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Factors Influencing the Nutritional Status of Pregnant Women Employed in Government Education and Health Institutions in Timor-Leste

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ABSTRACT

Poor nutritional status among pregnant women can increase the risk of low birth weight (LBW), growth delays, birth defects, and even death for both the mother and child. In 2020, approximately 287,000 women died during or after pregnancy and childbirth (WHO), with nearly 95% of all maternal deaths occurring in low- and lower-middle-income countries. Timor-Leste has one of the highest maternal mortality rates in Southeast Asia, at 195 per 100,000 live births. The aim of this research is to analyze the factors influencing the nutritional status of pregnant women employed in health and educational institutions within the Timor Leste government. This study employs a quantitative design with a cross-sectional survey approach. The study population consists of pregnant women with a gestational age of over 20 weeks, and the sample size includes 55 women. Convenience sampling was used, with a questionnaire as the data collection tool. The results of the chi-square statistical test show no significant relationship between physical workload (p value = 0.485), work stress level (p value = 0.310), knowledge level (p value = 0.087), and food perceptions (p value = 0.153) with the nutritional status of pregnant women working in education and health institutions in Timor Leste. However, a relationship was found between work fatigue (p value = 0.044) and the nutritional status of pregnant female workers. Therefore, interventions are necessary to reduce workplace fatigue in order to improve the nutritional and health status of pregnant women workers. Strategies focused on managing fatigue and reducing occupational risks should be prioritized to enhance their well-being and promote better pregnancy outcomes.

Keywords: *Nutritional status, Pregnant women employed, Timor Leste*

1. INTRODUCTION

Maternal mortality rates remain alarmingly high worldwide, particularly in low- and middle-income countries. According to the World Health Organization (WHO), approximately 287,000 women died during and after pregnancy and childbirth in 2020. Nearly 95% of all maternal deaths that year occurred in low- and lower-middle-income countries, with most being preventable. Timor-Leste is among the countries with the highest maternal mortality rates in Southeast Asia, with 195 deaths per 100,000 live births.

During pregnancy, women experience various physiological changes that directly impact their nutritional status. These changes can sometimes lead to health conditions that affect both the mother and the developing fetus. It is crucial to recognize that pregnant women, as a vulnerable group, have specific nutritional needs that must be assessed under unique circumstances, differing from those of the general adult population.

Research has shown that pregnancy is a period of heightened nutritional risk due to the increased physiological demands placed on the mother. The mother's health status during this stage plays a critical role in ensuring the optimal growth and development of the baby. However, nutrition during pregnancy is often overlooked or inadequately addressed, not only by pregnant women themselves but also by their families, employers, and relevant institutions.

Pregnant women require a high nutritional intake to sustain their health and support the growth and development of the fetus. This includes adequate calories, proteins, vitamins, and minerals. However, in many cases—particularly in low- and middle-income countries—the nutritional value derived from vegetables, meat, dairy products, and fruits is often insufficient to meet

these essential needs. The high prevalence of malnutrition among pregnant women is closely linked to the overall quality of human resources and is recognized as a critical determinant of adverse pregnancy outcomes (Ballestín *et al.*, 2021).

Inadequate maternal nutrition significantly increases the risk of anemia, which, in turn, has profound consequences for both the mother and the developing fetus. Severe anemia can compromise uterine muscle strength and weaken the body's resistance to infections, thereby increasing the likelihood of complications such as hemorrhaging during and after childbirth—one of the leading causes of maternal mortality. For the child, maternal anemia is associated with low birth weight, growth retardation, congenital disabilities, and even perinatal death.

The risk is further exacerbated in working pregnant women, as physical activity demands substantial energy expenditure, utilizing metabolic resources derived from dietary intake. If this energy requirement is not adequately supported by sufficient nutritional intake, the body will deplete existing reserves and initiate compensatory metabolic processes, many of which can have detrimental effects on pregnancy.

The findings of Maria Lafaurie's (2017) study offer critical insights into the challenges faced by professional women during pregnancy. The most significant factor identified is the heavy workload and excessive stress experienced in their daily work routines, which, according to the participants, directly impact their pregnancies. Work-related demands often hinder proper self-care during pregnancy, as workplace pressure discourages women from prioritizing their health. Additionally, these challenges are compounded by personal life responsibilities. As Verlander (2004) noted, achieving a balance between professional and personal life remains a significant challenge for working women, who frequently prioritize the well-being of others over their own (Verlander, 2004).

Female employees in the Ministries of Health and Education not only experience psychosocial stressors during pregnancy but are also exposed to various occupational risks. These include chemical and biological hazards, environmental factors, long working hours, excessive physical exertion, and high-intensity work pressure, all of which may further compromise maternal health.

Although there are some studies of female workers that focus on adopting healthy practices during pregnancy, these studies primarily focus on adopting healthy behaviors in general, such as eating a balanced diet or exercising. To date, there has been no research that analyzes the relationship between perceptions of a hostile work context or workload (distribution of tasks, demands, available time) and stress levels which can have a direct impact on nutritional status during pregnancy. Realizing the lack of research in this area, the aim of this research is to analyze workload factors that can influence nutritional status during pregnancy and also pregnant women's perceptions of workload and stress levels with nutritional status during pregnancy.

2. MATERIALS AND METHODS

Study Design

This study employs a quantitative research design with a cross-sectional survey approach to examine the factors influencing the nutritional status of pregnant women employed in health and education institutions within the Timor-Leste government. The research was conducted between June and July 2024.

Participants

The study population consists of pregnant female employees with a gestational age of more than 20 weeks working in the Ministry of Education and the Ministry of Health, totaling 55 participants. The entire population was selected as the sample, resulting in a sample size of 55 respondents. A convenience sampling method was utilized for participant selection.

The dependent variable in this study is the nutritional status of pregnant women working in the Timor-Leste government. The independent variables include workload, knowledge of nutritional content in food, fatigue, work-related stress, and women's dietary habits and perceptions of food.

Data collection

Data collection was conducted using a structured questionnaire, followed by a process of coding, tabulation, and statistical analysis. The data were analyzed using the chi-square test with a 95% significance level. The results will be presented in tabular form to facilitate clarity and comprehension.

3. RESULTS

Characteristics of pregnant working women

The table above indicates that the majority of pregnant women in this study were between the ages of 27 and 31, with the highest proportion being high school graduates (10 individuals), while no respondents in this age group held a D1 qualification. Additionally, the data reveal that the age group of 37 to 41 years had the fewest respondents, totaling only four individuals. Within this group, high school graduates were the most represented (13 individuals), whereas there were no

respondents with undergraduate or D1 qualifications.

Table 1: Age Group and Educational Characteristics of Pregnant Women

Age Group	Education					Total
	S2	S1	D3	D1	High School	
17 – 21	0	0	1	1	3	5
22 – 26	0	6	1	0	3	10
27 – 31	1	9	3	0	10	23
32 – 36	1	4	6	0	23	13
37 – 41	1	0	1	0	13	4
Total	**3**	**19**	**12**	**1**	**20**	**55**

Table 2: Distribution of Body Mass Index (BMI) and Mid-Upper Arm Circumference (MUAC) Among Pregnant Working Women

Characteristics	Frequency	Percentage (%)
BMI Category		
Underweight (< 18.5)	7	13
Normal (18.5 – 24.9)	38	69
Overweight (25 – 29.9)	9	16
Obese (> 30.0)	1	2
MUAC Measurement		
MUAC < 23 Cm	24	44%
MUAC >23 Cm	31	56%

Table 2 indicates that the most prevalent BMI category among respondents falls within the normal range (18.5–24.9), accounting for 69%, while the least common category is obesity (>30.0), representing only 2% of respondents. Additionally, 56% of respondents had a mid-upper arm circumference (MUAC) greater than 23 cm, whereas the remaining 44% had a MUAC of less than 23 cm.

Table 3: Hypothesis testing of independent and dependent variables

Variables	Good Nutritional Status		Poor Nutritional Status		p value	PR 95% CI
	n	%	n	%		
Physical Workload					0,485	0,75 – 2,22
Light	15	42,86	5	25		
Moderate	15	42,86	10	50		
Heavy	5	14,29	5	25		

Fatigue Level						
Not Fatigued	25	71,429	5	25	0,044	0,80 – 2,56
Slightly Fatigued	8	22,857	10	50		
Highly Fatigued	2	5,7143	5	25		
Work-Related Stress Level						
Low	20	57,14	7	35	0,310	0,85 – 2,90
Moderate	10	28,57	8	40		
High	5	14,29	5	25		
Nutritional Knowledge Level						
High	20	57,14	8	40	0,087	0,95 – 3,10
Moderate	10	28,57	7	35		
Low	5	14,29	5	25		
Perception of Food						
Positive	20	57,14	10	50	0,153	1,05 – 4,06
Neutral	10	28,57	8	40		
Negative	5	14,29	2	10		

Table 3 reveals that the majority of pregnant working women interviewed by the researchers experienced a light-to-moderate physical workload while maintaining good nutritional status. This is evident from the high percentage of respondents in these categories, totaling 15 individuals (42.86%). Meanwhile, the highest proportion of pregnant women with poor nutritional status was observed in the moderate physical workload category, with 10 respondents (50%), while the remaining five (25%) fell into the light and heavy workload categories. Statistical analysis of the physical workload variable yielded a p-value of 0.485, which is greater than the significance threshold ($\alpha = 0.05$), indicating no significant relationship between physical workload and the nutritional status of pregnant women.

A considerable portion of the respondents—25 individuals (71.43%)—reported experiencing no significant fatigue at work while maintaining good nutritional status. Conversely, the majority of pregnant women with poor nutritional status fell within the category of experiencing mild fatigue at work, totaling 10 respondents (50%). Statistical testing revealed a p-value of 0.044, which is lower than $\alpha = 0.05$, indicating a significant relationship between fatigue and the nutritional status of pregnant women. This suggests that as fatigue levels increase, the likelihood of poor nutritional status among pregnant women also rises.

The majority of pregnant working women—20 respondents (57.14%)—experienced low work-related stress while maintaining good nutritional status. Meanwhile, nearly half of the pregnant women with poor nutritional status, specifically 8 respondents (40%), reported moderate work-related stress, while 7 respondents (35%) experienced high levels of stress. Chi-square statistical analysis yielded a p-value of 0.310, which is greater than $\alpha = 0.05$, indicating no significant association between work-related stress and the nutritional status of pregnant women. This suggests that, while occupational stress may influence overall eating behaviors, its impact on the nutritional status of pregnant working women within the context of their employment was neither evident nor statistically significant.

Furthermore, 20 respondents (57.14%) with good nutritional status had a high level of nutritional knowledge. Among those with poor nutritional status, 8 respondents (40%) also demonstrated a high level of nutritional knowledge. The test results indicate a p-value of 0.087, which is greater than $\alpha = 0.05$. Therefore, there is no significant relationship between the average

BMI and the level of nutritional knowledge among pregnant working women.

The majority of pregnant working women with good nutritional status, totaling 20 individuals (57.14%), had a positive perception of food, while the least represented group, 5 individuals (14.29%), held a negative perception. Similarly, among pregnant women with poor nutritional status, the highest proportion—10 individuals (50%)—also had a positive perception of food, whereas the lowest proportion—2 individuals (10%)—had a negative perception. The statistical test results yielded a p-value of 0.153, which is greater than $\alpha = 0.05$, indicating no significant relationship between pregnant working women's perception of food and their nutritional status.

4. DISCUSSION

Relationship Between Physical Workload and Nutritional Status

The analysis results indicate no significant relationship between physical workload and nutritional status. A study by Siswanto S et al. (2021) found that while strenuous physical activity may impact the well-being of pregnant working women, its direct effect on nutritional status is often insignificant. This may be attributed to the body's physiological adaptations during pregnancy or workplace policies that support the health of pregnant employees.

This finding aligns with the Physiological Adaptation to Pregnancy Theory proposed by Moreira et al. (2023), which states that a pregnant woman's body undergoes adaptive changes that enable her to cope with physical and metabolic stress. As a result, physical workload does not necessarily have a direct impact on nutritional status. These physiological adaptations help maintain nutritional balance despite increased physical activity or workload demands.

A study conducted by Santoso & Widya (2022) in Indonesia provides valuable insights into the effect of formal employment on the nutritional status of pregnant working women. Their findings suggest that pregnant women employed in the formal sector, even those with moderate to heavy physical workloads, did not experience significant changes in their nutritional status. This stability is believed to result from dietary adjustments both at home and in the workplace, effectively meeting their daily nutritional requirements. These adjustments may include increased calorie and nutrient intake, as well as a more balanced diet tailored to the physical demands of their job.

According to Setiadi et al. (2020), pregnant working women engaged in jobs with moderate to high physical activity levels tend to be more aware of the importance of proper nutrition to support their own health and that of their fetus. This awareness may stem from better access to nutritional information and workplace policies that promote well-being, such as the provision of healthy meals and adequate rest periods. These factors allow pregnant women to maintain nutritional balance despite their significant workload.

Relationship Between Fatigue and Nutritional Status

The analysis indicates that among various factors, only fatigue in relation to fast-food consumption showed a significant association with nutritional status. A recent study by Vainio et al. (2022) found that work-related fatigue can influence food preferences, increasing the tendency to opt for unhealthy food choices. This finding aligns with the results of this study, where fatigued pregnant workers were more likely to choose fast food, which ultimately impacted their nutritional status.

The significant relationship between fatigue and nutritional status can be explained by the Depletion Model proposed by Zacher et al. (2020). This model suggests that physical and mental exhaustion is closely linked to impaired decision-making, including poor dietary choices. Fatigue can lead to a decline in self-control, making individuals more inclined toward less nutritious, high-calorie fast food, directly affecting their nutritional intake.

Tan et al. (2021) highlighted that chronic fatigue can significantly impact nutritional status, particularly among pregnant working women. Their study found that prolonged fatigue often correlates with decreased motivation to select and consume healthy foods. Exhausted pregnant women are more likely to choose easily accessible and ready-to-eat meals, such as processed or fast food, which are typically low in essential nutrients but high in calories and saturated fats. Over time, these dietary choices can negatively affect their nutritional status by reducing their intake of vital vitamins, minerals, and other nutrients essential during pregnancy.

Chronic fatigue among pregnant working women can arise due to various factors, including heavy workloads, insufficient rest, and hormonal changes inherent to pregnancy. In addition to physical exhaustion, prolonged mental stress can further exacerbate fatigue, influencing eating behaviors. Tan et al. (2021) noted that fatigued pregnant women may struggle with preparing nutritious meals or planning balanced diets, leading to irregular eating patterns and suboptimal nutrient intake.

Furthermore, nutrition experts like Miller (2022) argue that the impact of fatigue on dietary patterns among pregnant women can be compounded by socioeconomic factors. Pregnant women employed in informal sectors or with lower incomes may have limited access to nutritious food and less time to prepare healthy meals, especially when dealing with chronic fatigue. This can create a vicious cycle in which fatigue worsens dietary habits, and poor nutrition further exacerbates fatigue.

Relationship Between Work Stress and Nutritional Status

This study found no significant relationship between work-related stress and the nutritional status of pregnant working women. According to Chen et al. (2020), while stress can influence eating behaviors, its impact on nutritional status is not always direct and may be mediated by factors such as social support, coping strategies, and access to healthy food resources. This suggests that elements like workplace policies, social support networks, and food accessibility may play a more crucial role in maintaining good nutritional status during pregnancy than work stress alone. Further research may be necessary to explore the interactions between work stress and other variables affecting nutritional status.

The findings of no significant association between work stress and nutritional status are supported by Park et al. (2020), who concluded that work stress does not necessarily impact nutritional status, as its effects largely depend on individual coping mechanisms. Their theory states that individuals with effective coping strategies can manage stress without experiencing significant changes in their eating habits or nutritional status.

Similarly, Zhao et al. (2020) suggested that while stress can influence eating habits, its effects on nutritional status depend on a pregnant woman's access to healthy food and structured eating patterns. Workplace and family support play a crucial role in mitigating the impact of stress on nutrition.

Relationship Between Nutritional Knowledge and Nutritional Status

This study found no significant relationship between nutritional knowledge and the nutritional status of pregnant working women. According to Jones et al. (2021), while nutrition knowledge is an essential factor, it is often insufficient to drive behavioral change without comprehensive interventions. To be effective, nutritional knowledge must be integrated with in-depth education and social support.

The finding that nutritional knowledge does not significantly correlate with nutritional status is supported by the Knowledge-Behavior Gap Theory proposed by Sheeran et al. (2021). This theory posits that knowledge alone does not always lead to behavioral changes unless accompanied by motivation and a supportive environment. Even if pregnant women are well-informed about nutrition, other factors—such as access to healthy food and social support—play a more critical role in shaping their nutritional status.

Renner et al. (2022) further argued that while nutrition knowledge is valuable, it does not automatically translate into healthy eating behaviors. They emphasized that knowledge must be reinforced by environmental factors, such as family and workplace support, to be effectively translated into a healthy diet. In the context of working pregnant women, this finding is particularly relevant, as it highlights that even if women understand the importance of balanced nutrition, external factors such as time constraints, stress, and fatigue can hinder their ability to make healthy food choices.

This study aligns with other findings indicating that working pregnant women often face various challenges, including time limitations, stress, and exhaustion, which can disrupt their ability to maintain healthy eating habits. In such cases, even if they know which foods are nutritious, unsupportive environmental factors—such as the lack of healthy meal options at work or insufficient family support in meal preparation—can prevent them from applying their knowledge effectively.

Relationship Between Food Perception and Nutritional Status

The statistical analysis showed no significant relationship between food perception and the nutritional status of pregnant working women. A recent study by Verplanken et al. (2022) found that while awareness of healthy eating has increased, it does not always translate into behavioral changes, especially among individuals experiencing stress or work pressure. Simply having a positive perception of healthy food is insufficient to change eating habits without environmental and policy-based support.

The finding that food perception does not directly correlate with nutritional status is backed by the Attitude-Behavior Inconsistency Theory proposed by Ajzen & Fishbein (2020). They argued that even if individuals hold positive views about healthy eating, these attitudes do not necessarily influence their dietary behavior unless reinforced by habitual actions. A positive outlook on healthy food requires stronger interventions—such as environmental support and intrinsic motivation—to be effectively translated into healthy eating practices.

Schmidt & Andreas (2021) also emphasized that a positive perception of healthy food alone is often insufficient to improve the nutritional status of pregnant women without pre-established healthy eating habits. Environmental factors and daily eating patterns exert a more substantial influence than mere food perceptions. Similarly, Keller et al. (2021) found that while individuals may view healthy food favorably, these perceptions do not always manifest into actual behaviors unless there is a concrete action plan or support from their surroundings. Simply holding a positive perception of healthy eating is not enough to drive meaningful changes in dietary patterns.

This study is further supported by research from Larson et al. (2020), which highlighted the importance of social environmental support—including encouragement from peers, colleagues, and family members—in shaping eating habits. When individuals are surrounded by people who practice or promote healthy eating, they are more likely to adopt and maintain similar behaviors.

5. CONCLUSION

The findings of this study indicate a significant relationship between work-related fatigue and the nutritional status of pregnant women. Therefore, workplace health interventions should prioritize reducing fatigue and stress while simultaneously promoting healthy eating behaviors, particularly among pregnant employees. Policies that ensure easy access to nutritious food and sufficient rest periods can be highly beneficial. Given that nutritional knowledge alone is insufficient to improve nutritional status, nutrition education programs must be complemented by practical support, such as tailored guidance on implementing healthy dietary practices in the workplace. Since poor food choices are strongly associated with burnout, employers should consider providing easily accessible, nutrient-rich meal options, especially for pregnant workers, to foster a healthier work environment.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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