



# KNOWLEDGE, ATTITUDE & PRACTICE OF VITAMIN D SUPPLEMENTATION STATUS AMONG SIX MONTHS OLD INFANTS IN ABU DHABI ISLAND (N=245)

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## ABSTRACT

**Background:** Maintaining a normal level of Vitamin D is crucial in order to have a normal skeletal and extra-skeletal health. Vitamin D deficiency is considered a common problem not only in the United Arab Emirates but also worldwide. To the best of our knowledge, there is limited data available in the United Arab Emirates regarding vitamin D deficiency among infants.

**Aim:** To measure and correlate the knowledge, attitude and practice of mothers of six months old infants in Abu Dhabi Island, United Arab Emirates, regarding their infants' need for vitamin D supplementation.

**Methods:** A predefined questionnaire was submitted to 245 mothers of 6 months old infants in all governmental ambulatory health care centers in Abu Dhabi Island from 1<sup>st</sup> October 2013 to 23<sup>rd</sup> January 2014. The questionnaire measured the knowledge, attitude and practice of mothers of six months old infants in Abu Dhabi Island regarding their infants' need for vitamin D supplementation.

**Results:** The results in this study revealed poor knowledge, attitude and practice among mothers regarding vitamin D supplement for their infants.

**Conclusion:** All health care professionals are encouraged to educate mothers effectively in order to increase mothers' compliance to vitamin D supplementation according to the practiced guidelines.

**Key Words:** Knowledge, Attitude and practice, Vitamin D deficiency, Vitamin D drops, Vitamin D supplementation, Infants, Mothers, Breast-fed infant

## INTRODUCTION

### Importance of vitamin D

Vitamin D deficiency is often clinically silent and it is reported when having a level less than 20 ng/mL (< 50 nmol/L). Vitamin D is a fat-soluble vitamin that has several important functions. It helps to absorb dietary calcium and phosphate from the intestines and suppresses the release of parathyroid hormone (PTH). Vitamin D is involved in the regulation of cell growth, immunity and metabolism. On the other hand, Vitamin D deficiency has been linked to osteoporosis, asthma, autism, disturbed muscle function, resistance to tuberculosis, dental abnormalities, rheumatoid arthritis, multiple

sclerosis, inflammatory bowel diseases, diabetes, as well as the pathogenesis of specific types of cancer (Canadian Paediatric Society, 2007).

### Vitamin D supplementation in clinical practice

Historically, vitamin D's foremost source has been through its synthesis from cholesterol in the skin that has been exposed to Ultra-violet-B light. However, the present American Academy of Pediatrics and Canadian Dermatology Association recommend against direct sunlight exposure until 1 year of age, as the risk of developing skin cancer post exposure is higher in relation to other age groups. They also recommend supplementing breastfed and partially breastfed infants with

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400 IU/day of vitamin D drops from their first few days. This should be continued unless the infant is weaned to a minimum of 1 L/day of vitamin D-fortified whole or formula milk (Wagner & Greer, 2008) (Canadian Paediatric Society, 2007).

## Literature Review

Vitamin D deficiency is a common problem in the United Arab Emirates among all age groups (Rajah J., 2012). There are few studies conducted in the United Arab Emirates regarding vitamin D deficiency among infants. A study published in March 2012 in Sheikh Khalifa Medical City - Abu Dhabi showed that 18.7 % of infants less than 1 year of age were Vitamin D deficient, defined as  $<25$  nmol/L (Rajah, Haq, & Pettifor, 2012). Another study that was done by the pediatrics department of College of Medicine – United Arab Emirates University in 2003 showed 82 % prevalence of vitamin D deficiency (defined as  $<25$  nmol/L) among exclusively breastfed infants. The final recommendations were to offer vitamin D supplementation for breastfed infants and their mothers in the United Arab Emirates (Dawodu, Agarwal, Hossain, Kochiyil, & Zayed, 2003). Therefore, the aim of our study is to measure mothers' knowledge, attitude and practice regarding vitamin D supplementation for their infants as an indicator of adherence to the recommendations and to facilitate future development of guidelines for our population.

Regionally, there are no recently published data regarding the prevalence of infantile vitamin D deficiency in other Middle East countries. However, a pooling study published by the International Health Program Center for Epidemiology and Biostatistics – United States in 2004 examined the vitamin D status among Arab mothers and their newborns showed that the prevalence of vitamin D deficiency is high, in particular, the study estimated it to be 68% in Saudi Arabia (defined as  $<12.5$  nmol/L) and 52% in Pakistan ( $<25$  nmol/L) (Dawodu A., 2004).

In regards to similar studies that looked at the knowledge, attitude and practice of vitamin D supplementation, two regional studies were found. A study done in Tunisia in 2009 among hospitalized children aged 2 months to 3 years showed that 68% of the sample received vitamin D supplementation as recommended (Mrad, et al., 2009). A study published in Saudi Arabia in 2011 measured the knowledge and practice regarding vitamin D in female students has showed lack of knowledge and poor practice. (Christie & Mason, 2011)

Internationally, a study was done in the United States looked at adherence to the recommended vitamin D supplementation concluded that only 4-7% of infants aged 10.5 months and below are receiving vitamin D supplements (Perrine, Sharma, Jefferds, Serdula, & Scanlon, 2010). A second study, done in the United States in 2008, assessed parent's practice and attitude, showed that only 44.6% gave the supplementa-

tion to their children (Taylor, Geyer, & Feldman, 2010). Finally, a study done in Montreal in 2010, looking at practice of mothers regarding vitamin D supplementation proved that 74% of exclusively breast-fed infants met the recommendations (Gallo, Jean-Philippe, Rodd, & Weiler, 2010).

## METHODOLOGY

### Introduction

This is a descriptive cross sectional, questionnaire-based study conducted at the ambulatory health care centers in Abu Dhabi Island. 245 mothers' of 6 months old infants were recruited from all governmental ambulatory health care centers in Abu Dhabi Island during the period of 1<sup>st</sup> October 2013 to 23<sup>rd</sup> January 2014.

### Ethical approval procedure

It is worth mentioning that before conducting the study all investigators had completed the National Institutes of Health web-based training course "Protecting Human Research Participants". Later, the study protocol got the approval through the ethical committee. The study had also been accredited from the Health Authority Abu Dhabi - Research Authorization and Human Research Protections, United States Department of Health and Human Services. After fulfilling the requirements stated by Health Authority Abu Dhabi - Research Authorization an approval from the Sheikh Khalifa Medical City Institutional Review Board/Research Ethics Committee was obtained on 13 June 2013. A copy of the ethical approval attached in the appendix page (Picture 1).

### Research design

#### Questionnaire development and pretesting

The questionnaire questions had to be adapted from multiple questionnaires of international researches that were originally designed to look at different aspects of infants' health, vitamin D deficiency or its complications. A direct measurement of face validity was obtained by two family medicine consultants were one is an expert in evidence based medicine. Moreover, a pilot study was conducted before finalizing the questionnaire.

All mothers participating in the study were given clear and concise instructions on how to participate. The questionnaire was self-administered and designed in a simple layout that takes 15 minutes to complete. All respondents were informed that participation is voluntary and they may withdraw at any time. A consent form was attached with the questionnaire paper stating that all responses are confidential. In addition, study information sheet was attached explaining the research purposes and its possible benefits (Picture 3).

### Questionnaire scoring

The questionnaire attempted to measure knowledge, attitude and practice of mothers of six months old infants about vitamin D deficiency. To succeed a scoring system was established to analyze maternal response to the questions. Knowledge and attitude responses were divided into three categories according to the attained score. A score of 0-2 was considered poor, 3-4 scored as fair, and 5-6 as good knowledge or attitude. Similarly, the practice responses were divided into two categories according to the attained score. A score of 0-3 was considered poor, while 4-6 reflected good practice.

### Questionnaire distribution

All mothers of six months old infants attending their respective ambulatory health care centers in Abu Dhabi Island (total of five clinics) were approached by a staff nurse to participate.

### Determination of sample size

Regarding sample size, it was initially considered to take all 6 months old infants who visited the five ambulatory health care centers for vaccination in the month of April 2013. By using the records of their 2 months old vaccine visits, a targeted consensus sample of 600 infants were estimated to show for their 6 months vaccination visit. After running the questionnaires for one month the expected sample size was not met, therefore, the period was increased. Moreover, many public holidays came up during that period. As a result, it was aimed to take a representative sample based on "The Cheshire Maag – Ready Reckoner table of common sense approach to sampling" using a confidence interval of 95% which indicates a sample size of 234. Successfully, 245 questionnaires were collected in duration of three months and half.

### Selection of the study population

Those mothers were included regardless of their age, ethnicity, educational level, employment status and number of children they have. However, those who were mothers of less or more than 6 months old infants were excluded. Any participant who is non-Arab, non-English speaker and those who refused to participate were excluded from the study.

### Statistical method

#### Statistical analysis

After questionnaire collection, the data was organized with the Excel software program and analyzed using the Statistical Package for Social Sciences (SPSS) version 18. Total and sub-categorical scores were correlated among each other and with socio-demographic factors by using Pearson correlation coefficient ( $r$ ) and chi-square coefficient ( $X^2$ ).

## RESULTS

### Demographics and other characteristics

Two hundred forty five mothers were enrolled in the study. The majority of the participants (68.8%) were aged between 25-34 years old. In terms of educational level, the majority (68.3%) were university graduates. Other socio-demographics of the study population are presented in Table 1.

When highlighting maternal vitamin D status, 59.2% of respondents ( $n=238$ ) reported no deficiency during pregnancy. However, 55.9% of respondents ( $n=238$ ) were on vitamin D supplements during that period. Furthermore, during breastfeeding period two-thirds (63.1%) of the respondents ( $n=225$ ) were not on vitamin D supplements, while one third (30.7%) were on supplements.

Regarding infant's demographic data, 87.4% of respondents ( $n=230$ ) had breastfed their child at one point of time. The mean breast-feeding duration was 5.03 months. When asked about six months old infants' current feeding status, 236 mothers responded, 27.1% were exclusively breast fed while 13.4% were exclusively formula fed. Among all respondents, 91.2% reported that their infant has no known health problem.

About three-fourth (76%) of participants ( $n=233$ ) heard about vitamin D deficiency. Nearly 45% of them mentioned that doctors were the main source of information as presented in bar chart 1.

### Results of knowledge, attitude and practice questions

#### Maternal Knowledge about vitamin D

Knowledge was assessed by questions focusing on vitamin D's best source, its role in the human body, best dietary source, deficient consequences and the right period to start vitamin D supplement. Remarkably, the mean knowledge score was 1.88 indicating poor knowledge about vitamin D among mothers. Table 2 reflects mothers' response towards knowledge questions.

#### Maternal Attitude towards vitamin D supplementation

In regards to participants' attitude ( $n=106$ ), (53%) were concerned about vitamin D deficiency in their children. Majority of responding mothers (92.5%) showed willingness to administer vitamin D supplements to their child if a doctor offered them. Minority (2.2%) of the sample size chose not to give vitamin D supplements to their infants if offered by a doctor. The reasons were reported as follow; supplement's side effects ( $n=4$ ), lack of time ( $n=2$ ), being expensive ( $n=1$ ) and do not know ( $n=7$ ). The overall mean attitude score of

the respondents was 3.46 (fair) with a standard deviation of 1.56 and a normal distribution curve. Table 3 includes details of participant responses on their attitude towards vitamin D supplementation.

### Maternal Practice towards vitamin D

Almost three-fourth (73.9%) of the respondents had given their children vitamin D drops, 64.1% started correctly during the first month of life. Amongst favorable practices 82% (n=132), of responding mothers gave their children vitamin D on daily bases. However, giving the proper dose of vitamin D drops was hardly practiced (26%) and around (53.8%) of the respondents gave the vitamin D drops to their children for more than three months. When questioning about the source of getting vitamin D supplement, 37% stated that they got it from private health care centers, 14% from public health centers and 11% received over the counter preparation. The final question that measured maternal practice was questioning about sun exposure for the purpose of vitamin D and was found to be commonly practiced (77.5%) among the respondents. The mean practice score among the study participants revealed 2.01 poor practice with a standard deviation of 1.49 and a normal distribution curve.

### Correlations

All socio-demographic factors studied showed no significant difference between the various groups in their knowledge, attitude and practice scores. An exception is practice score in relation to ethnicity. "Good" practice was scored by one third (33.3%) of African mothers, two thirds (66.7%) of Western mothers, and 42.9% of other ethnicities. Although there was an overall predominance of poor practice, Western mothers had a significant better practice; with a P value of .05.

Maternal vitamin D supplementation during breast-feeding correlated significantly with attitude score but not with knowledge or practice scores. Majority The majority of mothers who took vitamin D supplements during breast-feeding had good attitude (42.6%) with P values of .05. Furthermore, maternal vitamin D deficiency during pregnancy correlated significantly with maternal concerns regarding child's vitamin D status. Almost two-thirds (66.1%) of mothers who were vitamin D deficient during pregnancy were concerned with regarding their child's vitamin D status with P value of <.01. The reason behind the significant correlation between maternal vitamin D deficiency during pregnancy and concerns regarding the child's vitamin D status could be due to proper antenatal counseling as well as the mother's worries about consequences of vitamin d deficiency.

When using two-tailed Pearson correlation coefficient, a positive but weak relation between attitude score and knowledge score with  $r = .26$ ,  $P < .001$  was obtained. In addition, using Chi square test, correlation between attitude score and knowledge score showed a  $\chi^2$  of 15.65 and P value of

<.01. Finally, when using both two-tailed Pearson correlation coefficient and Chi-square correlation, neither practice and knowledge nor practice and attitude showed significant association.

## DISCUSSION

### Discussion and comparison to other studies

Similar to a recent study published in 2013, 49.4% from Ireland Muslim mothers and 13.2% from Saudi Muslim mothers do give their infants vitamin D drops. Moreover, another study was conducted in Tunisia found that 68% of mothers have ever given vitamin D supplements to their infants; compared to 73.9% of mothers in our study (Mrad, et al., 2009). However, among the studied socio-demographic factors, the study only found a statistically significant correlation between practice scores and ethnicity, whereas the Tunisian study, reported that single parity, and distant living from primary healthcare center were the significant factors that affected the mothers' practice. Moreover, a study conducted in Montreal found that high maternal education level influenced supplementation practices positively and significantly (Gallo, Jean-Philippe, Rodd, & Weiler, 2010). When questioning about the source of information about vitamin D it was found that the majority of Irish mothers and participants in our study heard about it commonly from their doctors.

In addition, a study done in Montreal, looking at practice of mothers of infants less than or equal to 6 months of age in regards of vitamin D supplementation, proved that 74% of exclusively breast-fed infants met the recommendations (Gallo, Jean-Philippe, Rodd, & Weiler, 2010). In comparison to our study, 27.1% from 236 of the participating mothers were exclusively breastfeeding their infants and 63.7% (n=142) agrees that their infants need vitamin D supplements. Furthermore, 64.1% (n= 100) out of 156 mothers started using vitamin D supplements from the first month but neither supplement dose nor frequency were appropriate to the recommendations. This is a particularly important finding as doctors and pharmacists need to emphasize on the right dosage and frequency of the supplement.

In regards to vitamin D supplementation during pregnancy, 55.9% of the respondents were on vitamin D supplements in contrast to a study done in 2013 by Khadrawi, which showed only 28.6% of Irish mothers and 7.4% Saudi mothers took the supplement during prenatal period (Khadrawi, et al., 2013).

Good knowledge raises concern among mothers regarding their infant's vitamin D status but does not improve their practice. Similar poor vitamin D supplementation practices were reported among Muslim mothers and infants both in Ireland and Saudi Arabia (Khadrawi, et al., 2013). The possible causes of poor practice in our study among those with



good knowledge could be lack of time, cost, forgetfulness and the need for daily doses.

Moreover, the majority of the studied population believes that sun exposure is the best source of vitamin D for infants. This was also shown among Montreal mothers in a recent study (Gallo, Jean-Philippe, Rodd, & Weiler, 2010). In fact, there is an enormous need to educate mothers and the rest of the society in regards of vitamin D supplementation; especially that the Canadian Dermatology Association recommends against direct sun exposure to infants younger than 6 months of age to avoid risk of skin cancer in future.

### Limitations

There are several limitations highlighted in this study. First of all, there was no single questionnaire measuring mothers' knowledge, attitude and practice, which can be thoroughly obtained from, had made the study analysis including associations and correlations between variables challenging. In addition, lack of available prior similar research had limited the scope analysis as it was discovered lately by the researching team that some meaningful questions would be valuable to add in the questionnaire, as it would help in conducting the data results. Furthermore, the study population represented mothers from all emirates and not purely Abu Dhabi Island as ambulatory health care centers accept patients from all the 7 emirates. This may have influenced the results since they do not all come from the same background given the multicultural society that lives in the United Arab Emirates. It is indeed important to mention that patients have no identified family or pediatric physician and so health care is accessed easily across the country. Last but not least, as there is no unified or clear guideline regarding vitamin D supplementation in infants, health care professionals' recommendations are influenced by the basis of their training and practice.

### CONCLUSION AND RECOMMENDATIONS

The results of the present study revealed poor knowledge, attitude and practice among mothers in regards of vitamin D supplements for their infants. It may be appropriate to consider more empowered approaches in implementing counseling programs to increase awareness. All health care professionals especially, family physicians, pediatricians and obstetricians are encouraged to educate mothers during postnatal or well-baby visits to assure healthy population. Moreover, a routine postnatal prescription of vitamin D supplements should be given to all newborns and all health insurances are encouraged to cover the costs.

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## APPENDIX

3. Were you on vitamin D supplements when breastfeeding?  
 Yes  
 No  
 Do not know

### Child's information

We would like to ask you some questions about your child.

1. What is your baby gender?  
 Male  Female
2. Did you complete 8 months of pregnancy?  
 Yes  No
3. (a). Has your child ever been breastfed?  
 Yes  No – (proceed to q.4)
- (b) For how long has your child been breastfed? \_\_\_\_\_  
 Months Weeks
4. At what age did you introduce milk formula?  
 First month  
 Second month  
 Third month  
 Fourth month  
 Fifth month  
 Sixth month  
 Never introduced
5. What are you feeding your baby now?  
 Exclusively breastfed  
 Exclusively formula fed  
 Both but more breastfed  
 Both but more formula fed  
 Both equally
6. Is your baby known to have any of the listed health problems?  
 Bone diseases  
 Liver diseases  
 Kidney diseases  
 No health problems  
 Others (please specify) \_\_\_\_\_

Kindly note that approval is given on the understanding that the research team complies on the applicable guidelines and regulations governing the conduct of clinical trials<sup>1</sup> particularly as to the following:

- Any amendments or significant change which occurs in connection with this study and/or which may alter its ethical consideration, premature suspension or termination of the study must be reported immediately to the Research Ethics Committee Office.
- The investigator should provide the Research Ethics Committee office with a final report within three (3) months after Termination or Completion of a research study or the investigator's part of the research study.
- Research office should also be notified of the arrangements for publication or dissemination of the research including any feedback to participants.

SKMC Institutional Review Board/Research Ethics Committee (IRB/REC) has been organized and operates according to the Good Clinical Practice (GCP) Guidelines.

- Granted an authorization to conduct human subjects research by Health Authority Abu Dhabi (HAAD) - Research Authorization #2011.01.
- Received accreditation from the Office for Human Research Protections (OHRP), US Department of Health and Human Services (HHS). <http://ohrp.cit.nih.gov/search/search.aspx>
  - Institution Registration # IORG0006896 expires 22 May 2015
  - IRB Registration # 00008262
  - Federal Wide Assurance (FWA) # FWA00018992 expires 14 June 2017

On behalf of the IRB/REC members, we are wishing you all the best and looking forward to the smooth, productive and successful accomplishment of this research project.

Sincerely,



Dr. Jaishen Rajah, FCPaed(SA), Crit Care, DA  
 Chairman, Institutional Review Board/Research Ethics Committee  
 Sheikh Khalifa Medical City, Abu Dhabi, UAE



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<sup>1</sup> <http://www.fda.gov/oc/ohrt/ohrt/policies/45cfr46.html>

Picture 1: Ethical approval from IRB/REC.

**Mother's socio-demographics**

- How old are you?
  - Less than 20 years
  - 20-24 years
  - 25-29 years
  - 30-34 years
  - 35-39 years
  - 40-44 years
  - More than 45 years
- What is your educational level?
  - Illiterate
  - Primary School
  - High School
  - University
  - Master or PHD degree
- What is your employment status?
  - A housewife
  - A student
  - Employed part time (less than six hours)
  - Employed full time (more than or equal to six hours)
- How many children do you have?
  - 1 child
  - 2-3 children
  - 4-5 children
  - 6-7 children
  - More than 7 children
- What is your nationality?
  - Local
  - Arab
  - Asian
  - African
  - Western
  - Others

**Mother's vitamin D status**

We would like to ask you some questions about your vitamin D status.

- Were you vitamin D deficient while pregnant?
  - Yes
  - No
  - Never checked
- Have you received vitamin D supplements while pregnant?
  - Yes
  - No
  - Do not know
- Were you on vitamin D supplements when breastfeeding?
  - Yes
  - No
  - Do not know

**Child's information**

We would like to ask you some questions about your child.

- What is your baby gender?
  - Male
  - Female
- Did you complete 8 months of pregnancy?
  - Yes
  - No
- (a) Has your child ever been breastfed?
  - Yes
  - No – (proceed to q.4)
- (b) For how long has your child been breastfed? \_\_\_\_\_ Months \_\_\_\_\_ Weeks
- At what age did you introduce milk formula?
  - First month
  - Second month
  - Third month
  - Fourth month
  - Fifth month
  - Sixth month
  - Never introduced
- What are you feeding your baby now?
  - Exclusively breastfed
  - Exclusively formula fed
  - Both but more breastfed
  - Both but more formula fed
  - Both equally
- Is your baby known to have any of the listed health problems?
  - Bone diseases
  - Liver diseases
  - Kidney diseases
  - No health problems
  - Others (please specify) \_\_\_\_\_

**Knowledge**

We would like to ask you some general questions about vitamin D.

- Have you heard about vitamin D deficiency in babies?
  - Yes
  - No – (proceed to q.3)
- Where did you hear about it?
  - Doctor
  - Friend/ relative
  - Radio
  - Newspaper/Magazines
  - Television
  - Others (please specify) \_\_\_\_\_
- What is the best source of vitamin D for your baby?
  - Sun exposure
  - Breast milk
  - Milk formula
  - Vitamin D supplements
  - Do not know
- What is the role of vitamin D?
  - Important for bone growth
  - Important for immunity
  - Prevents inappropriate blood clotting
  - All of the above
  - Do not know
- Which of the following are good dietary sources of vitamin D?
  - Egg yolk, lamb liver and salmon fish
  - Red meat, egg white and nuts
  - Vegetable, fruits and rice
  - Egg yolk, vegetable and nuts
  - Do not know
- Which mineral does vitamin D help the body to absorb?
  - Iron
  - Magnesium
  - Calcium
  - Vitamin B 12
  - Do not know
- What does vitamin D deficiency cause?
  - Rickets
  - Diabetes
  - Asthma
  - Decrease immunity
  - All of the above
- When is the best time to start giving vitamin D supplement?
  - Do not know
  - Infancy period
  - Childhood period
  - Adolescence period
  - Never
  - Do not know

**Attitude**

Please indicate your response to the following statements:

- I have a concern that my child might currently have low vitamin D level:
  - Agree
  - Disagree
  - Do not know
- (a) If I was given vitamin D supplements by a doctor for my baby I will give it to him/her:
  - Agree (proceed to Q 3)
  - Disagree
  - Do not know
- (b) If you disagree please specify why (you can choose more than one)?
  - Worries about side effects
  - Lack of time
  - No need
  - Expensive
  - Do not know
  - Others (please specify) \_\_\_\_\_
- In my opinion, since my baby is breastfed he/she does not need vitamin D drops:
  - Agree
  - Disagree
  - Do not know
- In my opinion, since my baby is on milk formula he/she does not need vitamin D drops:
  - Agree
  - Disagree
  - Do not know
- In my opinion, since my baby is being exposed to sunlight he/she does not need vitamin D drops:
  - Agree
  - Disagree
  - Do not know
- Since I am on vitamin D supplement, my baby does not need vitamin D drops:
  - Agree
  - Disagree
  - Do not know
- I will advise my relative or friend to give vitamin D supplement to their babies:
  - Agree
  - Disagree
  - Do not know

Practice
<p>We would like to ask you some questions about your practice regarding vitamin D supplements for your baby:</p> <p>1. Have you ever given vitamin D drops for your baby?  <input type="radio"/> Yes <input type="radio"/> No – (proceed to q.8)</p> <p>2. At what age did you start giving vitamin D drops?  <input type="radio"/> First month  <input type="radio"/> Second month  <input type="radio"/> Third month  <input type="radio"/> Fourth month  <input type="radio"/> Fifth month  <input type="radio"/> Sixth month</p> <p>3. How often did you give him/her Vitamin D drops?  <input type="radio"/> Daily  <input type="radio"/> Three times a week  <input type="radio"/> Less than three times a week</p> <p>4. How many drops did you give him/her?  <input type="radio"/> 1 drop  <input type="radio"/> 2 drops  <input type="radio"/> 3 drops</p> <p>5. What do you do when you forget a dose of vitamin D drops?  <input type="radio"/> Wait till the next dose  <input type="radio"/> Give double dose  <input type="radio"/> Give the missed dose once remembered</p> <p>6. Where did you get the vitamin D drops?  <input type="radio"/> Public health care centers/hospitals  <input type="radio"/> Private Clinic/hospitals  <input type="radio"/> Over the counter</p> <p>7. For how long did you give the vitamin D drops to your baby?  <input type="radio"/> Less than seven days  <input type="radio"/> Less than four weeks  <input type="radio"/> Less than three months  <input type="radio"/> More than three months</p> <p>8. Have you ever exposed your baby to the sun for the purpose of vitamin D status?  <input type="radio"/> Yes <input type="radio"/> No</p> <p>9. Finally, what are your suggestions to improve vitamin D status for your baby?</p>

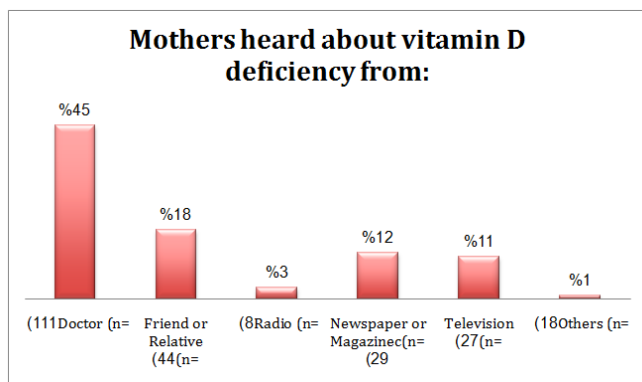
Picture 2: English questionnaire.

Table 1: Maternal socio-demographics data (n=245)

Characteristics	Number	Percent%
<b>Age</b>	<b>244</b>	
Less than 20 years	2	0.8 %
20 to 24 years	31	12.7 %
25 to 29 years	86	35.2 %
30 to 34 years	82	33.6 %
35 to 39 years	30	12.3 %
40 to 44 years	11	4.5%
More than 45 years	2	0.8 %
<b>Education Level</b>	<b>243</b>	
Illiterate	1	0.4 %
Primary School	3	1.2 %

High School	38	15.6 %
University	166	68.3 %
Master Degree or PHD	35	14.4 %
<b>Occupation</b>	<b>240</b>	
House wife	143	59.6 %
Student	5	2.1 %
Part time Employee	4	1.7 %
Full Time Employee	88	36.7 %
<b>Number of Children</b>	<b>245</b>	
1 child	101	41.2 %
2 to 3 children	118	48.2 %
4 to 5 children	22	9 %
6 to 7 children	2	0.8 %
More than 7 children	2	0.8 %
<b>Ethnicity</b>	<b>243</b>	
Local	33	13.6 %
Arab	115	47.3 %
Asian	78	32.1 %
African	3	1.2 %
Western	7	2.9 %
Others	7	2.9 %





**Bar chart 1:** Representing different vitamin D sources mother heard from (n=237).

**Table 2:** Reflect participants response towards knowledge questions (n=245).

Question	Number of correct responses	% of correct responses
Best source of vitamin D is vitamin D	33	14.1
Vitamin D is important for bone growth, immunity and prevents inappropriate blood clotting	69	29.6
Dietary sources of vitamin D are egg yolk, lamb liver, and salmon fish	92	40.2
Vitamin D helps the body to absorb Calcium	97	41.6
Vitamin D deficiency causes (plays role in) Rickets, Diabetes, Asthma, Decreased immunity	24	10.6
Vitamin D supplements are best started during infancy	133	59.9

**Table 3:** Describes the responses of the participants in maternal attitude towards vitamin D supplementation section (n=245). Noting that the total respondents in the first and second question respectively (n=226) and (n=227).

Maternal attitude towards vitamin D	Agree	Disagree	Do not know
I have a concern that my child might currently have low vitamin D	120(53.1%)	59 (26.1%)	47(20.8%)
If I was given vitamin D supplements by a doctor for my baby I will give it to him/her	210(92.5%)	5 (2.2%)	12 (5.3%)
In my opinion, since my baby is breastfed he/she does not need vitamin D drops:	36(16.1%)	142 (63.7%)	45 (20.2%)
In my opinion, since my baby is on milk formula he/she does not need vitamin D drops:	41(18.5%)	131 (59%)	50 (22.5%)
In my opinion, since my baby is being exposed to sunlight he/she does not need vitamin D drops	78 (35%)	97 (43.5%)	48 (21.5%)
Since I am on vitamin D supplement, my baby does not need vitamin D drops:	29 (12.9%)	135(60.3%)	60 (26.8%)
I will advise my relative or friend to give vitamin D supplement to their babies	165 (73.3%)	14 (6.2%)	46 (20.4%)