyed, rarely paid attention to nutrition information on products they used. More than 90% of those surveyed believed that the attached nutrition messages related to food health were just advertising gimmicks to increase sales <sup>[14]</sup>.

#### ***Association between educational level and nutritional knowledge among study participants***

Education has been shown to improve a person's ability to comprehend and remember diverse types of information. Educated individuals are more motivated and engaged in nutritional health. In our study, the result showed that participants who had a tertiary level of education had higher nutritional knowledge. Individuals with higher education levels had a higher proportion of self-reported ability to seek and check nutrition-related information than those with only primary education <sup>[15]</sup>. Other studies also mentioned that the nutritional education of mothers has a positive impact on their children's eating habits <sup>[16]</sup>. The study of 302 mothers of students in Ankara, Turkey discovered that mothers with high nutritional awareness have higher percentiles for preparing at least three portions of vegetables, two-portion fruit, and salads in each meal for their children than mothers with low nutritional knowledge <sup>[17]</sup>. Thus, it can be observed that there was an exact association between educational level and nutritional knowledge among study participants.

In addition, mothers' nutritional knowledge and attitudes are essential to enhance children's feeding patterns to receive appropriate nourishment and grow and develop normally. The status of the family's nutrition is primarily influenced by the mother's nutrition knowledge implemented in daily life. Nutritional knowledge is a necessary precondition for changing one's attitude and behaviour toward food. People are usually ignorant of the necessity to feed young children frequently due to a lack of understanding. A strong understanding of nutrition will motivate a mother to establish a healthy eating plan for her children. It will encourage her to select nutritious and healthy foods for her family. The quality of a child's upbringing is strongly influenced by the mother's education <sup>[18]</sup>. Moreover, people with a higher level of education are more likely to be health literate, seek out dietary information for health reasons, comprehend nutritional information from the media, and make more educated decisions about correct and inaccurate commercial marketing <sup>[11]</sup>.

#### ***Association between marital status and nutritional knowledge among study participants***

Our study showed a significant relationship between marital status and nutritional knowledge. Marital status was a factor impacting the lifestyle of an individual whereby individuals achieve a more regular lifestyle through marriage. It positively changed lifestyle, which was reflected in the behaviours and habits about health and nutrition. Married or living as married individuals achieved slightly higher nutritional knowledge scores than those who were either single or separated, divorced or widowed <sup>[11]</sup>. In addition, a study done in China revealed that married individuals scored higher on nutritional knowledge and were more aware of dietary guidelines than those who were single, contrary to earlier findings. It could be because married couples are more inclined to share nutrition information<sup>[18]</sup>.



### ***Association between salary income and nutritional knowledge among study participants***

More than 97% of the participants perceived the role of nutrition in health favorably toward the importance of nutrition in health. With rising socioeconomic status, nutritional knowledge improved logically. Fruit, vegetable, dairy group, red meat, chicken and poultry, fish, and egg intake was significantly higher in households with high socioeconomic status, whereas sugar consumption was significantly higher in families with inadequate socioeconomic status. This past paper supported our results obtained in this study, where working mothers that earned RM2501 and above were associated with high nutritional knowledge [19]. According to this study, people with a higher income were found to have more dietary awareness. Dietary education may encourage citizens to modify their eating habits by equipping them with the knowledge and skills they need to make healthy food choices in the context of their lives and financial resources. These studies repeatedly demonstrated a gap in nutrition knowledge between economic groups, with lower-income people having the slightest nutrition knowledge. Although both dietary and nutrition knowledge emphasizes the need for healthy eating, nutrition knowledge focuses more on nutrients found in food and their links to disease. In contrast, dietary knowledge emphasizes the importance of a well-balanced diet and physical activity [11].

### ***Association between location and nutritional knowledge among study participants.***

The study revealed that there was no association between locations and the nutritional knowledge of the study participants. A study conducted by [11] opposes our result where the dietary knowledge score and the urbanization index had a favorable association. One possible explanation is that inhabitants in places with higher levels of urbanization are more likely to receive nutritional education in school and have better access to health information. In addition, nutritional information is frequently obtained from television and radio in less developed regions. Yet, fast food commercials abound in the media, which are typically low in nutritional value. Residents of lower urbanized communities have lower dietary awareness due to poor analysis skills and judgment abilities. According to their data, 38.65% of respondents in communities with a higher urbanization index proactively sought nutrition information, whereas only 15.55% of respondents had a lower urbanization index [11]. Moreover, there was a study on nutritional knowledge among urban and rural pregnant mothers. This study exhibited that 67% of urban mothers have good knowledge compared to 50% of rural mothers. Most of the rural mothers in this study lacked the awareness of nutritional knowledge [20].

### ***Association between the type of job and nutritional knowledge among study participants***

There was no significant difference between the type of job and nutritional knowledge among study participants. Contrarily, mothers who work long hours have adverse effects on their children's eating habits [21]. For example, decreased breakfast consumption increased intake of unhealthy foods such as processed foods high in fat and sugar, decreased intake of vegetables and fruits, and poor diet quality. The majority of these studies were conducted in Western countries. However, findings that dietary habits in childhood affect those in adulthood and that good eating habits in childhood may reduce the future risk of noncommunicable diseases [21]. In addition, the intervention of electric rice cookers helps them since white rice is a staple food for the Japanese people. The same goes for Malaysian people, where white rice is our staple food, and it is easy to speculate that preparing white rice is straightforward and time-saving for busy mothers [22]. The longer working hours caused mothers to prepare food that saved their time and it was associated with lower intakes of soybean products, vegetables, fruits, fish, and shellfish, as well as a higher intake of bread and white rice among the mothers [22].

### ***Association between family members and nutritional knowledge among study participants***

There was no significant difference between family members and nutritional knowledge among participants in our study. Based on a past study in Kenya, the majority of the families, 53 % had five or

more members, 26% had four members, and 21% had just three members [22]. Thus, it shows that our study contradicted the previous study where 83.6% had 3-5 members, 16% had 6-8 members, and 0.4% had nine or more members. In comparison to single families, extended families' children consumed much more vegetables, fruits, meat products, and milk. Besides, mothers from extended families had considerably higher healthy eating scores than mothers from single homes. In extended families, this can be explained by the influence of other family members. Siblings and other family members were also found to impact children's nutritional consumption, where older siblings may introduce their younger siblings to new snacks and cuisines [23].

Furthermore, the number of families did not affect the nutritional knowledge of the mother, but the nutritional knowledge of the mother affected the health of their family members. The higher the nutritional knowledge level of the mother, the higher their children's dietary intake levels on total fat and cholesterol were decreased, and consumption of dietary fiber was increased [17]. Even though another study found that over 60% of 8–12-year-old children choose their foods, studies have linked children eating alone with bad nutritional habits due to a lack of parental guidance. Moreover, children are prone to imitate their parents' food habits, therefore the family environment can influence and enhance good dietary habits. According to recent research conducted with Irish children, parents are important influencers on their children's diets, and the frequency of shared meals has a favourable effect on children's food knowledge [22]. Thus, mothers are typically responsible for dietary decisions and food preparation, women are highly significant for the nutritional outcomes of children and other household members.

## Conclusion

In conclusion, the study shows high number of participants of having excellent nutritional knowledge. Study also finds the association between sociodemographic factors (age, educational level, marital status, monthly income) with nutritional knowledge among participants. The results suggest that middle aged working mothers, with high educational level, married and have a good income shows high nutrition knowledge. Improvement of socio-demographic circumstances of working mothers may contribute to child's nutritional status.

## List of abbreviations

UNISZA (Universiti Sultan Zainal Abidin), Human Research and Ethics Committee (UHREC), General Nutrition Knowledge Questionnaire (GNKQ), General Nutrition Knowledge Questionnaire revised (GNKQ-R), standard deviation (SD), Ringgit Malaysia (RM), University Malaysia Terengganu (UMT) Kuala Terengganu City Council (MBKT), Nutrition knowledge (NK)

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## Competing interests

The authors declare no competing interests.

## Authors' contributions

Laila Ruwaida Mohd Zainuddin: analyzed and interpreted the data; wrote the paper  
Iffah Izzati: Conduct data collection, analyzed and interpreted the data; wrote the paper  
Napisah Hussin: Conceived and designed the study; Wrote the paper.

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