

Prevalence & Risk Factors of Underweight in Children Aged 6 Months to 6 Years Among Sons of Female Medical Staffs in Sana'a City, Yemen.

Research Project To Fulfill Part Requirement For The Bachelor's Degree in Medical Bachelor & Bachelor of Surgery (MBBS)

Researchers

- **Abdulrahman Ahmed Morshed Alkhaiat**
- **Abdurab Saif Abdullah Mosad**
- **Ali Ahamed saleh Almakmy**
- **Fathulrahman Shauqi Abdulhadi Alhajri**
- **Fatima Aidh Mohsen Al hashdi**
- **Hanadi Abdulkareem Badri Al-shameeri**
- **Mohammed Najeeb Taha Al-mosawa**
- **Mosheera Nagi Ahmed Robaid**
- **Rima Samir Ahmed Al-Hakemi**
- **Sara Saif Mohsen Al-Waisi**
- **Taloot Muaamar Abdullah Abu-munassar**
- **Yousif Bandar Mohammed Aljaberi**

Supervisors

Head of pediatrics department : **Dr.Nora Noraldeen**

Head of community medicine department : **Dr.Ahmed Al-Shahethi**

Dean of Faculty of medicine : **Dr.Salwa Alghomairy**

انتشار و عوامل خطورة نقص الوزن في أطفال العاملات في المجال
الصحي الذين تتراوح أعمارهم بين ٦ أشهر و ٦ سنوات في مدينة صنعاء - اليمن

(بحث مقدم إلى كلية الطب البشري كمتطلب للحصول على درجة البكالوريوس في الطب العام و
الجراحة)

الباحثون

- عبدالرحمن احمد مرشد الخياط
- عبدالرب سيف عبدالله مسعد
- علي احمد صالح المكتمي
- فتح الرحمن شوقي عبدالهادي الحجري
- فاطمة عايض محسن الحاشدي
- هنادي عبد الكريم بدري الشميري
- محمد نجيب طه المساوي
- مشيرة ناجي احمد ربيد
- ريما سمير احمد الحكيمي
- سارة سيف محسن الويسي
- طالبوت معمر عبدالله ابو منصر
- يوسف بندر محمد الجابري

المشرفون

رئيس قسم طب الأطفال : د . نورة نور الدين

رئيس قسم طب المجتمع : د . احمد الشاحدي

عميد كلية الطب البشري : د . سلوى الغميري

الخلاصة

الخلفية:-

سوء التغذية يشمل نقص التغذية (الهزال ، التقزم ، نقص الوزن) ، زيادة الوزن والسمنة ، عموماً مصطلح "سوء التغذية" يقصد به "نقص التغذية" .

يحدث سوء التغذية عادة على شكل نقص في تناول الطاقة أو البروتين أو المغذيات الدقيقة . سوء التغذية "نقص التغذية" هو أحد الأسباب الرئيسية لوفاة الأطفال دون سن الخامسة وهو أحد الأسباب الأكثر شيوعاً لتدهور صحة الأطفال وحياتهم ، مما يؤدي إلى انخفاض القدرة على التعلم وعدم الكفاءة وعدم القدرة على اكتساب المهارات .

ثلاثة مؤشرات مهمة تستخدم لتقدير سوء التغذية هي التقزم (انخفاض الطول بالنسبة للعمر) ، والهزال (انخفاض الوزن بالنسبة للطول) ، ونقص الوزن (انخفاض الوزن بالنسبة للعمر) ، في هذا البحث ، استخدمنا (مخطط الوزن بالنسبة للعمر) لمعرفة مدى انتشار نقص الوزن التغذوي عند الأطفال وعلاقته بعمل الأم .

الطريقة:-

دراسة مقطعية وصفية مستقبلية هدفت للكشف عن انتشار نقص الوزن التغذوي (اعتماداً على مخططات منظمة الصحة العالمية للنمو : الوزن إلى العمر) بين أطفال الموظفات في المستشفيات الحكومية في مدينة صنعاء ؛ اليمن ، باعتبارهن أكثر الموظفات معرفة بسوء التغذية (أسبابه و مخاطره و كيفية تجنبه) و الأكثر تثقفاً حول أهمية التغذية و النمو الطبيعيين للطفل . وكذلك التعرف على العوامل المتعلقة بعمل الأم التي تؤثر على نمو الطفل وتغذيته وصحته .

بعد استبعاد الأطفال المصابين بتشوهات خلقية و / أو أمراض مزمنة ، أجريت هذه الدراسة على ٢٧٨ موظفة ، منهن ١١٦ ممرضة ، ٤٩ فنية ، ٤٩ عاملة مختبرات ، ٣٩ طبية عامة ، و ٢٧ أخصائية ، جميعهن لديهن طفل واحد على الأقل بين ٦ أشهر و ٦ سنوات. تم جمع المعلومات من خلال مقابلات مع الأمهات وملاً الاستبيانات من قبل الباحثين. تم وزن حوالي ٤٥٪ من الأطفال في العينة من قبل الباحثين أنفسهم ، بينما تم معرفة أوزان البقية من أمهاتهم .

النتائج:-

كشفت هذه الدراسة ، بناءً على مقارنة الوزن إلى العمر على مخطط النمو ، أن ١,٥ ٪ من الأطفال الذين تعمل أمهاتهم كموظفات في القطاع الصحي الحكومي يعانون من نقص الوزن التغذوي حيث أن مخطط الوزن إلى العمر لديهم أقل من ٥ ٪ في النسبة المثوية .

أظهرت الدراسة أن أهم عوامل الخطر هي : كون الأم ممرضة ، كون الطفل بين ١ و ٣ سنوات ، ترك الأطفال في المنزل دون وجود ربة منزل ، عمل الأم لأكثر من ١٢ ساعة في اليوم ، وجود أكثر من طفلين دون سن السادسة ، انخفاض الوضع الاقتصادي الاجتماعي للأسرة ، الخدج وأولئك الذين يعانون من انخفاض الوزن عند الولادة .

الإستنتاج:-

عمل الأم - مهما كان مستواها الأكاديمي - عند عدم وجود من يعتني بالطفل ويطعمه بشكل كاف ومناسب لعمره في حالة غيابها ، أو عندما يكون الوضع الاقتصادي للأسرة غير جيد بالرغم من عملها : يؤثر سلباً على صحة و نمو أطفالها .

التوصيات:-

- ننصح الأمهات بشكل عام والموظفات بشكل خاص بمعرفة الأطعمة المناسبة لأطفالهن حسب أعمارهم والمقادير التي يحتاجون إليها في اليوم و في وقت غيابهم وتوفيرها لهم .
- تنظيم الإنجاب وعدم سماح الأمهات الموظفات بوجود أكثر من طفلين دون السادسة من العمر وخاصة من يقضين أكثر من ١٢ ساعة في اليوم في وظائفهن .
- الاهتمام بالتغذية الصحية والمتنوعة التي تشمل جميع المكونات الأساسية والفيتامينات والمعادن التي يحتاجها الطفل ، مما يضمن له نمواً مثالياً وصحة جيدة .

DEDICATION

This project is dedicated to our parents who have never failed to give us financial and moral support, for meeting all our needs throughout our educational journeys and for teaching us that even the largest task can be accomplished if it is done one step at a time.

To our family members who believed in us more than we believed in ourselves.

To our friends who have been of much support and encouragement until this work was successfully done.

To our first love, Yemen.

To Allah before and after everything.

Acknowledgment

First, our prayers are to Allah the most gracious the most merciful for helping us in completing this humble work.

Second, many warm thanks covered with our love and gratitude for the full support, encouragement and inspiration of our families.

Third, special thanks dedicated to **Dr. Ahmed Al-Shahethi** , **Dr.Nora Noraldeen** and **Dr.Salwa Alghomairy** for their professional notes, comments and accepting to be the supervisors of this study, We can't forget their role in encouraging us to finish this study and for their efforts at every step of this monumental work.

We are highly indebted to Faculty of Medicine, 21 September University of Medical & Applied Sciences to be our lighthouse that guides us always to our future and our dreams.

Finally, we would thank all those who contributed directly and indirectly to the success of this humble effort, to the people who contributed in finishing this study and getting it in its final version.

Abstract

Background :

Malnutrition includes undernutrition (wasting, stunting, underweight), overweight and obesity , Arbitrarily the term “malnutrition” means “undernutrition”. Malnutrition usually occurs in the form of a deficiency in the intake of energy, protein, or micronutrients . Malnutrition “undernutrition” is one of the main causes of death for children under the age of five and is one of the most common causes of deterioration in children’s health and life, which leads to reduced ability to learn, incompetence and inability to acquire skills . Three important indicators used to estimate malnutrition are stunting (low height-for-age), wasting (low weight-for-height), and underweight (low weight-for-age) [1] , In this research, we used (Weight-for-age Growth chart) to find out the prevalence of nutritional underweight in children and its relationship to mother's work .

Methods :

A descriptive prospective cross-sectional study aims to reveal the prevalence of nutritional Underweight (depending on CDC Weight-for-age growth charts) among the children of female employees in government hospitals in Sana'a city ; yemen . Considering that they are the most knowledgeable female employees about malnutrition (its causes, risks, and how to avoid it) and the most educated about the importance of normal nutrition and growth for children in health aspects and also to identify the factors related to the mother's work that affected the child's growth, nutrition, and health.

After excluding children have congenital deformities and/or chronic diseases ; This study was conducted on 278 female employees, including 116 nurses, 49 technicians, 49 laboratory technicians, 39 general practitioners, and 27 specialists, all of whom have

at least one child between 6 months and 6 years. Information was collected through interviews with the mothers and questionnaires filled out by the researchers. About 45% of the children in the sample were weighed by the researchers themselves, while the weights of the rest were learned from their mothers .

Results :

This study revealed, based on weight-for-age on the growth chart, that 41.5% of the children whose mothers work as employees in the government health sector suffer from nutritional Underweight as their Weight-for-age chart is less than 5% percentile.

The study shows that the most important risk factors are : Nurse Mother , The child between 1 and 3 years old , Leaving the children at home without the presence of a housewife , The mother's work for more than 12 hours a day , The presence of more than two children under the age of six years , low social economic situation of the family , preterms & those with low birth weight .

Conclusion :

The mother's work - Whatever its academic level - when there is no one to take care of the child and feed him adequately and appropriately for his age in the event of her absence , or when the economic situation of the family is not good despite her work : negatively affects the health and development of children .

Table of Contents

CHAPTER 1 : INTRODUCTION	1
1.1 Background	1
1.2 Wellcome classification “	2
1.2.1 Acute malnutrition or Protein Energy malnutrition	2
1.3 Etiology	2
1.4 Epidemiology	3
1.4.1 Globally	3
1.5 Clinical Syndromes	3
1.5.1 Marasmus	3
1.5.2 kwashiorkor	4
1.5.3 Marasmic kwashiorkor “Mixed type “	5
1.6 Chronic malnutrition	6
CHAPTER 2 : LITERATURE REVIEW	7
2.1 Study Objectives	8
2.1.1 General Objective	8
2.1.2 Specific Objectives	8
CHAPTER 3 METHODOLOGY	9
3.1 Study design	9
3.2 Study setting	9
3.3 Study Population	9
3.4 Sample Size	10
3.5 Data Collection	11
3.6 Ethical Consideration	16
3.7 Data Analysis	16
3.8 Work-Time	17
3.9 Budget	17
CHAPTER 4 DATA ANALYSIS	18
CHAPTER 5 RESULTS	47
CHAPTER 6 DISCUSSION	48
CHAPTER 7 REFERENCES	49
CHAPTER 8 APPENDIX	51

ABREVIASSIONS

PEM	Protein Energy Malnutrition
WHO	World health organization
CDC	Centers for disease control and prevention
GPs	General practitioners
SPSS	Statistical package for the social sciences

CHAPTER 1 : INTRODUCTION

1.1 Background

Malnutrition in all its forms, includes undernutrition (wasting, stunting, underweight), vitamins or minerals (Micronutrient-related malnutrition), overweight, obesity, and resulting diet-related non-communicable diseases [5].

Malnutrition usually occurs as a deficiency in the intake of energy, protein, or micronutrients [1] .

Malnutrition “undernutrition” is one of the main causes of the death of children under the age of 5 years and is one of the most common causes of the decline in the health and life of children, which results in decreased learnability, inefficiency, and inability to acquire skills [1].

MALNUTRITION “Undernutrition” contributes to the death of nearly half of the children under five years of age in Asia and Africa also Inadequate nutrition increases the risk of death due to common infections, increases the number and severity of the infections, and may lead to delayed recovery [1].

International references are established that allow normalization of anthropometric measures in terms of z scores. Other measurements include height and weight for age, weight for height, BMI, and mid-upper arm circumference [2].

Three important indicators used in estimating malnutrition are stunting (low height for age) , wasting (low weight for height) , and underweight (low weight for age) [1] .

According to a UNICEF report in 2014, the prevalence of underweight, stunting, and wasting in the world was 15%, 25%, and 8%, respectively.[1]

1.2 Wellcome classification “

A system for classifying protein-energy malnutrition in children based on percentage of expected weight for age and the presence or absence of oedema. Between 60 and 80% of expected weight is underweight in the absence of oedema, and kwashiorkor if oedema is present; under 60% of expected weight is marasmus in the absence of oedema, and marasmic kwashiorkor if oedema is present [4]

1.2.1 Acute malnutrition or Protein Energy malnutrition

In 1959 Jelliffe introduced the term “ protein calorie malnutrition ”, which has been replaced by “ acute malnutrition ”.

Defined protein energy malnutrition as nutritional deprivation amongst children in developing countries.

All terms , though , refer to pediatric undernutrition as a state of nutrition in which deficiency of energy, protein and other nutrients leads to measurable adverse effects on tissue and body functions, and a clinical outcome of growth deviation. [3]

1.3 Etiology

Primary acute malnutrition (Dietetic) in children is the result of inadequate food supply caused by socioeconomic, political, and environmental factors, and it is most commonly seen in low- and middle-income countries .

Causes include poverty, poor nutrition of pregnant women, intrauterine growth restriction, low birth weight, poor breastfeeding and inadequate complementary feeding , Feeding difficulties as in cleft palate ,...etc.

Secondary acute malnutrition (Non-Dietetic) is usually due to abnormal nutrient loss, increased energy expenditure, or decreased food intake or frequently that mostly Caused by chronic diseases like Chronic infections as TB , cystic fibrosis or

another malabsorption dis, chronic renal failure, chronic liver diseases, childhood malignancies, congenital anomalies as CHPS or congenital heart diseases .

1.4 Epidemiology

Acute malnutrition is responsible for almost one third of all deaths in children <5 years of age and causes intellectual or cognitive impairment among those who survive [3] .

The estimated number of underweight children (weight-for-age Z score < -2) globally is 101 million or 16% [3].

1.4.1 Globally

in 2020, 149 million children under 5 were estimated to be stunted (too short for age), 45 million were estimated to be wasted (too thin for height), and 38.9 million were overweight or obese [5] .

Around 45% of deaths among children under 5 years of age are linked to undernutrition. These mostly occur in low- and middle- income countries [5] .

1.5 Clinical Syndromes

Acute malnutrition pertains to a group of linked disorders that includes kwashiorkor, marasmus, and intermediate states of marasmic kwashiorkor.

They are distinguished based on clinical findings, with the primary distinction between kwashiorkor and marasmus being the presence of edema in kwashiorkor .

1.5.1 Marasmus

The term “marasmus” is inferred from the Greek word “marasmus”, correlating to wasting or withering , Marasmus is the most frequent syndrome of acute malnutrition . It is due to inadequate energy intake over a period of months to years. It results from the body’s physiologic adaptive response to starvation in response to severe deprivation of energy and all nutrients , and is characterized by wasting of body tissues, particularly muscles and subcutaneous fat, and is usually a result of severe restrictions in energy intake .

Children younger than five years are the most commonly involved because of their increased caloric requirements and increased susceptibility to infections .

These children appear emaciated , weak and lethargic, and have associated bradycardia, hypotension, and hypothermia .

Their skin is xerotic, wrinkled, and loose because of the loss of subcutaneous fat, but is not characterized by any specific dermatosis.

Muscle wasting often starts in the axilla and groin (grade I), then thighs and buttocks (grade II), followed by chest and abdomen (grade III), and finally the facial muscles (grade IV), which are metabolically less active. In severe cases, the loss of buccal fat pads gives the children an aged facial aspect.

Severely affected children are often apathetic but become irritable and difficult to console .

1.5.2 kwashiorkor

The term “kwashiorkor” derives Kwashiork or the Kwa language of Ghana and its meaning is equivalent to “the sickness of the weaning” .

Kwashiorkor is thought to be the result of inadequate protein but reasonably normal caloric intake.

It was first reported in children with maize diets (these children have been called “sugar babies”, as their diet is typically low in protein but high in carbohydrate) . Kwashiorkor is frequent in developing countries and mainly involves older infants and young children. It mostly occurs in areas of famine or with limited food supply, and particularly in those countries where the diet consists mainly of corn, rice and beans .

Kwashiorkor represents a maladaptive response to starvation.

Edema is the distinguishing characteristic of kwashiorkor, which does not exist in marasmus , and usually results from a combination of low serum albumin, increased cortisol, and inability to activate the antidiuretic hormone. It usually starts as pedal edema (grade I), then facial edema (grade II), paraspinal and chest edema (grade III) up to the association with ascitis (grade IV). Besides edema, clinical features are almost normal weight for age, dermatoses, hypopigmented hair, distended abdomen, and hepatomegaly.

Hair is usually dry, sparse, brittle, and depigmented, appearing reddish yellow, Cutaneous manifestations are characteristic and progress over days from dry atrophic skin with confluent areas of hyperkeratosis and hyperpigmentation, which then splits when stretched, resulting in erosions and underlying erythematous skin .

1.5.3 Marasmic kwashiorkor “Mixed type “

Marasmic kwashiorkor is represented by mixed features of both marasmus and kwashiorkor. Characteristically, children with marasmic kwashiorkor have concurrent gross wasting and edema. They usually have mild cutaneous and hair manifestations and an enlarged palpable fatty liver.

1.6 Chronic malnutrition

“ Low height-for-age is known as stunting. It is the result of chronic or recurrent undernutrition, usually associated with poor socioeconomic conditions, poor maternal health and nutrition, frequent illness, and/or inappropriate infant and young child feeding and care in early life. Stunting holds children back from reaching their physical and cognitive potential “[5].

CHAPTER 2 : LITERATURE REVIEW

According to the World Food Program, even before the war started, Yemen had one of the highest rates of malnutrition in the Arabian Peninsula [6] .

Most Researchs said that More than 2.3 million children under the age of five in Yemen suffer from acute malnutrition [7].

A Results of 2019 retrospective study of Yemeni nutrition surveillance program for 5276 children under five in Ibb and Sana'a acute malnutrition was found in 13.3% of overall screened children [8]. Another Study of 13,624 Yemeni children under 5 years of age show the higher malnutrition level – the prevalence of stunting was 47%, wasting "Acute malnutrition" was 16%, and underweight was 39% [9].

The current war in Yemen has exacerbated the country's pre- existing challenges including poverty & poor health , According to UNICEF, 9.9 million children are in need of some form of nutrition assistance [6] .

Both national and other countries studies show that Increase Mother's education level has positive effect on child health , the odds of Malnutrition decreased with the increase in the level of Mother's education due to health knowledge , awarness of prenatal visits & vaccinations , fertility behaviour & access of informations [9] [10][11][12][13] .

Therefore, rising education level among unemployed mothers increased the probability of children's health , but mother's employment had a negative effect on child health & increases the possibility of of Malnutrition and stunting due to the malnutrition, decreasing in times of Childcare & breastfeeding , Early postnatal return to work & Stress of work ; also recent Indian study show that " the children

of non-working mothers had better health statistics and improvements in women's employment opportunities are consistently associated with worse child health " [13][14][15][16][17] .

Other factors affect child health in addition to maternal education & job are Paternal education & income and family size , also being twins had negative effect on children's health ; therefore " both family income and maternal time are important inputs to child health " [13][14][15][16] .

2.1 Study Objectives

2.1.1 General Objective

To Explore the prevalence & risk associated factors of Nutritional underweight (Depend on CDC growth charts ; weight-for-age)" in children aged 6 months to 6 years among sons of female medical staffs in Sana'a city ; yemen : 2022

2.1.2 Specific Objectives

1. To describe the sociodemographic variables of respondents of the study
2. To Explore the prevalence of " Underweight " among sons of female medical staffs of general hospitals of Sana'a city
3. To identify the association between sociodemographic and other factors with Nutritional underweight in children.
4. To determine the risk factors, associate with malnutrition among children

CHAPTER 3 :METHODOLOGY

3.1 Study design

Our study is descriptive prospective cross-sectional study to assess prevalence and risk associated factors of nutritional Underweight in children aged 6 months to 6 years among son's of female medical staffs in Sana'a city, Yemen.

3.2 Study setting

This study conducted in Governmental (general) hospitals of Sana'a City Which are :-

1. Al -Thawra Modern General Hospital (TMGH).
2. Republican Teaching Hospital Authority or (Aljimhory Hospital).
3. Al_kwait University hospital
4. AlSabeen hospital of Maternity and childhood
5. Al-Zobiry Hospital
6. Military hospital
7. 48 hospital
8. AL-rawdha hospital

Through the period (1 May 2022 - 30 May 2023)

3.3 Study Population

Children (males and females) of All Yemeni female health workers (doctors 'GPs & specialists' - nurses - laboratorians - Technicians) in the previous public hospitals

Inclusion criteria	Exclusion Criteria
<ul style="list-style-type: none"> - Children at age from 6 months to 6 years - Child Who has Yemeni Mother works in previous public hospitals as doctor, nurse, laboratorian or Technician . - Child Who are cooperative . 	<ul style="list-style-type: none"> - Child who his mother do not agree to participate in the study - Children who are not fulfillment the above inclusion criteria - Children who are refusing the Measurements taking / Examination

3.4 Sample Size

Unfortunately, the sample population could not be collected for reasons, the most important of which is the inability to obtain a list of hospital employees' names from the hospital administration, and also the difficulty of interviewing all hospital female employees to register the employees' children who are within the age we specified

As the sample community is unknown, we used the following equation to determine the sample size

$$n = \frac{Z^2 \cdot (P[1 - P])}{e^2}$$

n = sample size

z = represents confidence ; from Z-score table

- confidence at 95% $Z = 1.96$
- $e =$ acceptable error 5% =0.05
- $p =$ Estimated prevalence \sim [if unknown maximum = 0.5]
- By assuming that 50% of female employees in the health aspect of government hospitals have children aged between 6 months and 6 years , and the assumption that 50% of them suffer from malnutrition .

So the Estimated prevalence (p) = 25 % or 0.25.

So sample size = 288

3.5 Data Collection

Three tool used for data collection:

- Tool 1 : **Questionnaire**

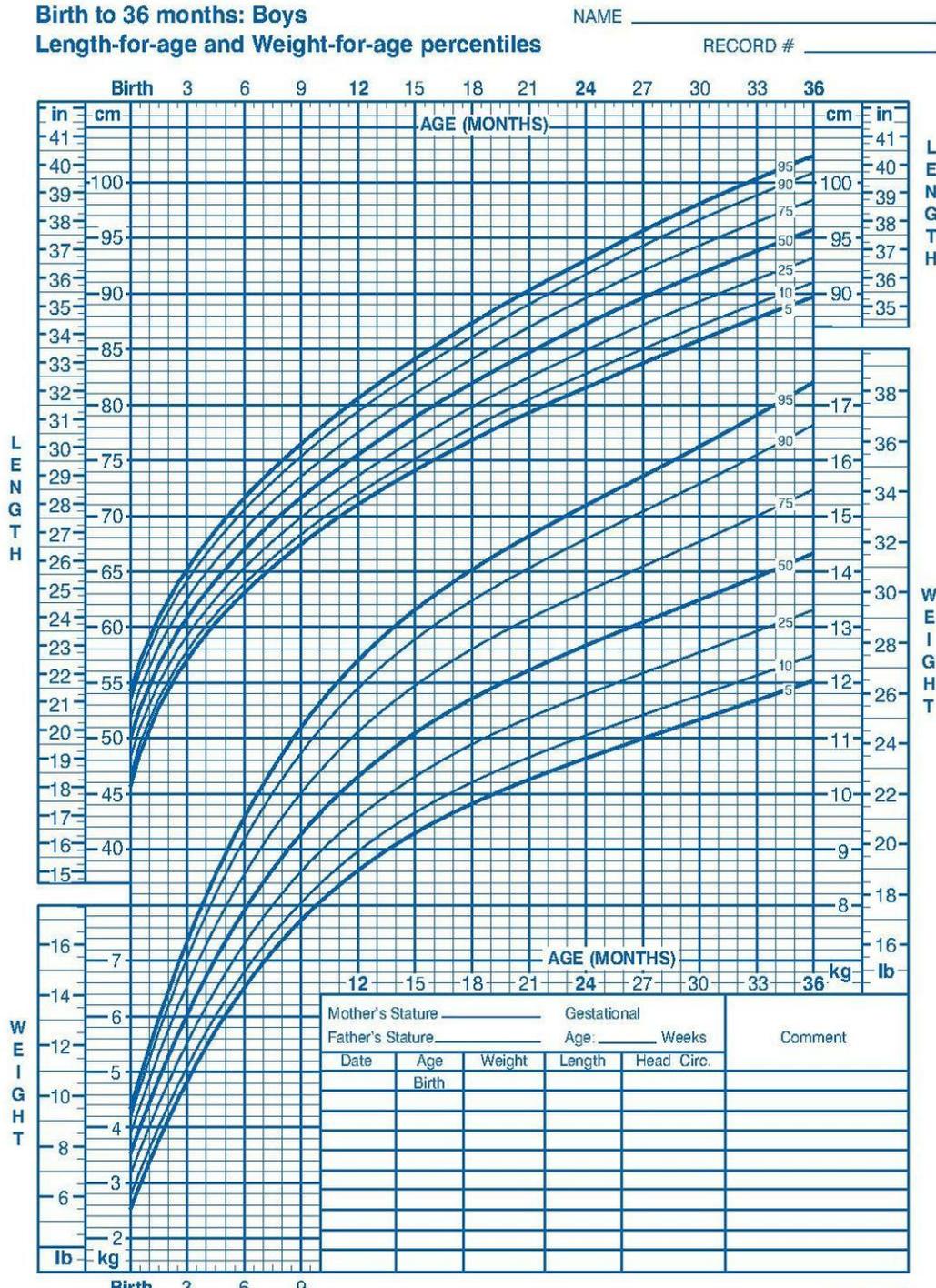
Interview structured questionnaire developed by. the researchers. The questionnaire covered :-

- **Socio - demographic & Family-Related Factors:** (age , gender , Residence , Father Occupation , Father education level , family size ,..etc).
- **Mother's employment Related factors** (Mather age , Education level , type of employment , Daily Time of work ...etc)
- **Risk factors of Malnutrition** (birth weight , breast feeding period , Number of meals etc)

- Tool 2 : **Anthropometric Measurements**

- Weight

- Height
- Weight-for-age on CDC growth chart



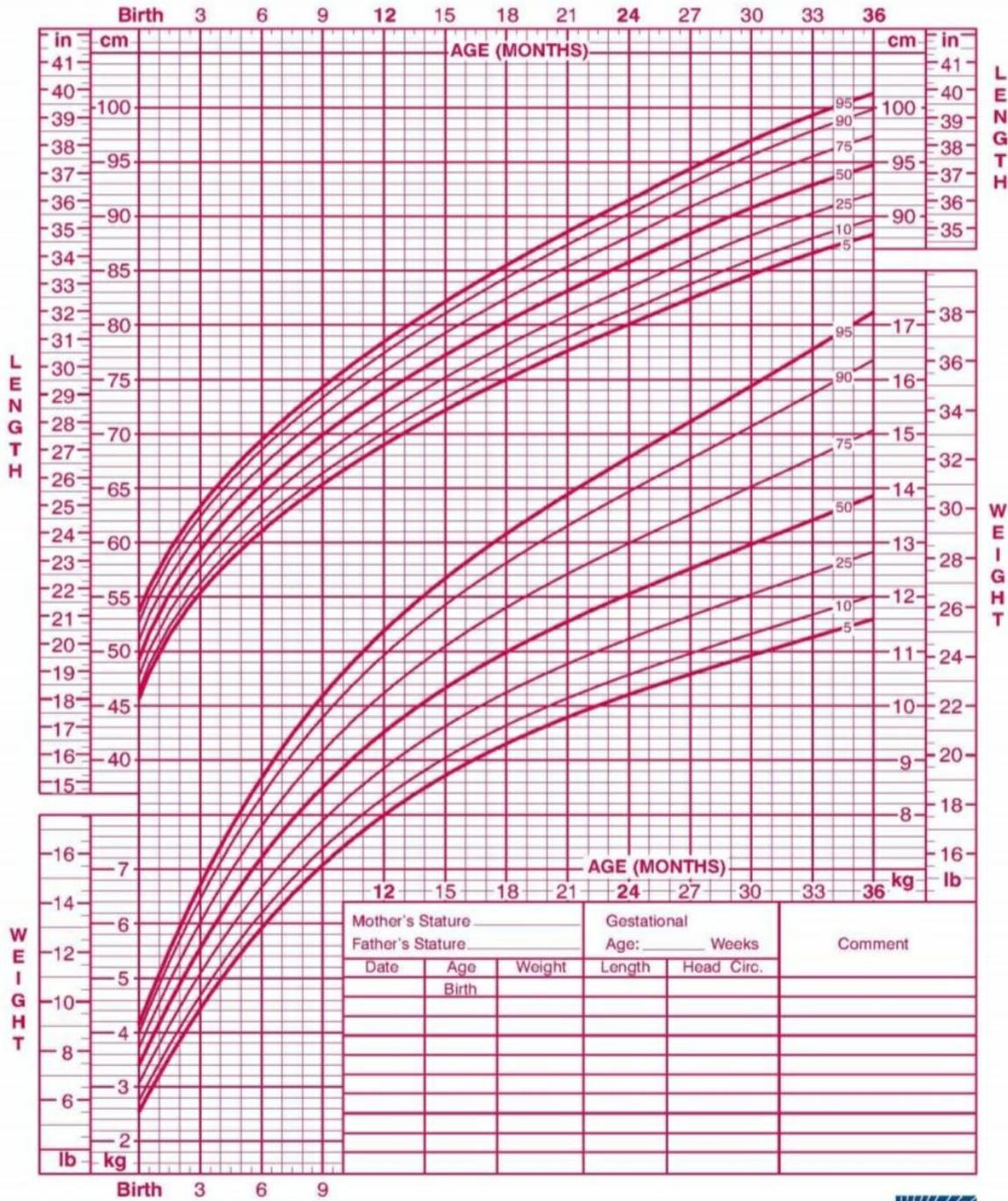
Published May 30, 2000 (modified 4/20/01).
 SOURCE: Developed by the National Center for Health Statistics in collaboration with
 the National Center for Chronic Disease Prevention and Health Promotion (2000).
<http://www.cdc.gov/growthcharts>



Birth to 36 months: Girls
Length-for-age and Weight-for-age percentiles

NAME _____

RECORD # _____



Published May 30, 2000 (modified 4/20/01).
 SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).
<http://www.cdc.gov/growthcharts>



3.6 Ethical Consideration

- We started after a license & guidance from 21UMAS
- The purpose , benefits & procedure of the study explained to Every Medical worker (Child Mother) , Also Oral approval obtained before Starting any procedure in the study .
- We were gentle with the children during the examination and taking measurements .
- Every one also had the right to refuse to participate or to withdraw from the study .
- All data obtained was confidential and not used for purposes other than scientific research .

3.7 Data Analysis

- After collection of data from Structured questionnaire & Anthropometric Measurements , These data subjected to Edditing , followed by coding .
- a codebook developed to provide numerical results for analysis .
- computer analysis program “SPSS” , used for statistical analysis of this data .
- After that Descriptive measures , including prevalence , percentage & others presented with Appropriate Methods .

3.8 Work-Time

	May 2022	June 2022	July 2022	Aug. 2022	Sept 2022	Oct. 2022	Nov. 2022	Dec. 2022	Jan. 2023
Proposal Writing									
Questionnaire development									
Data Collection									

	Feb. 2023	March 2023	April 2023	May 2023	June 2023
Data Analysis					
Writing final report					
Discussion					

3.9 Budget

Activity	Cost
Proposal preparing	11,000 RY
Weigt scale , Tapes	25,000 RY
Data Collection	Self- working
Data Analysis	50,000 RY
Final reporting	10,000 RY

CHAPTER 4

DATA ANALYSIS

4.1 Introduction :

After excluding children who have congenital deformities and/or chronic diseases ; This study was conducted on 278 female employees, including 116 nurses, 49 technicians, 49 laboratory technicians, 39 general practitioners, and 27 specialists, all of whom have at least one child between 6 months and 6 years. Information was collected through interviews with the mothers and questionnaires filled out by the researchers. About 45% of the children in the sample were weighed by the researchers themselves, while the weights of the rest were learned from their mothers .

This chapter provides the findings of the study that were generated from data analysis and its interpretation. This chapter starts with data screening which focuses on the way of coding and checking the missing data on SPSS, sample profile which is data about the respondents or subjects characteristics (in tabular and/or graphical forms). Next, this chapter presents the results of the Chi-square Analysis.

4.2 Personal data & measurements :

4.2.1 Gender Frequency:

Gender was the once demographic variable that describes the gender of Children responding to the survey instrument as it is shown in Table 4.1 and Figure 4.1

Table 4.1 Frequency Distribution–gender of Respondents

Gender	Frequency	Percent
Male	135	48.6%
Female	143	51.4%
Total	278	100.0%

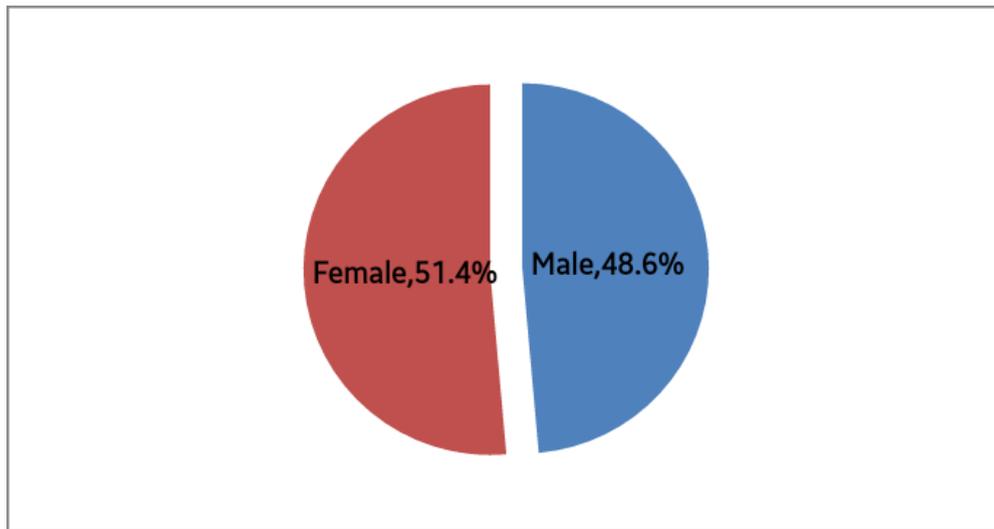


Figure 4.1 Frequency Distribution–Gender of Children

4.2.2 Age Frequency:

Age was the second demographic variable which describes the respondents ages to the survey instrument. These data are presented in following Table 4.2 and Figure 4.2.

Table 4.2 Frequency Distribution–Age of Respondents

Age	Frequency	Percent
Less than 1 years	48	17.3%
1 - 3 years	110	39.6%
4 years or more	120	43.2%
Total	278	100%

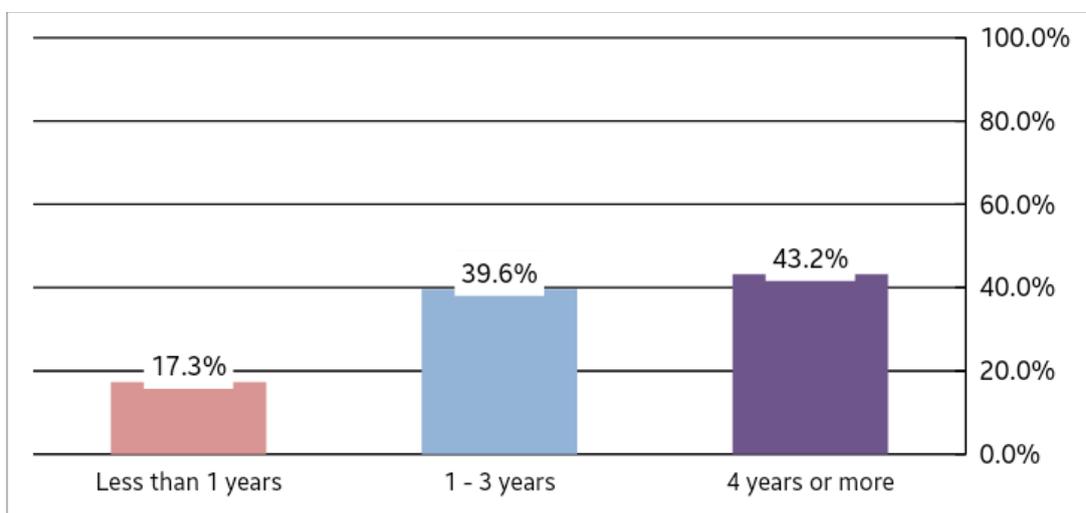


Figure 4.2 Frequency Distribution–Age of Respondents

4.2.3 Weight-for-age on growth chart Frequency :

Weight-for-age on growth chart was the main variable of this study that by it we determined who was underweight by mean of 'below 5% on growth chart (weight-for-age chart) as it is shown in Table 4.3 .

Table 4.3 Frequency Distribution–Weight-for-age on growth chart of Respondents

Weight-for-age on growth chart	Frequency	Percent
Below 5%	115	41.5%
5% - 25%	82	29.6%
25% - 50%	34	12.3%
50% -75%	21	7.6%
75% - 95%	11	4.0%
above 95%	14	5.1%
Total	277	100.0%

Table 4.3 shows that 115 Children have a (below 5%) of standard deviation on growth chart with a percentage of 41.5% of children included in this study , Which indicates Malnutritional Underweight according to CDC data tables , But CDC itself said that " Growth charts are not intended to be used as a sole diagnostic instrument " [18] , So This should be confirmed by other measurements and indexes .

4.3 Family and social factors:

4.3.1 Family size Frequency:

The frequency distribution of this family size variable shows in Table 4.6 and Figure 4.6 that highest respondents have a (Small family) that consists of parents and sons only with a percentage of 89.2% and a total number of 248 respondents. Only 30 respondents or 10.8% have a (Large family) of the total number of respondents.

Table 4.6 Frequency Distribution– Family size of Respondents

Family size	Frequency	Percent
Small	248	89.2%
Large	30	10.8%
Total	278	100.0%

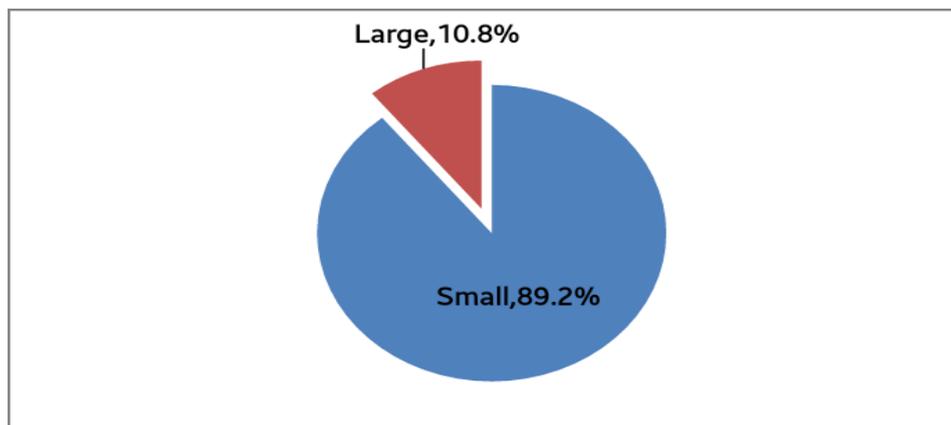


Figure 4.6 Frequency Distribution– Family size of Respondents

4.3.2 Family Members Frequency:

The frequency distribution of this family Members variable shows in Table 4.7 and Figure 4.7 that highest respondents have a (From 4 to 6) with a percentage of 64.7% and a total number of 180 respondents. 25.2% of the total respondents have (Less than 4) and this represents the second among respondents with 70 persons. Only 28 respondents or 10.1% have a (More than 6) of the total number of respondents.

Table 4.7 Frequency Distribution– Family Members of Respondents

Family Members	Frequency	Percent
Less than 4	70	25.2%
From 4 to 6	180	64.7%
More than 6	28	10.1%
Total	278	100.0%

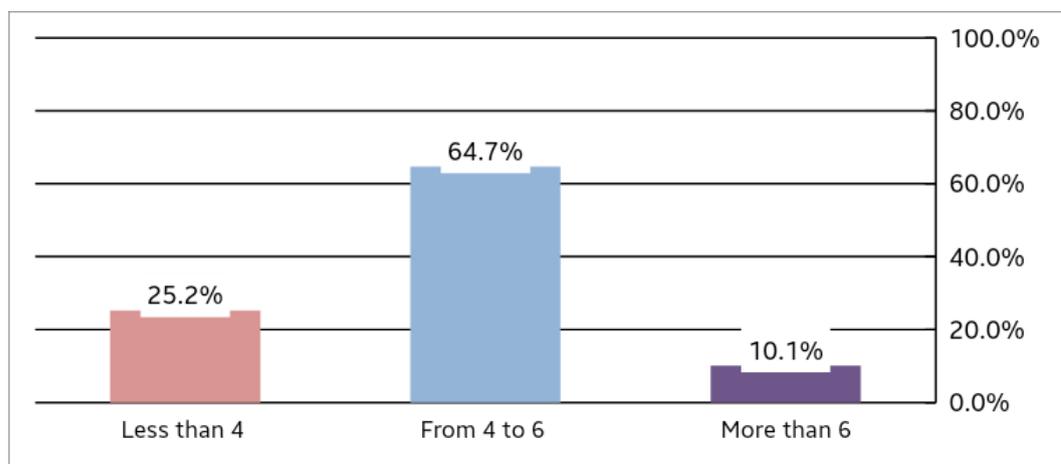


Figure 4.7 Frequency Distribution– Family Members of Respondents

4.3.3 Numbers of children Frequency:

The result of Numbers of children distribution illustrated shows in Table 4.8. & **Figure 4.8** .

Table 4.8 Frequency Distribution– Numbers of children of Respondents

Numbers of children	Frequency	Percent
Less than 4	243	87.4%
From 4 to 6	30	10.8%
More than 6	5	1.8%
Total	278	100%

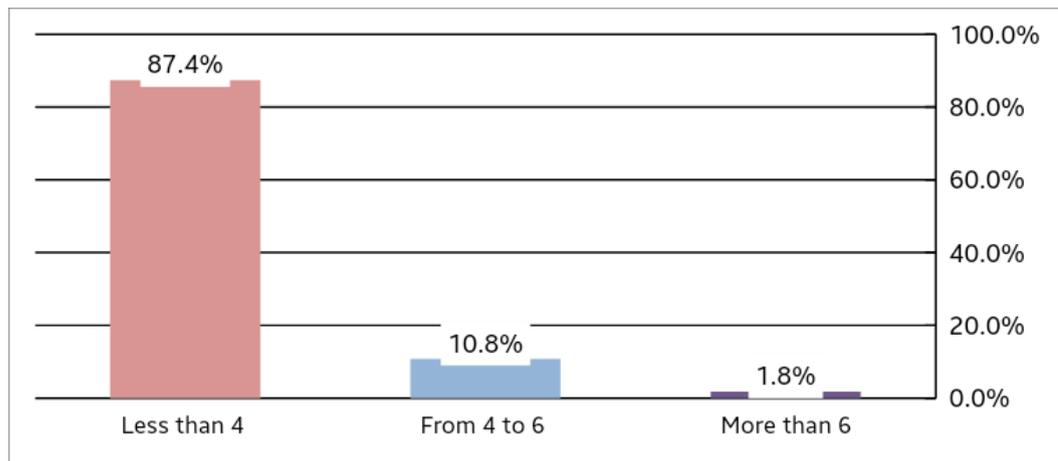


Figure 4.8 Frequency Distribution– Numbers of children of Respondents

4.3.4 Numbers Of children under 6 years Frequency:

The result of Numbers Of children under 6 years distribution illustrated shows in Table 4.9 .

Table 4.9 Frequency Distribution– Numbers Of children under 6 years of Respondents

Numbers Of children under 6 years	Frequency	Percent
One	161	55.9%
Two	100	36.0%
Three and more	17	6.1%
Total	278	100%

4.3.5 Father's educational level Frequency:

The result of father's educational level distribution illustrated shows in Table 4.10 and Figure 4.10 that the greatest number of the respondents was in (Academic) with total number of (185) respondents and represent (66.5%) of the total respondents. Then another group followed by respondents (Secondary) with total number of (73) respondents and represent (26.3%) of the total respondents. The last group was with (Basic) with (20) respondents and represents (7.2%) of the total respondents.

Table 4.10 Frequency Distribution– Father's educational level of Respondents

Father's educational level	Frequency	Percent
Basic	20	7.2%
Secondary	73	26.3%
Academic	185	66.5%
Total	278	100%

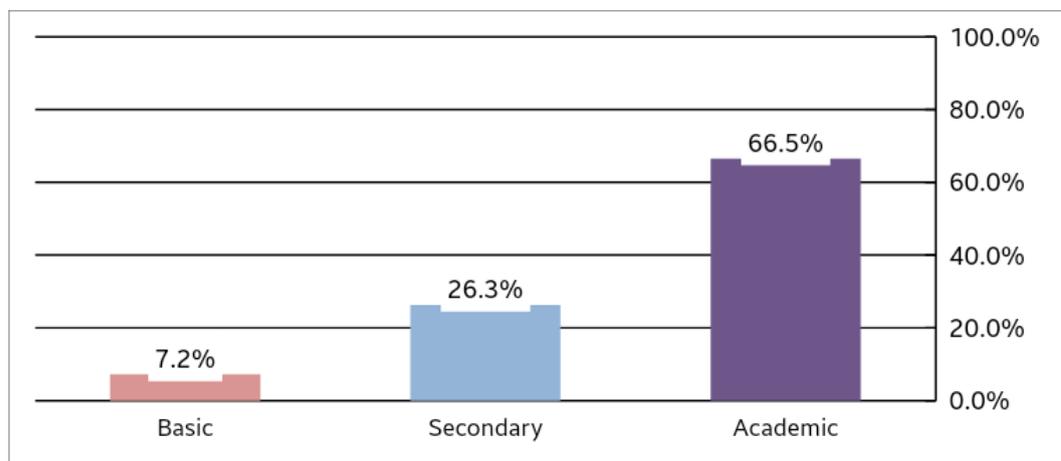


Figure 4.10 Frequency Distribution– Father's educational level of Respondents

4.3.6 Father's job Frequency:

The result of father's job distribution illustrated shows in Table 4.11 .

Table 4.11 Frequency Distribution– Father's job of Respondents

Father's job	Frequency	Percent
Daily wages / No job	82	29.5%
Governmental sector	87	31.3%
Private sector	109	39.2%
Total	278	100%

4.3.7 Child's living situation Frequency:

The result of child's living situation distribution illustrated shows in Table 4.12 and Figure 4.12 that the greatest number of the respondents live (With father and mother) with total number of (257) respondents and represent (92.4%) of the total respondents. Then another group followed by that lives (With father) with total number of (15) respondents and represent (5.4%) of the total respondents. The last group that lives (With mother) with (6) respondents and represents (2.2%) of the total respondents.

Table 4.12 Frequency Distribution– Child's living situation of Respondents

Child's living situation	Frequency	Percent
With father and mother	257	92.4%
With father	15	5.4%
With mother	6	2.2%
Total	278	100%

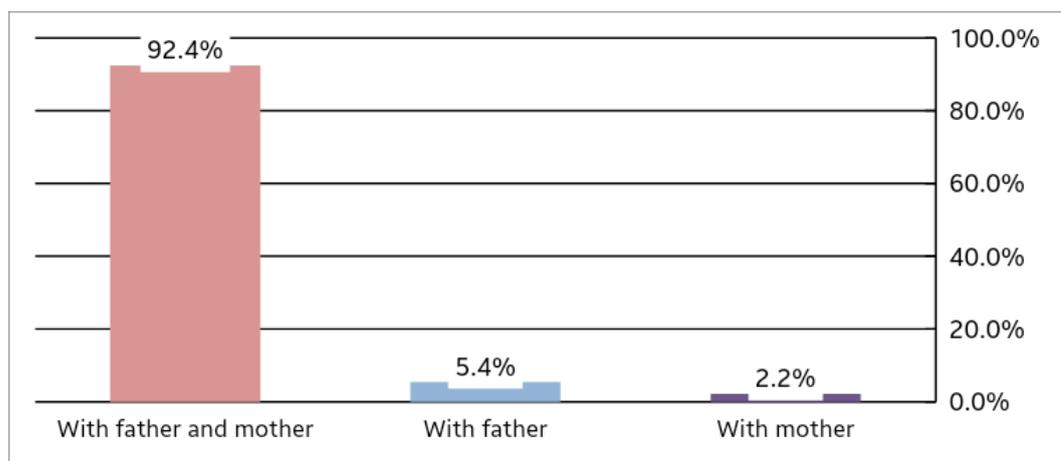


Figure 4.12 Frequency Distribution– Child's living situation of Respondents

4.3.8 Child's school Frequency:

The result of child's school distribution illustrated shows in Table 4.13 and Figure 4.13 that the greatest number of the respondents was in (Especially) with total number of (87) respondents and represent (60.0%) of the total respondents. The last group was with (Governmental) with (58) respondents and represents (40.0%) of the total respondents , rest of respondents have not children at school age .

Table 4.13 Frequency Distribution– Child's school of Respondents

Child's school	Frequency	Percent
Governmental	58	40.0%
Especially	87	60.0%
Total	145	100%

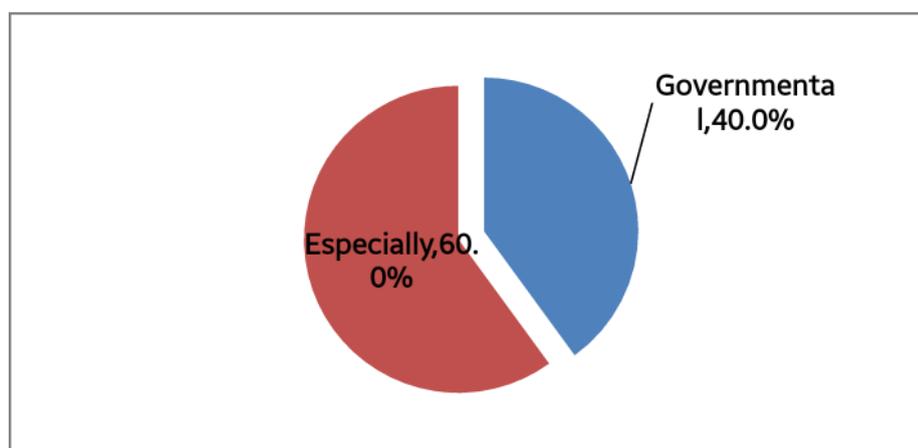


Figure 4.13 Frequency Distribution– Child's school of Respondents

4.3.9 Home Frequency:

The result of home distribution illustrated shows in Table 4.14 and Figure 4.14 that the greatest number of the respondents was in (Rent) with total number of (168) respondents and represent (60.4%) of the total respondents. The last group was with (Own) with (110) respondents and represents (39.6%) of the total respondents.

Table 4.14 Frequency Distribution– Home of Respondents

Home	Frequency	Percent
Own	110	39.6%
Rent	168	60.4%
Total	278	100%

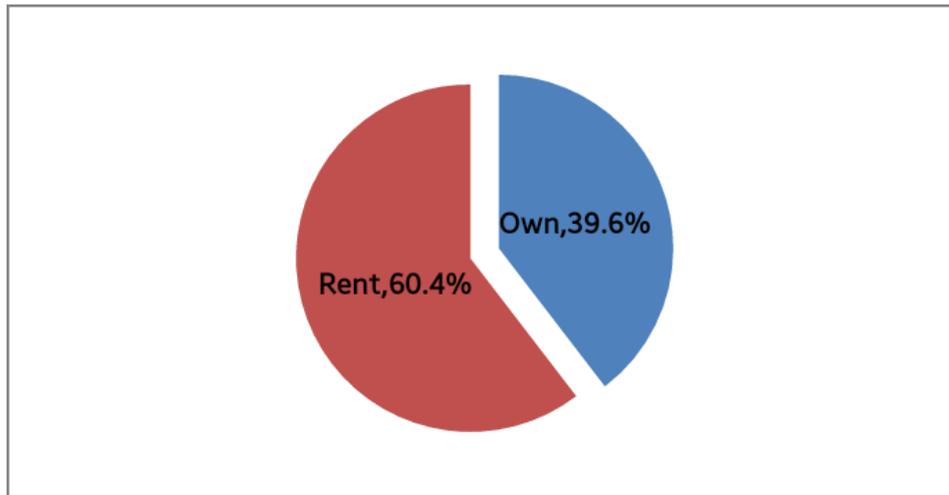


Figure 4.14 Frequency Distribution– Home of Respondents

4.4 Factors related to the mother’s job:

4.4.1 Mother's age Frequency:

The result of the mother's age distribution in Table 4.15 illustrated that the greatest number of the respondents was (from 20 to 30 years old) with total number of (150) respondents and represent (54.0%) of the total respondents. Then another mother's age group followed by respondents aged (31 - 40 years) with total number of (120) respondents and represent (43.2%) of the total respondents. The last mother's age group was with (More than 40 years) with 8 respondents and represents (2.9%) of the total respondents.

Table 4.15 Frequency Distribution– Mother's age of Respondents

Mother's age	Frequency	Percent
20 - 30 years	150	54.0%
31 - 40 years	120	43.2%
More than 40 years	8	2.9%
Total	278	100%

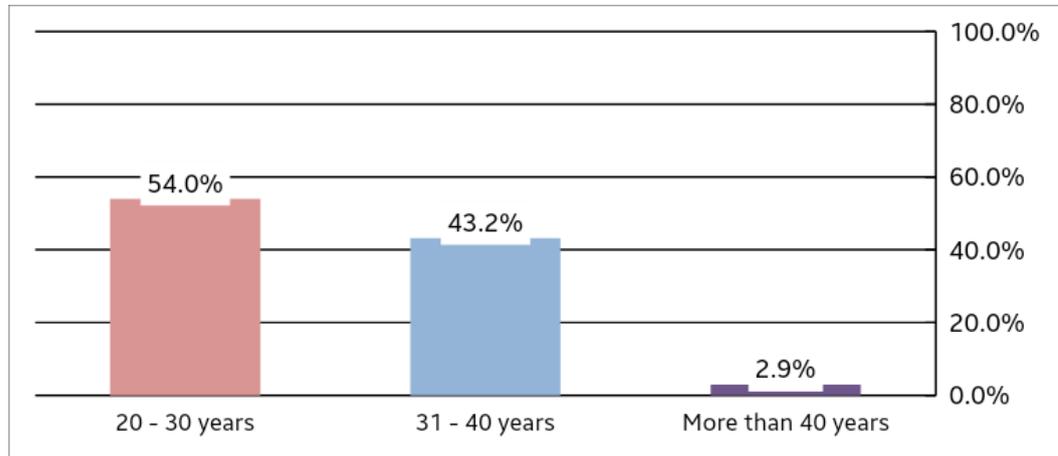


Figure 4.15 Frequency Distribution– Mother's age of Respondents

4.4.2 Job period Frequency:

The result of the job period distribution in Table 4.16 illustrated that the greatest number of the respondents was (More than 6 years) with total number of (133) respondents and represent (47.8%) of the total respondents. Then another job period group followed by respondents (Less than 3 years) with total number of (74) respondents and represent (26.6%) of the total respondents. The last job period group was with (3 - 6 years) with 71 respondents and represents (25.5%) of the total respondents.

Table 4.16 Frequency Distribution– Job period of Respondents

Job period	Frequency	Percent
Less than 3 years	74	26.6%
3 - 6 years	71	25.5%
More than 6 years	133	47.8%
Total	278	100%

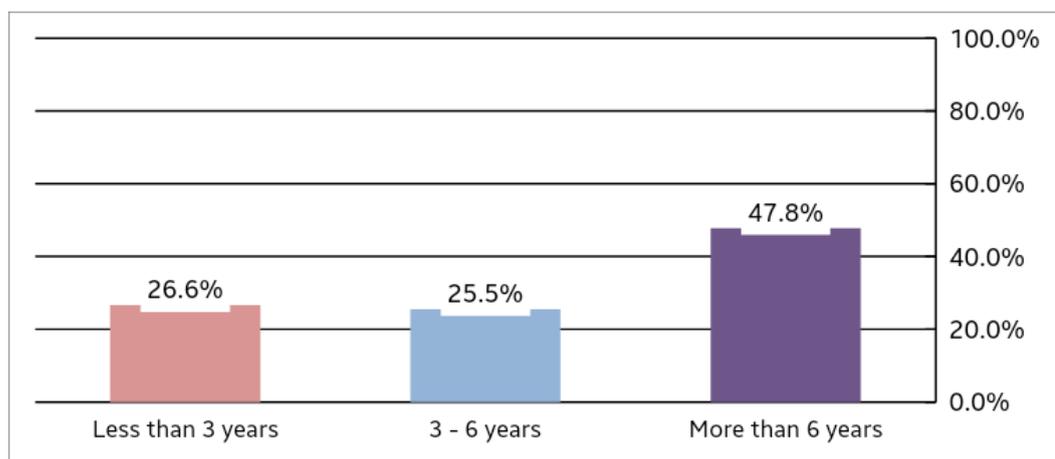


Figure 4.16 Frequency Distribution– Job period of Respondents

4.4.3 Work place Frequency:

The result of the work place distribution in Table 4.17 illustrated that the greatest number of the respondents was (Hospital only) with total number of (221) respondents and represent (79.5%) of the total respondents. Then another work place group followed by respondents (Private job with hospital) with total number of (45) respondents and represent (16.2%) of the total respondents. The last work place group was with (All of the above) with 3 respondents and represents (1.1%) of the total respondents.

Table 4.17 Frequency Distribution– Work place of Respondents

Work place	Frequency	Percent
Hospital only	221	79.5%
Private job with hospital	45	16.2%
Hospital with clinic	9	3.2%
All of the above	3	1.1%
Total	278	100%

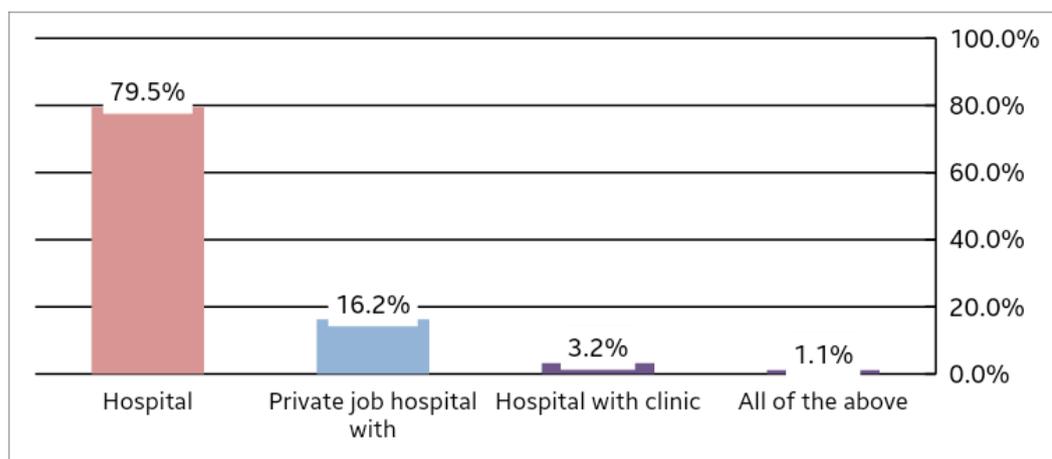


Figure 4.17 Frequency Distribution– Work place of Respondents

4.4.4 Type of the job Frequency:

The result of the type of the job distribution in Table 4.18 illustrated that the greatest number of the respondents was (Nurse) with total number of (116) respondents and represent (41.7%) of the total respondents. Then another type of the job group followed by respondents (Technical) and (Laboratory) with total number of (49) respondents and represent (17.6%) of the total respondents. The last type of the job group was with (Specialist) with 27 respondents and represents (9.7%) of the total respondents.

Table 4.18 Frequency Distribution– Type of the job of Respondents

Type of the job	Frequency	Percent
Technical	49	17.6%
Laboratory	49	17.6%
Nurse	116	41.7%
General practitioners	37	13.3%
Specialist	27	9.7%
Total	278	100%

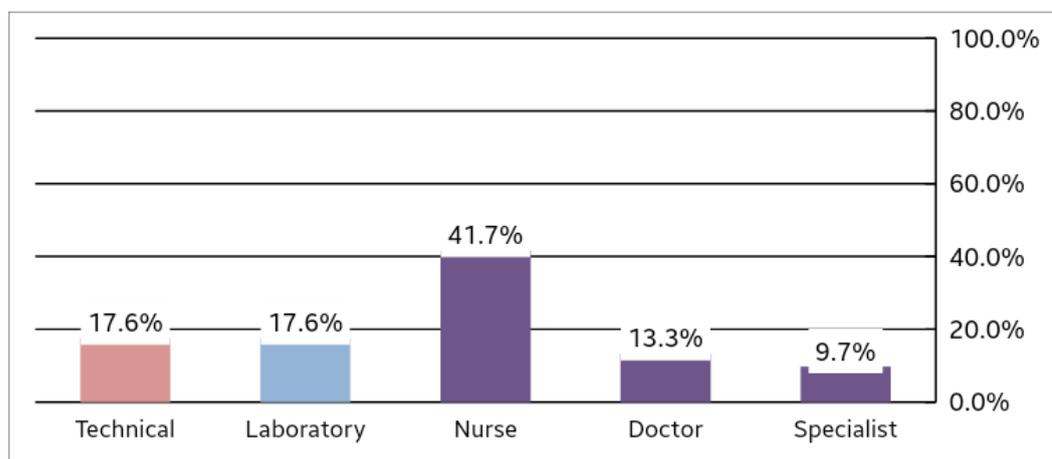


Figure 4.18 Frequency Distribution– Type of the job of Respondents

4.4.5 Number of working days Frequency:

The result of the number of working days distribution in Table 4.19 illustrated that the greatest number of the respondents was (5 day per week) with total number of (101) respondents and represent (36.3%) of the total respondents. Then another number of working days group followed by respondents (Less than 4 day per week) with total number of (53) respondents and represent (19.1%) of the total respondents. The last number of working days group was with (4 day per week) with 29 respondents and represents (10.4%) of the total respondents.

Table 4.19 Frequency Distribution– Number of working days of Respondents

Number of working days	Frequency	Percent
Every day	47	16.9%
6 day per week	48	17.3%
5 day per week	101	36.3%
4 day per week	29	10.4%
Less than 4 day per week	53	19.1%
Total	278	100%

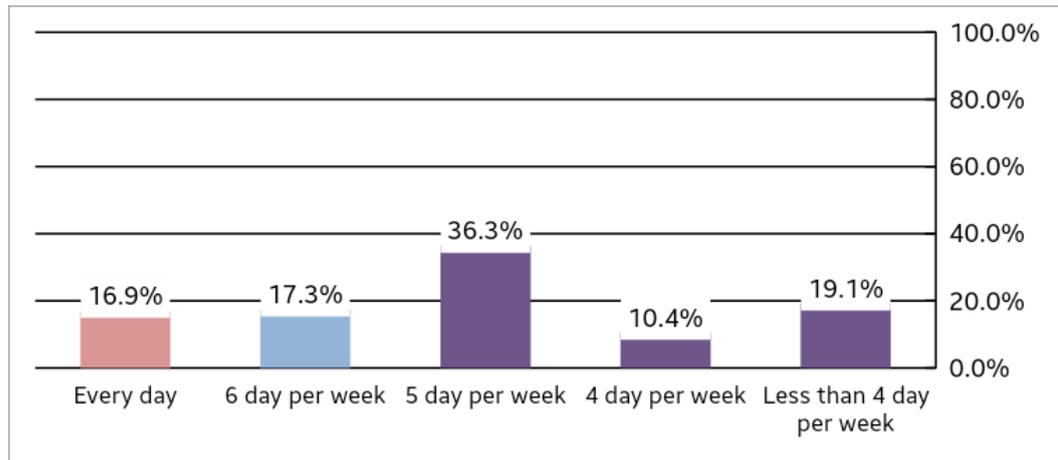


Figure 4.19 Frequency Distribution– Number of working days of Respondents

4.4.6 Average working hours per day Frequency:

The result of the average working hours per day distribution in Table 4.20 illustrated that the greatest number of the respondents was (6 to 12 hours) with total number of (162) respondents and represent (58.3%) of the total respondents. Then another average working hours per day group followed by respondents (Less than 6 hours) with total number of (85) respondents and represent (30.6%) of the total respondents. The last average working hours per day group was with (More than 12 hours) with 31 respondents and represents (11.2%) of the total respondents.

Table 4.20 Frequency Distribution– Average working hours per day of Respondents

Average working hours per day	Frequency	Percent
Less than 6 hours	85	30.6%
6 to 12 hours	162	58.3%
More than 12 hours	31	11.2%
Total	278	100%

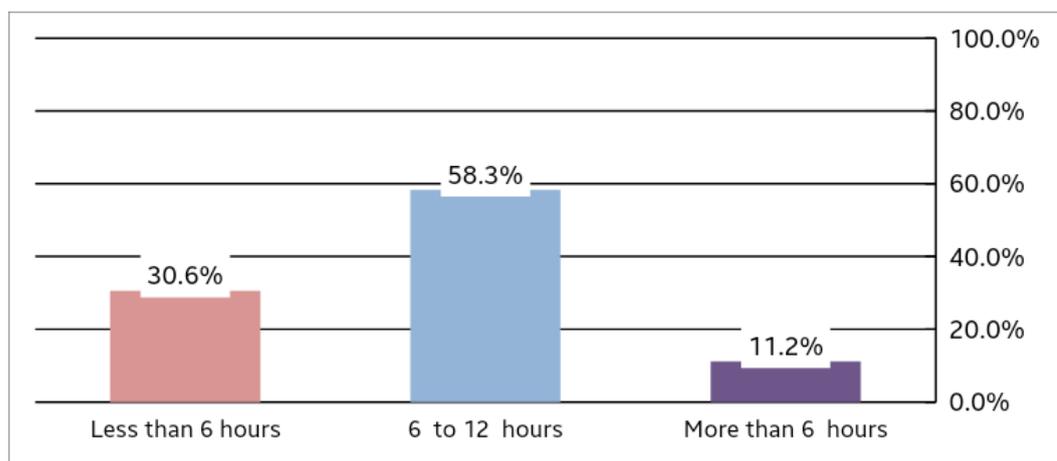


Figure 4.20 Frequency Distribution– Average working hours per day of Respondents

4.5 If the mother is busy with work, where do you put the child Frequency:

The result of the If the mother is busy with work, where do you put the child distribution in Table 4.21 illustrated that the greatest number of the respondents was (At a relative) with total number of (101) respondents and represent (36.3%) of the total respondents. Then another group followed by respondents (At home with a housewife) with total number of (90) respondents and represent (32.4%) of the total respondents. The last group was with (At home with no housewife) with 11 respondents and represents (4.0%) of the total respondents.

Table 4.21 Frequency Distribution– If the mother is busy with work, where do you put the child of Respondents

If the mother is busy with work, where do you put the child	Frequency	Percent
At home with a housewife	90	32.4%
At home with no housewife	11	4.0%
At a relative	101	36.3%
At one of the neighbors	12	4.3%
In the hospital's kindergarten	64	23.0%
Total	278	100%

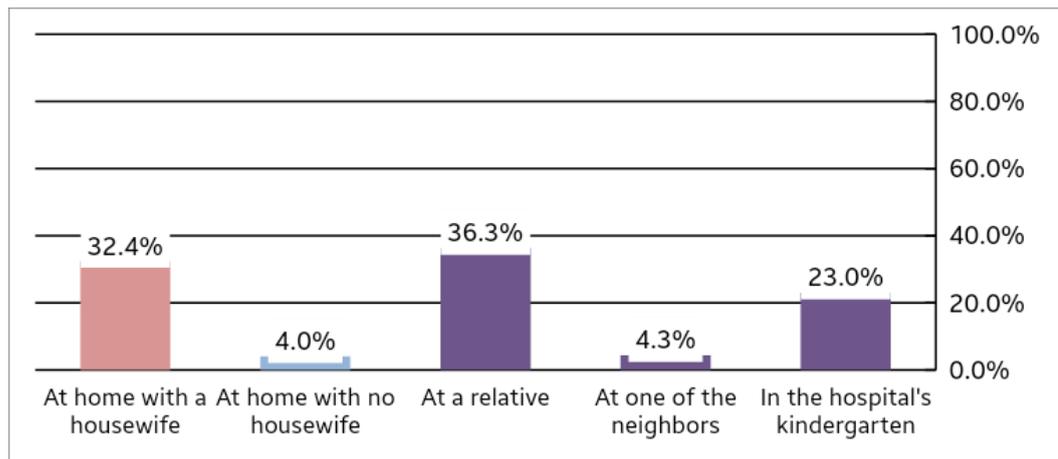


Figure 4.21 Frequency Distribution– If the mother is busy with work, where do you put the child of Respondents

4.6 Other factors:

4.6.1 Pregnancy period Frequency:

The result of the pregnancy period distribution in Table 4.24 illustrated that the greatest number of the respondents was (37 to 42 weeks) with total number of (243) respondents and represent (87.4%) of the total respondents. Then another pregnancy period group followed by respondents (Less than 37 weeks) with total number of (25) respondents and represent (9.0%) of the total respondents. The last pregnancy period group was with (More than 42 weeks) with 10 respondents and represents (3.6%) of the total respondents.

Table 4.24 Frequency Distribution– Pregnancy period of Respondents

Pregnancy period	Frequency	Percent
Less than 37 weeks	25	9.0%
37 to 42 weeks	243	87.4%
More than 42 weeks	10	3.6%
Total	278	100%

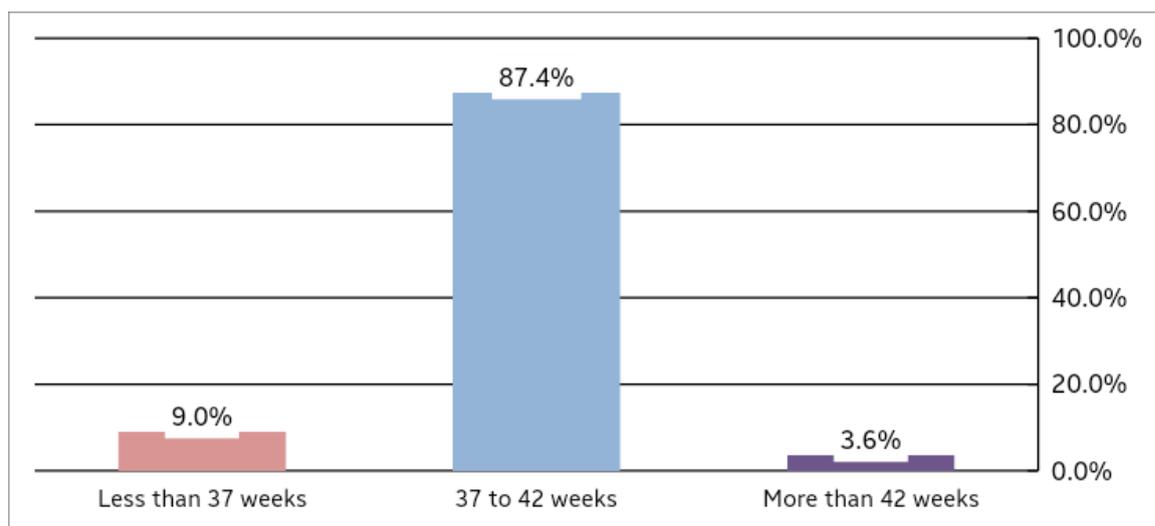


Figure 4.24 Frequency Distribution– Pregnancy period of Respondents

4.6.2 Baby weight at birth Frequency:

The result of the baby weight at birth distribution in Table 4.25 illustrated that the greatest number of the respondents was (2.5 to 4 kg) with total number of (183) respondents and represent (65.8%) of the total respondents. Then another baby weight at birth group followed by respondents (Less than 2.5 kg) with total number of (81) respondents and represent (29.1%) of the total respondents. The last baby weight at birth group was with (More than 4 kg) with 14 respondents and represents (5.0%) of the total respondents.

Table 4.25 Frequency Distribution– Baby weight at birth of Respondents

Baby weight at birth	Frequency	Percent
Less than 2.5 kg	81	29.1%
2.5 to 4 kg	183	65.8%
More than 4 kg	14	5.0%
Total	278	100%

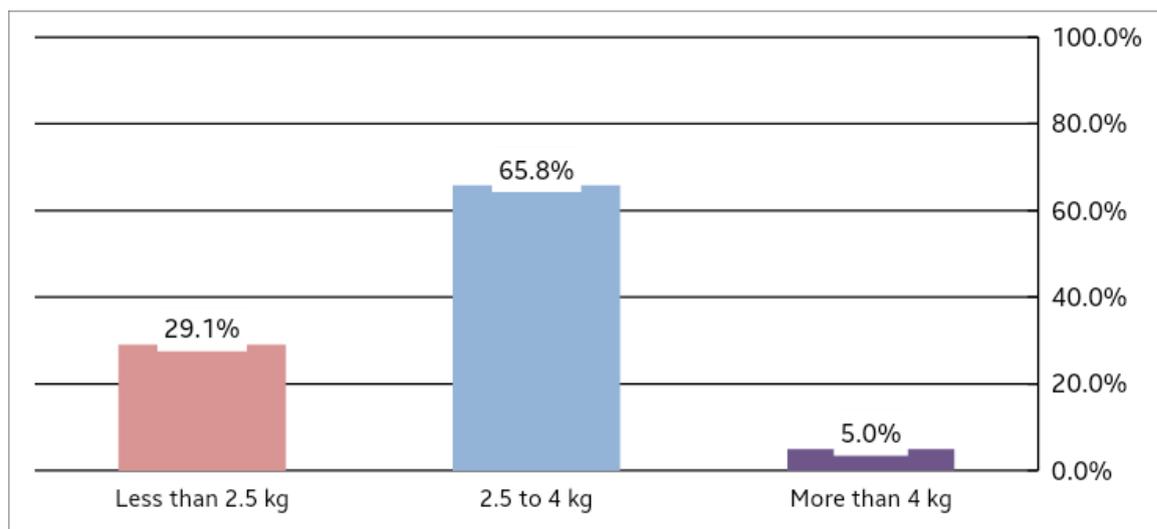


Figure 4.25 Frequency Distribution– Baby weight at birth of Respondents

4.6.3 Breastfeeding period Frequency:

The result of the breastfeeding period distribution in Table 4.26 illustrated that the greatest number of the respondents was (More than 6 months) with total number of (168) respondents and represent (60.4%) of the total respondents. Then another breastfeeding period group followed by respondents (Less than 6 months) with total number of (74) respondents and represent (26.6%) of the total respondents. The last breastfeeding period group was with (6 months) with 36 respondents and represents (12.9%) of the total respondents.

Table 4.26 Frequency Distribution– Breastfeeding period of Respondents

Breastfeeding period	Frequency	Percent
Less than 6 months	74	26.6%
6 months	36	12.9%
More than 6 months	168	60.4%
Total	278	100%

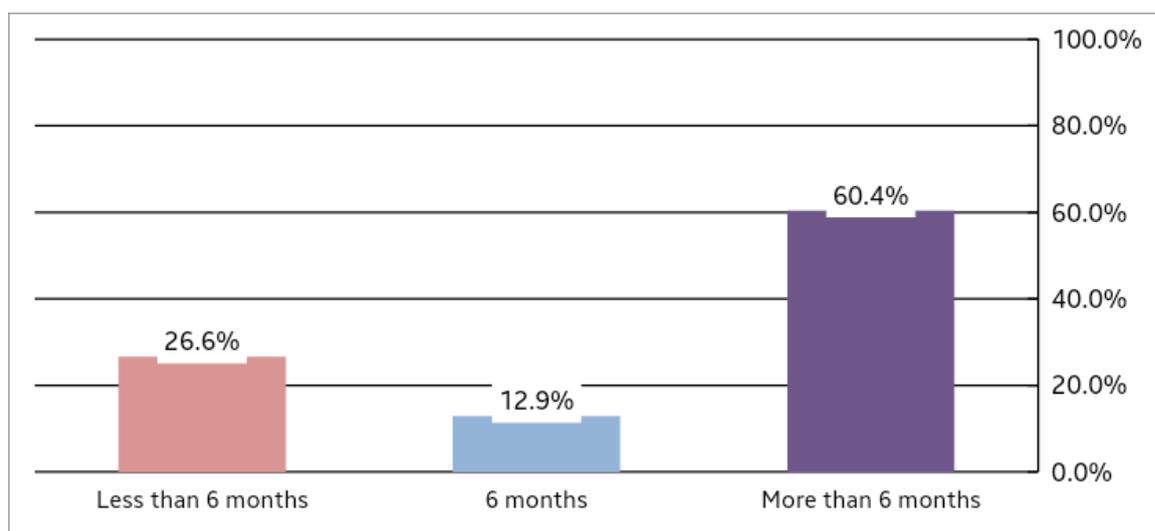


Figure 4.26 Frequency Distribution– Breastfeeding period of Respondents

4.7 Association between personal data factors and growth chart:

4.7.1 Association between Gender , Age and growth chart:

Table 4.28 Association between Gender & age and growth chart (n = 277)

Factors		Growth chart below 5% n (%) 115 (41.5)	Growth chart more 5% n (%) 162 (58.5)	X ²	P
Gender	Male	65 (56.5)	70 (43.2)	4.770	0.029*
	Female	50 (43.5)	92 (56.8)		
Age	Less than 1 years	19 (16.5)	29 (17.9)	5.064	0.080
	1 - 3 years	54 (47.0)	55 (34.0)		
	4 years or more	42 (36.5)	78 (48.1)		

4.7.2 Association between family and social factors and growth chart:

Table 4.29 Association between family and social factors and growth chart (n = 277)

Factors		Growth chart below 5% n (%) 115 (41.5)	Growth chart more 5% n (%) 162 (58.5)	X ²	P
Family size	Small	97 (84.3)	150 (92.6)	4.734	0.030*
	Large	18 (15.7)	12 (7.4)		
Family members	Less than 4	30 (26.1)	40 (24.7)	2.156	0.340
	From 4 to 6	70 (60.9)	109 (67.3)		
	More than 6	15 (13.0)	13 (8.0)		
Numbers of children	Less than 4	98 (85.2)	144 (88.9)	0.998	0.607
	From 4 to 6	15 (13.0)	15 (9.3)		
	More than 6	2 (1.7)	3 (1.9)		
Numbers Of children under 6 years	One	68 (59.1)	93 (57.4)	0.436	933
	Two	39 (33.9)	60 (37.0)		
	Three and more	8 (7.0)	9 (5.6)		
Father's educational level	Basic	7 (6.1)	13 (8.0)	1.850	0.397
	Secondary	35 (30.4)	38 (23.5)		
	Academic	73 (63.5)	111 (68.5)		
Father's job	Not working / Daily wages	40 (34.8)	42 (25.9)	10.579	0.014*
	Governmental sector	42 (36.5)	44 (27.2)		
	Private sector	33 (28.7)	76 (46.9)		
Child's living situation	With father and mother	104 (90.4)	152 (93.8)	1.124	0.570
	With father only	8 (7.0)	7 (4.3)		
	With mother only	3 (2.6)	3 (1.9)		
Child's school	Governmental	26 (44.8)	32 (36.8)	0.939	0.333
	Especially	32 (55.2)	55 (63.2)		
Home	Own	42 (36.5)	68 (42.0)	0.835	0.361
	Rent	73 (63.5)	94 (58.0)		

4.7.3 Association between factors related to the mother's job and growth chart:

Table 4.30 Association between factors related to the mother's job and growth chart (n = 277)

Factors		Growth chart below 5% n (%) 115 (41.5)	Growth chart more 5% n (%) 162 (58.5)	X ²	P
Mother's age	20 - 30 years	66 (57.4)	83 (51.2)	1.028	0.598
	31 - 40 years	46 (40.0)	74 (45.7)		
	More than 40 years	3 (2.6)	5 (3.1)		
Job period	Less than 3 years	30 (26.1)	44 (27.2)	0.519	0.771
	3 - 6 years	27 (23.5)	43 (26.5)		
	More than 6 years	58 (50.4)	75 (46.3)		
Work place	Hospital only	93 (80.9)	127 (78.4)	2.439	0.486
	Private job with hospital	19 (16.5)	26 (16.0)		
	Hospital with clinic	3 (2.6)	6 (3.7)		
	All of the above	0 (0.0)	3 (1.9)		
Type of the job	Technical	17 (14.8)	32 (19.8)	5.831	0.212
	Laboratory	16 (13.9)	33 (20.4)		
	Nurse	57 (49.6)	58 (35.8)		
	General practitioner ' Doctor '	15 (13.0)	22 (13.6)		
	Specialist	10 (8.7)	17 (10.5)		
Number of working days	Every day	17 (14.8)	30 (18.5)	1.451	0.835
	6 day per week	23 (20.0)	25 (15.4)		
	5 day per week	42 (36.5)	58 (35.8)		
	4 day per week	12 (10.4)	17 (10.5)		
	Less than 4 day per week	21 (18.3)	32 (19.8)		
Average working hours per day	Less than 6 hours	32 (27.8)	53 (32.7)	2.808	0.246
	6 to 12 hours	66 (57.4)	95 (58.6)		
	More than 12 hours	17 (14.8)	14 (8.6)		
If the mother is busy with work, where do you put the child	At home with a housewife	41 (35.7)	49 (30.2)	7.281	0.122
	At home with no housewife	8 (7.0)	3 (1.9)		
	At a relative	40 (34.8)	60 (37.0)		
	At one of the neighbors	3 (2.6)	9 (5.6)		
	In the hospital's kindergarten	23 (20.0)	41 (25.3)		

4.7.4 Association between other factors and growth chart:

Table 4.32 Association between other factors and growth chart (n = 277)

Factors		Growth chart below 5% n (%) 115 (41.5)	Growth chart more 5% n (%) 162 (58.5)	X ²	P
Pregnancy period	Less than 37 weeks	14 (12.2)	11 (6.8)	2.796	0.247
	37 to 42 weeks	96 (83.5)	146 (90.1)		
	More than 42 weeks	5 (4.3)	5 (3.1)		
Baby weight at birth	Less than 2.5 kg	38 (33.0)	43 (26.5)	1.453	0.484
	2.5 to 4 kg	72 (62.6)	110 (67.9)		
	More than 4 kg	5 (4.3)	9 (5.6)		
Breastfeeding period	Less than 6 months	33 (28.7)	40 (24.7)	10.66 2	0.005 *
	6 months	23 (20.0)	13 (8.0)		
	More than 6 months	59 (51.3)	109 (67.3)		

4.8 percentages of Underweighted children " below 5 % of standard deviation on weight-for-age chart " In Each Category of respondents' children :

4.8.1 Related to child Age & gender :-

Table 4.33 percentages of Underweight in gender and age categories

Category		Total no. of that with this Catg.	Number of that " below 5% " on growth chart	%
Gender	Male	135	65	48 %
	Female	143	50	35 %
Age	Less than 1 years	48	19	40 %
	1 - 3 years	110	54	49 %
	4 years or more	120	42	35 %

About 48% of males children are below 5 % of standard deviation on weight-for-age chart , Compared to 35 % of females ; so We can say that underweight is more prevalent among boys than in girls .

Also, children between 1-3 years are exposed to the risk of underweight more than others , where the incidence of them reached 49% , followed by those who are less

than a year by 40% , and finally at the least risk is children who are older than 3 years and less than 6 years since the rate of Underweight in them is 35%.

4.8.2 Related to Family & social factors

Table 4.34 percentages of Underweight in relation to family and social factors categories

Category		Total no. of that with this Catg.	Number of that " Underweight " on growth chart	%
Family size	Small	248	97	39 %
	Large	30	18	60 %
Family members	Less than 4	70	30	43 %
	From 4 to 6	180	70	39 %
	More than 6	28	15	56 %
Numbers of children	Less than 4	243	98	40 %
	More than 4	35	17	49 %
Numbers Of children under 6 years	One	161	68	24 %
	Two	100	39	39 %
	Three and more	17	8	47 %
Father's job	Daily wages / Non	82	40	49 %
	Governmental sector	87	42	48 %
	Private sector / self business	109	33	30 %
Child's school	Governmental	58	26	45 %
	Especially	87	32	37 %
Home	Own	110	42	38 %
	Rent	168	73	43 %

As shown in Table 4.34, Children Underweight is more prevalent among large families (more than 1 small family) that consist of more than 6 individuals, more than small families (which consist of parents and their children only) or whose families consist of less than 6 members .

The percentage of Underweight in children decreases the fewer the number of children who are less than 6 years in the single family (small family), as the prevalence of it in the child who also has two or more Brothers under the sixth (3 or more in total) is almost

twice that in the child who does not have a brother under the age of six like him which is 47% and 24%, respectively .

It also appears that the weight of the child is affected by the level of the father's income / the level of the father's job, as the prevalence of Underweight in children whose Fathers work in the private sector or their Fathers have their own business is the lowest of 30%, compared to who their Fathers work in the government sector or who their Fathers work with intermittent daily income, as the prevalence rate in them is 48% and 49%, respectively : this also shows the extent of the impact of employees in The government sector is cutting their monthly salaries due to the instability of the Country since 2015 .

We note that The prevalence of Underweight in the children of families whose children study in public schools is more than in those whose children study in private schools, also in families who live in rent houses more than in those that have their own homes, in addition to being affected by the father's job (previously explained) makes us can say that the prevalence of Underweight in children is affected by the socio-economic level of the family / level of family Income where it is more prevalent in low-Income families and less than in good-income families . for clarification ; The Education in public schools in general was severely affected by bad political and economic conditions of country , which prompted good-income families to transfer their children to private schools .

4.8.3 Related to mother's work factors

Table 4.35 percentages of Underweight in relation to Mother's work factors categories

Category		Total no. of that with this Catg.	Number of that " Underweight " on growth chart	%
Mother's age	20 - 30 years	150	66	44 %
	31 - 40 years	120	46	38 %
	More than 40 years	8	3	36 %
Job period	Less than 3 years	74	30	41 %
	3 - 6 years	71	27	38 %
	More than 6 years	133	58	43 %
Work place	Hospital only	221	93	42 %
	Private Hospital As well	45	19	42 %
	have own clinic in additional to 1 or both of above	12	3	25 %
Type of the job	Technical	49	17	35 %
	Laboratory	49	16	33 %
	Nurse	116	57	49 %
	General practitioner	37	15	41 %
	Specialist	27	10	37 %
Number of working days	Every day	47	17	36 %
	6 day per week	48	23	48 %
	5 day per week	101	42	42 %
	4 day per week	29	12	42 %
	Less than 4 day per week	53	21	40 %
Average working hours per day	Less than 6 hours	85	32	38 %
	6 to 12 hours	162	66	41 %
	More than 12 hours	31	17	55 %
If the mother is busy with work, where do you put the child	At home with a housewife	90	41	46 %
	At home with no housewife	11	8	73 %
	At a relative	101	40	40 %
	At one of the neighbors	12	3	25 %
	In the hospital's kindergarten	64	23	36 %

As shown in Table 4.34 , The prevalence of underweight in children decreases with increasing the age of their mothers, and has a complex relationship with the mother's working period (years) ; We cannot explain them.

Also, the prevalence of underweight among children whose mothers have own private clinics (25%) is lower than that of those whose mothers work in government and/or

private hospitals (42% in both). This also indicates that the incidence of underweight decreases with increasing The mother / family income . This is supported by the fact that the prevalence rate among children of female specialists (37%) is lower than it is among children of general practitioners and nurses (41% & 49% respectively - 49% is the highest prevalence rate ; So If the mother is a nurse, her child is more likely to be underweight than others) , but we cannot say that the prevalence of underweight children decreases with increasing Mother's academic level , Because the prevalence of underweight in children of technicians and laboratory technicians (35% & 33%, respectively) is lower than that of children of female specialists , this can be attributed to the average working hours per day ; Where it appears in the table that the prevalence of underweight in children increases with the increase in the average number of hours spent by the mother in the job : And since we - according to what we observe realistically - believe that the nurse takes the first place in terms of the number of working hours per day , even if she works in a public hospital Only , followed by the general physician and Specialist (because they work at least in two places), then the technician and laboratory technician ; But confirmation of this need a More professional Data analysis .

Finally, the table shows that 73% of the children whose mothers leave them at home in the absence of a housewife when they go to work are underweight, which is a high percentage compared to the rest of the options.

4.8.4 Related to other factors :

Table 4.36 percentages of Underweight in relation to other factors categories

Factors		Total no. of that with this Catg.	Number of that " Underweight " on growth chart	%
Pregnancy period	Less than 37 weeks	25	14	56 %
	37 to 42 weeks	243	96	40 %
	More than 42 weeks	10	5	50 %
Baby weight at birth	Less than 2.5 kg	81	38	47 %
	2.5 to 4 kg	183	72	40 %
	More than 4 kg	14	5	38 %
Breastfeeding period	Less than 6 months	74	33	45 %
	6 months	36	23	64 %
	More than 6 months	168	59	35 %

The previous table shows that 56% of those who were preterms have underweight compared to only 40% of children who had a normal pregnancy period , therefore , Preterms have great risk of Underweight in the future ; we cannot know if these preterm infants had natural weight in the first six months of their lives or not. It is also clear that the incidence of Underweight decreases the greater the weight of the child at birth, as the percentage of those who have a Underweight who also had a Underweight at birth is 47%, compared to 40% of those who had natural weights at birth and 38% of those who had Overweight at birth.

The table also shows that infants who continue to breastfeed after the age of six months are at lower risk of underweight than those whose breastfeeding stops at the age of 6 months or before .

CHAPTER 5 RESULTS

5.1 Results

This study revealed, based on Weight-for-age on the growth chart, that 41.5% of the children whose mothers work as employees in the government health sector suffer from nutritional Underweight as their Weight-for-age chart was below 5% of standard deviation .

The study shows that the most important risk factors related to Nutritional Underweight in children of female employees are :-

1. Mother's work as a nurse.
2. The child age between 1 and 3 years .
3. Leaving the children at home alone or with their siblings without the presence of a housewife.
4. The mother's work for more than 12 hours a day
5. The presence of more than two children under the age of six years
6. Children who live in relatively large families (more than 6 members)
7. Low social economic situation of the family
8. preterms & those with Low birth-weight

5.2 Conclusions

The mother's work - Whatever its academic level - when there is no one to take care of the child and feed him adequately and appropriately for his age in the event of her absence , or when the economic situation of the family is not good despite her work : negatively affects the health and development of children .

CHAPTER 6 DISCUSSION

6.1 Discussion

According to the latest study conducted on children under the age of 5 years in Yemen, which was published in 2021 [9], the prevalence of underweight was 39%, and this percentage is close to the results of our study, 41.5%; This confirms that the mother's high level of education and her health knowledge does not have a positive effect on the health and development of her child if she is working (an employee). This supports what was mentioned by a study conducted in Tehran - Iran ; which explained that " rising education level among unemployed mothers increased the probability of children's health , but mother's employment had a negative effect on child health ".

However, when comparing the results of these studies with the results of the international study published in 2020 [3], which stated that the prevalence of underweight in children under 5 years was 16%, we realize the catastrophic prevalence of malnutrition in children in Yemen , and The extent to which children are affected in general in Yemen by political and economic conditions, especially in light of the existing conflict 2015 - 2023 .

6.2 Limitations

1. Some mothers did not comply with bringing their children to the hospital kindergarten to have their weights measured by the researcher himself, and also did not accept the idea of home visits.
2. Many female Specialists refused to participate in this study

3. Our narrow understanding of the subject of data analysis by means of SPSS, and the use of a statistician to do so, which led to inability in the processes of deducing factors and their relationship to each other.

6.3 Recommendations

1. Establishing a national program to which all newly born children are subject during the first three years of life ; It is based on examining and recording the nutritional status of the child (Weight-for-age - height-for-age - weight-for-height), and growth following up during periodic visits to the health unit, intervening when needed, and following up on recovery after that in a specific period, whether by linking that to the national immunization program or making a separated program .
2. Taking care of malnourished children and providing appropriate, free and close-to-all interventions that ensure a speedy recovery from this problem.
3. We advise mothers in general and female employees in particular to know the appropriate food / food for their children according to their age and the amounts they need per day and at the time of their absence and to provide it for them.
4. Regulating childbearing and not allowing mothers to have more than two children under the age of six, especially those who spend more than 12 hours a day in their jobs.
5. Avoid leaving a child under the age of three without the presence of someone who is aware of how to take care of them and feed them, or with someone who does not care about them. And also not to leave children whose ages range

between 3-6 years alone unless they put what they need of ready-to-eat food near them and in an easily accessible manner .

6. Paying more attention to healthy and varied nutrition that includes all the basic ingredients, vitamins and minerals needed The child, which guarantees him perfect growth and good health.

REFERENCES

- [1] Prevention of malnutrition among children under 5 years old in Iran : A policy analysis <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0213136>
- [2] Nelson's Essentials of pediatrics
- [3] Acute Malnutrition in Children: Pathophysiology, Clinical Effects and Treatment 2020 [<https://www.mdpi.com/2072-6643/12/8/2413/htm#B4-nutrients-12-02413>]
- [4] Wellcome classification' in Oxford Reference
- [5] WHO website[<https://www.who.int/news-room/fact-sheets/detail/malnutrition>]
- [6] Malnutrition in Yemen: an invisible crisis [The Lancet 389 (10064), 31-32, 2017] [[https://doi.org/10.1016/S0140-6736\(16\)32592-2](https://doi.org/10.1016/S0140-6736(16)32592-2)]
- [7] The silence of the lambs: Child morbidity and mortality from malnutrition in Yemen [<https://www.pediatricnursing.org/home>]
- [8] An overview on acute malnutrition and food insecurity among children during the conflict in Yemen 2019[<https://doi.org/10.3390/children6060077>]
- [9] Alarmingly high malnutrition in childhood and its associated factors:A study among children under 5 in yemen 2021 [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7870187/#_ffn_sectitle]
- [10] EFFECT OF MOTHER NUTRITIONAL KNOWLEDGE ON CHILD NUTRITION ::15th Islamic Countries Conference on Statistical Sciences (ICCS-15), 393[https://www.researchgate.net/profile/Muhammad-Suhail-6/publication/339999807_Modified_ridge_regression_estimators-a_simulation_study/links/5e71fa9492851c93e0aa7b2b/Modified-ridge-regression-estimators-a-simulation-study.pdf#page=400]
- [11] Shedding light on maternal education and child health in developing countries ::

India 2020[<https://doi.org/10.1016/j.worlddev.2020.105005>]

[12] Maternal education and the multidimensionality of child health outcomes in India ::
Published online by Cambridge University Press: 21 May 2019
[<https://doi.org/10.1017/S0021932019000245>]

[13] Maternal employment and child nutritional status in Uganda :: PloS one 14 (12),
e0226720, 2019

[14] The relationship between mother's socioeconomic status and child health ::
Tehran :: Journal of Research and Health 8 (2), 143-151, 2018

[15] The effects of aggregate and gender-specific labor demand shocks on child health :
2019

[16] Bioecological determinants of malnutrition in underprivileged children in India ::
Asian Social Work and Policy Review, 2022[<https://doi.org/10.1111/aswp.12254>]

[17] Maternity Leave, Early Maternal Employment and Child Health and Development
in the US 2005[<https://doi.org/10.1111/j.0013-0133.2005.00971.x>]

APPENDIX :- questionnaire



Questionnaire no. ----- | / / 2022

questionnaire about

Prevalence & Risk Factors Of Nutritional Underweight In Children Aged 6 Months To 6 Years Among Son's Of Female Medical Staffs In Sana'a City , 2022

This questionnaire is carried out by the student researcher, after the approval of the health staff employee, to share the information that will be taken from her, which will be subject to strict confidentiality in accordance with the ethics of scientific research

approval

Do you agree to participate in the letter

() *Yes, I agree and complete the post*

() *I do not agree*

1. personal data :-

Name:-

Gender :-

Age:-

Place of residence:-

Date of birth:-

Mother name :-

Contact no. :

2. Body Measurements :- :

Weight (Kg) :-

Height (cm):-

Weight-for-age on growth chart :-

Weight to height / Z-score :-

3. Family and social factors :-

1. Family Size	- Small () - large ()
2. Family members	
3. Members of children	
4. Members Of children under 6 years	
5. Father's educational level	- Basic () - secondary () - academic ()
6. father's Job	- daily wages / no work () - In governmental sector () - in private sector/ has own business ()
7. Child's living situation	- With both parents () - with mother only () - with father only
8. Child's School	- governmental () - especially () - No child at school age ()
9. Home	- Own () - rent ()

4. Factors related to mother's job :-

1. Mother's age	<ul style="list-style-type: none"> - 20-30 years () - 30-40 years () - More 40 years ()
2. job period	<ul style="list-style-type: none"> - Less than 3 years () - 3-6 years () - More 6 years ()
3. Workplace	<ul style="list-style-type: none"> - hospital only () - private job with hospital () - Hospital with clinic () - all of the above ()
4. Type of the job	<ul style="list-style-type: none"> - Technical () - laboratory() - nurse () - General practitioner () - specialist ()
5. The number of working days	<ul style="list-style-type: none"> - every day () - 6 day per week () - 5 day per week () - 4 days a week () - less than 4 day per week ()
6. Average working hours per day	<ul style="list-style-type: none"> - less than 6 h () - 6 to 12 h () - more than 12 h ()
7. If the mother is busy with work, where do you put the child?	<ul style="list-style-type: none"> - At home with a housewife () - At home with no housewife () - At a relative () - At one of the neighbors () - In the hospital's kindergarten ()

8. Types of meals that given to child during mother absence

.....

9. Number of this meals = []

According to previous 2 questions, the researcher should answer this question ; The mother cares about the type of food given to her child during her absence appropriately to time period , his age & types of foods ? yes () No ()

استبيان رقم ----- تاريخ / / ٢٠٢٢م

استبيان حول

الإنتشار و عوامل الخطورة لنقص الوزن التغذوي في أطفال العاملات في المجال الصحي الذين تتراوح أعمارهم بين ٦ أشهر و ٦ سنوات في مدينة صنعاء ; ٢٠٢٢

Prevalence & Risk Factors Of Nutritional Underweight In Children Aged 6 Months To 6 Years Among Son's Of Female Medical Staffs In Sana'a City , 2022

يقوم بهذا الاستبيان الطالب الباحث وذلك بعد موافقة موظفة الكادر الصحي بالمشاركة بالمعلومات التي ستؤخذ منها والتي ستخضع للسرية التامة وفقاً لأخلاقيات البحث العلمي

الموافقة

- هل توافق على المشاركة في هذه الدراسة_
- نعم أوافق وأكمل المشاركة ()
 - أنا لا أوافق ()

● ١- البيانات الشخصية :-

- الاسم :-
- الجنس :-
- العمر :-
- تاريخ الميلاد :-
- مكان الإقامة :-
- اسم الام :-
- رقم التواصل :-

● ١٢ - القياسات المطلوبة

- وزن الطفل :- كجم
- طول الطفل :- سم
- الوزن إلى العمر في مخطط النمو :-
- الوزن إلى الطول / :- Z score

- 3 *العوامل الاسرية والاجتماعية :-

كبيرة ()	صغيرة ()	١- حجم الاسرة :-
		٢- عدد افراد الاسرة :-
		٣- عدد الابناء :-
		٤- عدد الاطفال تحت السادسة :-
	- اساسي () - ثانوي () - أكاديمي ()	٥- المستوى التعليمي للأب :-
	- بالأجر اليومي / بدون عمل () - موظف في القطاع حكومي () - موظف قطاع الخاص / لديه عمله الخاص ()	٦- الحالة الاقتصادية / وظيفة الاب :-
	- مع الأب والام () - مع الام فقط () - مع الأب فقط ()	٧- الحالة الاجتماعية / الوضع المعيشي للطفل
	- حكومي () - اهلي () - لا يوجد أطفال في سن التعليم ()	٨- تعليم الاطفال :-
	- ملك () - ايجار ()	٩- المنزل :-

٤- العوامل المتعلقة بوظيفة الام :-

<ul style="list-style-type: none"> - من ٢٠ الى ٣٠ سنة () - من ٣٠ الى ٤٠ سنة () - اكثر من ٤٠ سنة () 	<p>١- عمر الام</p>
<ul style="list-style-type: none"> - اقل من ٣ سنوات () - بين ٣ الى ٦ سنوات () - اكثر من ٦ سنوات () 	<p>٢- فترة الوظيفة</p>
<ul style="list-style-type: none"> - المستشفى فقط () - المستشفى مع وظيفة خاصة () - المستشفى مع عيادة خاصة () - كل ما سبق () 	<p>٣- مكان العمل</p>
<ul style="list-style-type: none"> - فنية () - مخبرية () - ممرضة () - طبية/عامة () - أخصائية () 	<p>٤- نوع الوظيفة</p>
<ul style="list-style-type: none"> - كل يوم () - ستة ايام بالأسبوع () - خمسة ايام بالأسبوع () - اربعة ايام بالأسبوع () - اقل من اربعة ايام بالأسبوع () 	<p>٥- عدد أيام الدوام</p>
<ul style="list-style-type: none"> - اقل من ست ساعات () - من ٦ الى ١٢ ساعة () - اكثر من ١٢ ساعة () 	<p>٦- متوسطة ساعات في اليوم الواحد</p>
<ul style="list-style-type: none"> - في البيت مع وجود ربة بيت () - في البيت بدون وجود ربة بيت () - عند احد الاقارب () - عند جارتها () - في الحضانة الخاصة بالمشفى () 	<p>٧- في حالة انشغال الأم بالوظيفة أين تضع الطفل؟</p>

نوع الاغذية التي تعطى للطفل في حالة غياب الام:-:

٨. الغذاء لطفل اقل من سنتين	- حليب صناعي () - بسكويت () # عدد الوجبات =
٩. الغذاء لطفل اكبر من سنتين	- جعالة () - فواكه () - اطعمه () # عدد الوجبات =

بعد ملئ هذا الجدول السابق يجيب الباحث على السؤال التالي :-
هل الأم تهتم بنوع الطعام الذي يعطى لطفلها في وقت غيابها ؟
نعم () لا ()

● ٥ - العوامل الاخرى :-

١- فترة الحمل	- اقل من ٣٧ اسبوع () - (مكتمل) بين ٣٧-٤٢ اسبوع () - اكثر من ٤٢ اسبوع ()
٢- وزن الطفل عند الولادة	- اقل من ٢,٥ كجم () - من ٢,٥ كجم الى ٤ كجم () - اكثر من ٤ كجم ()
٣- فترة الرضاعة الطبيعية	- اقل من ٦ اشهر () - ٦ أشهر () - اكثر من ٦ أشهر ()

٤- عدد الوجبات في اليوم الواحد
سواء رضاعة طبيعية او صناعية او تكميلية او وجبات طعام :-

٥- النوع / الأنواع :-

من السؤالين السابقين يجيب الباحث على السؤال التالي :-
هل الأم تهتم بنوع الطعام الذي يعطى لطفلها بشكل مناسب لعمره ؟
نعم () لا ()

٦- تشوهات / أمراض خلقية :-

٧- امراض مزمنة أو متردد:-
