Assessment of Knowledge, Attitude, and Practice of Sunlight Exposure of Infants among Mothers Attending in Governmental Health Facilities in Farta District, South Gondar Zone, North West Ethiopia, 2018

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Received 6 August 2018; Revised 27 October 2018; Accepted 31 July 2019; Published 23 September 2019

Academic Editor: Hind A. Beydoun

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Background. Sunlight exposure serves an important purpose in human bodies. It promotes good health and plays a major role in the production of the very essential vitamin, vitamin D. Vitamin D is important for the growth of healthy, normal bones. Research conducted in different areas suggested that daily exposure to sunshine remains the cheapest, safest, and most effective method of preventing rickets.

Objective. To assess knowledge, attitude, and practice of infants to sunlight exposure among lactating women in Farta district, in 2018.

Method. Institution based cross sectional study design was conducted among mothers attending the selected health center. Systematic sampling method was used to select individual respondents. Data were entered and analyzed by using SPSS version 20.

Result. Among 357 respondents identified for the study, 95% (n = 339) was responding to the interview. Of the total respondents, 49.9%, 46%, and 45.7% of them had poor knowledge, unfavorable attitude, and poor practice about sunlight exposure, respectively.

Conclusion and recommendation. The results of this study showed that almost half of the mothers had inadequate knowledge, attitude, and inadequate practice about sunlight exposure. Therefore, mothers need to be educated about the importance of sunlight exposure.

1. Introduction

Regular sunlight exposure increases the serotonin levels in the body, making it more active and alert. The most important advantage of exposure to sunlight is the ability to boost your body’s vitamin D supply [1]. Exposing a child to sunlight through window panes for 10 min twice a day protects mild neonatal jaundice [2]. When people are exposed to sunlight in the morning, their nocturnal melatonin production occurs sooner, and they enter into sleep more easily at night. Melatonin production also shows a seasonal variation relative to the availability of light, with the hormone produced for a longer period in the winter than in the summer. Even if exposure of children to sunlight is important for the development, exposure to high sunlight is a risk factor in the development of skin cancers [3, 4].

Studies suggest that achieving and maintaining an adequate vitamin D blood serum level, as determined by a 25-hydroxyvitamin D (25(OH)D) blood test, is essential to the prevention and treatment of autoimmune diseases such as multiple sclerosis and type 1 diabetes. Additionally, vitamin D appears to play a protective role in cardiovascular health, various types of cancer, Autism, depression, schizophrenia, and respiratory conditions such as cystic fibrosis [5].

Recent knowledge suggests that the risk of some chronic diseases could be reduced if vitamin D intake and sun exposure of the population were increased. In some developed countries, the prevalence of rickets in the general population diminished after the emergence of dietary supplementation. However, in such countries, vitamin D deficiency rickets has re-emerged in recent years, particularly among groups with limited exposure to UVB-containing sunshine [6].
Previous studies indicate that insufficient exposure of sunshine was an important cause of rickets in children [7–10]. Studies indicate that regular exposure to sunshine is the most effective way of preventing the disease [8, 11, 13]. Health education has a vital role on behavioral change regarding infant’s exposure to sunshine. Hence in the early 1960s, it was adopted as the main strategy to prevent rickets [13]. Evidence of world health organization indicate that worldwide one billion people have vitamin D deficiency [14]. A risk of rickets is dominant in children who live in crowded houses, which have no sunlight [15].

Evidence shows that many people have low vitamin D levels and also there is a well-documented relationship between low vitamin D levels and poor bone health [16]. Beside these, studies in Gaza strip in 2010 among 340 cases and controls show only 65% have sunlight exposure. The prevalence of rickets and its determinant factor were educational status, occupation, number of deliveries, health education, and exclusive breastfeeding (EBF) [17].

Nutritional rickets are gaining the attention of public health professionals and individual clinicians worldwide as the disease remains an endemic problem in many developing countries and has re-emerged in a number of developed countries [18].

In middle east vitamin D deficiency and rickets continue to be a public health problem despite all year sunshine. In some parts of Asia, such as the northern parts of China (including Tibet), Mongolia, and Afghanistan rickets appears to be mainly due to vitamin D deficiency associated with the high altitude, cold winters, and limited skin exposure [19].

Vitamin D deficiency and nutritional rickets are still health problems in developing countries. Despite Turkey being in a geographical location with abundant sun light exposure, vitamin D deficiency continues to be a major health problem. Yearly incidence rates of vitamin D deficiency revealed in Turkey vary from 1.67% to 19%. Thus, sunning for bone development is still being advised [20]. In spite of adequate sunshine, vitamin D deficiency (nutritional) rickets has remained a common problem in the tropics and sub-tropics, including some of the most populated countries such as China, India, Nigeria, Egypt, Iran, and Turkey [21].

In Ethiopia, its prevalence was in the order of 30% in the 1950s and does not seem to have changed over the years. The main cause of nutritional rickets in Ethiopian children is lack of exposure to sunshine and not adequate intake of vitamin D. Lack of awareness and traditional beliefs are major causes for not exposing infants to sunshine [22].

A retrospective study in Jimma university specialized hospital revealed that the prevalence of rickets was 10.5% [23]. In a research conducted in Addis Ababa town, four in ten children who had visited health institutions had rickets and the problem was higher in infants [24]. Other study conducted in Jimma hospital showed that nearly one in ten children have rickets [25].

2. Methods

2.1. Study Design. Institutional based cross-sectional study design was conducted.

2.2. Study Area and Period. The survey was done from February 15, up to March 25, 2018, in Farta district, Amhara regional state. Farta district is located in the northwest part of Ethiopia and about 667 km from Addis Ababa and 99 km from Bahir Dar. The area is found at the altitude, which ranges from 2000 to 2500meters above sea level and it consists of four major agro-ecological zones: 25% low land, 45% medium highland, 24% highland, and 6% gorge. The annual temperature ranges between 9 and 25 degree Celsius and the rainfall varies from 1250 mm in the lowlands to 1500 mm in the highland areas during summer.

2.3. Source Population. All lactating women whose child’s age was less than 1 year and attended all health institutions of the Farta district for health care and immunization.

2.4. Study Population. All lactating women whose child’s age was less than 1 year and attended selected health institutions of the Farta district for health care and immunization during the study period.

2.5. Inclusion and Exclusion Criteria. Inclusion criteria—All women who were lactating with a child less than 1 year.

Exclusion criteria—Mothers who were unable to communicate were excluded.

2.6. Sample Size Determination and Sample Selection. To determine the sample sizes required existence of estimated prevalence rates is compulsory’s the prevalence of knowledge, attitude, and practice of sunlight exposure was 38.8% of Jimma university specialized hospital with an absolute precision of ±5% and a statistical confidence of 95% [24].

The sample size is computed using the following formula.

\[ n = \frac{Z^2 p(1 - p)}{d^2}, \]  

where, \( n = \) sample size; \( z = \) statistical certainty chosen; \( p = \) estimated prevalence level to be investigated; \( q = 1 - p; \) \( d = \) precision desired

\[ n = \frac{(1.96)^2 \times (0.388 \times 0.612)}{0.05^2} = 365. \]

The total number of infants in Farta district is 4973. Since this figure is below 10,000.

Use the following adjustment formula for the sample size:

\[ n = \frac{n}{(1 + n/N)}, \]

where, \( n = \) sample size for population of size above 10,000; \( N = \) number of infants in Farta district. Therefore,

\[ n = \frac{365}{(1 + 365/4973)} . \]

\[ n = 340. \]

Taking 5% [17] non response rate the final sample size was 357.
2.7. **Sampling Technique and Procedure.** The sampling method employed in this study was a systematic sampling method. That means proportional numbers of mothers were included into the sample from each selected health facility to make up a total sample size. Each study participant was selected using the systematic sampling technique in which every second client was interviewed in each health facility.

The proportional allocation of the study subjects of the four health facilities were as follows:

\[ n_{\text{facility}} = \frac{n_{\text{total}}}{n_{\text{total}} + n_{\text{facility}}} \]

where,

- \( n_{\text{facility}} \) is proportion of mothers with infants in a given health facility
- \( n_{\text{total}} = \text{Total sample size} \)
- \( n_{\text{total}} = \text{Number of mothers with infants in all health facilities} \)

2.8. **Variable of the Study**

2.8.1. **Dependent Variables.** Knowledge, attitude, and practice of sunlight exposure of infant.

2.8.2. **Independent Variable.** Age, occupation, income, educational status, no. of sibling and culture, place of delivery, antenatal care, and postnatal care.

2.9. **Data Collection Procedures.** A semi-structured pre-tested questionnaire was prepared and translated into Amharic by an expert to ensure its consistency. A pretest study was also carried out in other health center to gain some useful feedbacks.

2.10. **Data Quality Control.** To ensure quality data collection, one day training was provided to data collector to make sure good interviewing techniques. The training was focused on how to complete the questionnaire, proper interview techniques, and proper asking. Through the data collection into the sample from each selected health facility to make up a total sample size. Each study participant was selected using the systematic sampling technique in which every second client was interviewed in each health facility.

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### Table 1: Socio demographic characteristics of respondents whose child age was less than 12 months in Farta district, Northwest Ethiopia, 2018.

| Item                        | Category         | Number | %  |
|-----------------------------|------------------|--------|----|
| Age of mother               | <19 years        | 11     | 3.1|
|                             | 20–29 years      | 176    | 52 |
|                             | 30–39 years      | 91     | 26.8|
|                             | 40–49 years      | 61     | 18 |
| Age of child in months      | <4               | 132    | 38.8|
|                             | 5–8              | 113    | 33.4|
|                             | 9–12             | 94     | 27.8|
| Gender of child             | M                | 184    | 54.3|
|                             | F                | 155    | 44.7|
| Number of children          | 1                | 72     | 21.2|
|                             | 2–5              | 218    | 64.3|
|                             | 6–10             | 49     | 14.5|
| Religion of the mother       | Orthodox         | 332    | 98 |
|                             | Muslim           | 5      | 1.6 |
|                             | Protestant       | 2      | 0.6 |
| Marital status              | Single           | 0      | 0   |
|                             | Married          | 323    | 95.2|
|                             | Windowed         | 4      | 1.2 |
|                             | Divorced         | 12     | 3.5 |
| Educational status of the mother | Unable to read & write | 241 | 71.1|
|                             | Able to read & write | 54 | 15.9|
|                             | Primary school(1–8) | 32 | 9.4 |
|                             | Secondary school and above | 12 | 3.5 |
| Husband educational status  | Unable to read & write | 195 | 60.5|
|                             | Able to read & write | 54 | 16.7|
|                             | Primary school(1–8) | 49 | 15.2|
|                             | Secondary school and above | 25 | 7.7|
| Monthly income              | <500             | 102    | 30 |
|                             | 500–1000         | 143    | 42.3|
|                             | >1000            | 94     | 27.7|
| Maternal occupation         | Farmer           | 288    | 85 |
|                             | Civil servant    | 4      | 1.2 |
|                             | Merchant         | 5      | 1.5 |
|                             | Daily laborer    | 6      | 1.8 |
|                             | House wife       | 36     | 10.6|
| Husband occupation          | Farmer           | 275    | 85.2|
|                             | Civil servant    | 12     | 3.7 |
|                             | Merchant         | 15     | 4.6 |
|                             | Daily laborer    | 9      | 2.8 |
|                             | Other            | 12     | 3.7 |
| Mass media                  | Yes              | 190    | 55.9|
|                             | No               | 149    | 44.1|
| Type of mass media          | Radio            | 161    | 48.9|
|                             | Television       | 26     | 15.1|

### Table 2: Obstetric history of women whose child age was less than 12 months in Farta woreda, Northwest Ethiopia, 2018.

| Item                        | Category     | Number | %  |
|-----------------------------|--------------|--------|----|
| ANC visit                   | Yes          | 306    | 90.3|
|                             | No           | 33     | 9.7 |
| Number of visit             | One          | 26     | 8.6 |
|                             | Two          | 97     | 31.7|
|                             | Three        | 70     | 22.9|
|                             | Four and above | 113 | 37 |
| Place of delivery           | Home         | 54     | 15.9|
|                             | Health post  | 40     | 11.8|
|                             | Health center | 180 | 53 |
|                             | Hospital     | 65     | 19.2|
| PNC visit                   | Yes          | 188    | 55.4|
|                             | No           | 151    | 44.6|
| Number of visit             | One          | 79     | 42 |
|                             | Two          | 29     | 15.4|
|                             | Three        | 60     | 32 |
|                             | Four         | 20     | 10.6|
illiterate. More than half, 312 (91.9%) of their occupations were farmer. Almost all (70%) of respondents' incomes were above five hundred Birr (Table 1).

3.2 Obstetrical History of Mothers' about Sunlight Exposure of Their Infant. Most, 306 (90.3%) of respondents had ANC follow up and the remaining 33 (9.7%) had no follow up. Among respondents who had ANC follow up, 113 (37%) of having four and above visits, only low proportion, 26 (8.6%) of women had one time visit. More than half, 180 (53%) of the mothers delivered at the health center. One hundred eighty eight (55.4%) of respondents had PNC follow up. Among respondents who had PNC follow up, 79 (42%) of 188 respondents have a 1st PNC visit and 60 (32%) had three visits (Table 2).

3.3 Level of Mothers’ Knowledge about Sunlight Exposure of Their Infants. Nearly half (49.9%) of the respondents had knowledge of sunlight exposure to their infant. Of 183 respondents, 84 (46%) had knowledge of sunlight exposure every day and 39 (21.1%) had knowledge of sunlight exposure every two days. More than three quarters, 134 (73.2%) of 183 respondents had knowledge of sunlight exposure to infants before four hours and the remaining, 7 (3.8%) after four hours. Similarly, more than three quarters, 68 (36.6%) of 183 respondents had knowledge of sunlight exposure to infants for less than 30 min and the remaining, 29 (16.1%) for more than 30 min. More than half, 183 (53.98%) of respondents had information about sunlight exposure of infant and most of them knew the importance of sunlight exposure. More than half, 312 (91.9%) of their occupations were farmer. Almost all (70%) of respondents' incomes were above five hundred Birr (Table 1).
the respondents, 120 (54.6%) had got the information from a health professional (Table 3).

3.4. Practice of Respondents on Sunlight Exposure of Infant. Less than half of the participants (45.7%) were exposed their infants to sunlight. Only, 37 (15.7%) of 176 respondents started to expose their child to sunlight before 10 days and the remaining, 198 (84.3%) were after 10 days. Out of 176 respondents, about 80 (45.7%) participants exposed their child to sunlight every day and the remaining 96 (54.3%) were 5 up to 6 times a week and less. Most of, 169 (75%) of respondents covered their infant's body when they exposed (Table 4).

3.5. Attitude of Respondent on Sunlight Exposure of Infant. Of the total respondents, 46% agreed with an advantage of sunlight exposure of their infants. More than half, 176 (51.98%) of respondents were happy when they exposed/if they exposed their child to sunlight and the remaining, 163 (48%) felt anxiety and other. About 156 (46%) of respondents perceived consequences after they exposed or if they exposed their child to sunlight were to become strong and the remaining, 183 (54%) were to be healthy, helps to sleep, and others (Table 5).

### Table 4: Practice of respondents on sunlight exposure of infant in Farta woreda, Northwest Ethiopia, 2018.

| Item Category Description | Number | Percentage |
|---------------------------|--------|------------|
| Do you expose your child for sunlight? | Yes | 176 | 51.98 |
| | No | 163 | 48.02 |
| Number of days of sunlight exposure per week | Every day | 80 | 45.7 |
| | 2 | 28 | 15.9 |
| | 3–4 | 43 | 24.4 |
| | 5–6 | 25 | 14.6 |
| Starting day of sunlight exposure | Within 5 days | 17 | 7.2 |
| | 5–10 days | 20 | 8.5 |
| | 10–15 days | 91 | 38.7 |
| | After 15 days | 107 | 45.5 |
| Time of sunlight exposure | Before 4 h | 129 | 73 |
| | 4–7 h | 38 | 21.5 |
| | 7–10 h | 9 | 5.5 |
| Duration of sunlight exposure | <15 min | 59 | 33.5 |
| | 15–20 | 38 | 21.5 |
| | 20 min–1 h | 69 | 38.5 |
| | Above 1 h | 10 | 5.7 |
| Do you cover the infants body when you exposed | Yes | 169 | 75 |
| | No | 56 | 25 |
| Reason for you cover | To prevent skin damage | 44 | 19.3 |
| | To prevent from evil eye | 98 | 55.7 |
| | Other | 27 | 25 |
| Reason of respondents for not exposing | Fear of blackness | 4 | 2.4 |
| | Lack of knowledge | 76 | 46.6 |
| | Fear of evil eye | 59 | 36.2 |
| | Fear of pneumonia | 5 | 3.1 |
| | Lack of time | 5 | 3.1 |

### Table 5: Attitude of respondents on sunlight exposure of infant in Farta Woreda, Northwest Ethiopia, 2018.

| Item Category Description | Number | Percentage |
|---------------------------|--------|------------|
| Sunlight exposure is | Agree | 139 | 41 |
| | Disagree | 155 | 43.7 |
| Advantageous | Strongly agree | 17 | 10.98 |
| | Strongly disagree | 28 | 4.2 |
| Feeling of respondents while they expose their child | Happy | 176 | 51.98 |
| | Anxiety | 80 | 23.6 |
| | Angry | 3 | 0.9 |
| | Other | 80 | 23.6 |
| Perceived consequence of respondents on sunlight exposure of infant | To become healthy | 60 | 17.7 |
| | To become strong | 156 | 46 |
| | Helps to sleep | 3 | 0.9 |
| | Exposes my child to cold/pneumonia | 94 | 27.7 |
| | Others | 26 | 7.7 |
| Thought that sunlight exposure cause skin cancer | Yes | 203 | 60 |
| | No | 136 | 40 |
| Thought that sunlight exposure cause nappy rash | Yes | 237 | 70 |
| | No | 102 | 30 |

### 4. Discussion

The aim of our study was to assess knowledge, practice, and attitude of sunlight exposure of lactating mothers to their infants in Farta district. Currently the government of Ethiopian gives emphasis to decreasing child morbidity and mortality. Therefore, assessing the knowledge, practice, and attitude of lactating mothers regarding exposing their infants to sunlight is one important aspect in maintaining children's health.

The proportion of respondents who reported that they had the information (knowledge) about sunlight exposure was 53.98%; the same studies done in Turkey and jimma town showed that 86.4% and 100% of mothers had information about sunlight exposure, respectively [20, 12]. Our research was lower than the study done in Turkey and jimma town; the possible reason for this might be different educational status of study participants about sunlight exposure.

Out of the total respondents who responded to the question “is sunlight exposure beneficial?” 75.98% mentioned sunlight exposure was beneficial; our finding was lower than the study done in jimma town which was 99.68% [22]. The reason may be due to mothers in jimma town as mentioned above had 100% information about sunlight exposure and our finding was greater than the study done in sakarya which was 64.1% [21]. The possible reason for this may be mothers in sakarya were educated about harmful effects of sunlight exposure rather than benefits of sunlight exposure because they live in a high temperature region and they had fear of skin cancer. Seventy five percent of the respondents mentioned the most benefit of sunlight exposure was strengthening bone; our
finding was similar to the same study done in jimma town which was 64.62% [12]. Regarding the best time to sunlight exposure of infants, 95.7% of the mothers mentioned it was in the morning; this is similar to the same study done in jimma town which was 100% [12].

Regarding the practice of sunlight exposure, 51.98% of mothers exposed their infants to sunlight. This finding is lower than the same study done in sakarya, which was 87.5% of mothers exposed their infants to sunlight [21]. The reason for this difference may be due to the adequate information mothers had in sakarya about sunlight exposure compared to mothers in Farta district. It was also greater than the study done in debre markos town which was 44.6% [28]. The possible explanation for this may be they were found in tropical regions which was increased prevalence of skin cancer; so due to fear of skin cancer, mothers may not have exposed their infants to sunlight.

This study showed that 15.7% of mothers started sunlight exposure of their babies between 0–15 days. This was lower than the study done in jimma town, 42.04% and debre markos town, 23.4% [22, 28]. This study also showed that 51.98% of the mothers exposed their infants to sunlight, but only 40% of mothers exposed their infants to sunlight daily and the rest of the mothers exposed their infants sometimes. This result was lower than the study done in jimma town which was 92.16% of mothers exposed daily [12]. The reason for this difference may be the community had more information and maybe there was a health education program for mothers in jimma.

In our study, 73.2% of mothers exposed their infants to sunlight in the range of time from 8 to 10 AM in the morning and 21.9% of participants exposed their infants with time duration of 15–20 min. It was lower than the study done in debre markos [28].

About 36.5% of respondents had feared to expose their infants to sunlight. Among these 15.2%, % of participants not exposed their infants to sunlight due to fear of the evil eye. This finding was higher than the study done in debre markos town which was 11.9% [28]. The possible explanation for this difference may be due to cultural differences between the two populations and differences in a study setting in Farta district; the majority of respondents were residing in rural areas, whereas in the study done in debre markos respondents were residing in urban areas, which may have contributed to the observed difference.

For the current study, feeling of lactating women while they exposed their children, 53.98% were happy, 0.3% angry, 18.4% feel anxiety and 4.8% were other which was higher than with ethio-swedish children’s hospitals. Respondents perceived consequences while they exposed their child to sunlight, 17.7% were makes healthy, 75% were made strong, 0.9 were helped to sleep, 27.7% were exposed the infant to cold (pneumonia), and 1.8 other which was higher than the result of ethio-swedish children’s hospital [7].

However, this study does have some inherent limitations. Though there are wide ranges of factors which affect rickets among mothers attending governmental health institutions, only knowledge, attitude, and practice about sunlight exposure were addressed in this study. Hence, taking into consideration factors from the different contributors like calcium deficiency would have been important.

5. Conclusion

According to our study, participants had not good knowledge, practice, and attitude regarding sunlight exposure of infants. Therefore, health education focusing on the importance of sunlight exposure is important to improve knowledge, practice, and attitude of mother’s sunlight exposure of their infants.

Data Availability

The datasets generated during the current study are available from the corresponding author on reasonable request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors’ Contributions

All authors participated in proposal conception and designing the proposal, data collection and analysis, and wrote the manuscript. Finally, the paper was approved by all authors.

Acknowledgments

We would like to express our deepest appreciation and heartfelt thanks to Bahir Dar University for giving the chance of doing this project. We also thank the Farta district health officer and community for their cooperation and their valuable information for this work. Last but not the least, we would like to express our heartfelt thanks to all data collectors and supervisor for their valuable contribution.

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