# prevalence of Vitamin D deficiency and related behaviors among pregnant women in Municipality of Qaser Bin Ghashir

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مدى انتشار نقص فيتامين (د) والسلوكيات المرتبطة به بين النساء الحوامل في بلدية قصر بن

# غشير

#### الملخص:

تم إجراء هذه الدراسة للتحقيق في مدى انتشار نقص فيتامين (د) والسلوكيات ذات الصلة بين النساء الحوامل. وقد شملت هذه الدراسة 140 امرأة حامل تتراوح أعمارهن بين 20 و 50 عامًا في الفترة ما بين 1 يناير 2023 إلى 30 يونيو 2023. وتم إجراء استبيان ذاتي. مصمم لجمع البيانات و تصنيفها وتبويبها وتحليلها باستخدام برنامج الإحصاء 2023 . أظهرت النتائج 40.7٪ من النساء الحوامل يعانين من نقص فيتامين (د) (تركيز المصل 25 (OH) مستوى 30 < D نانوغرام / مل)، و معظم المشاركين في المرحلة المتوسطة للتعليم، مع بشرة بنية ويتعرضون أحيانًا لأشعة الشمس في منتصف النهار بنسبة أقل من ساعة، وفي بعض الأحيان يستخدمن النظارة الشمسية.

وفيما يتعلق بالمعلومات الغذائية، فإن معظم المشاركين في الاستطلاع لا يتناولون الحليب و أوميجا 3 ومكملات فيتامين(د) بشكل منتظم. على الرغم من الوعي المتزايد بأهمية فيتامين(د) في الفترة الأخيرة، ورغم أن النساء الحوامل في عيادات بلدية قصر بن غشير يخضعن بشكل عام للمكملات الغذائية، إلا أن المستويات دون المستوى الأمثل من فيتامين(د) لا تزال شائعة.

الكلمات المفتاحية: فيتامين (د)، النقص، القصور، عوامل الخطر، النساء الحوامل.

#### Abstract:

This study was performed to investigate the prevalence of Vitamin D deficiency and related behaviors among pregnant women were included in this study 140 pregnant women, aged 20-50 years old were surveyed between 1<sup>st</sup> January 2023 to 30<sup>th</sup> June 2023. a self-made questionnaire was designed to gather data. The data gathered were classified, tabulated and analyzed using SPSS statistics software. 40.7% of the pregnant women had deficient vitamin D (serum concentration 25 (OH) D level  $\leq$  30 ng/ml ), Most of the respondents are in secondary level, with brown skin and sometimes exposed to sunlight in the mid-day with less than one hour, some-times use of sunscreen. In terms of dietary information, most of the respondents don't had regular intake of milk, omega 3 and Vitamin D supplementation. Despite the increasing awareness of the importance of vitamin D in the recent period, and although pregnant women in Municipality of Qaser Bin Ghashir clinics are generally subjected to a course of supplements, but suboptimal levels of vitamin D is still common.

Keywords: Vitamin D, Deficiency, Insufficiency, risk factors, pregnant women.



## Introduction:

Pregnant women have been found to have widespread vitamin D insufficiency in recent years. The importance of maternal vitamin D in controlling cell growth, immunology, and metabolism has recently come to light (Al Emadi & Hammoudeh, 2013). As previously mentioned, vitamin D aids in the maintenance of healthy calcium and phosphate levels in the human body (Edwards, M. H. *et al.*, 2014).

Mothers with darker skin tones are more likely to have a vitamin D deficit (Holmes, V. A. *et al.*, 2009). Pre-eclampsia, premature births, and low birthweight are all things that may be avoided with vitamin D treatment throughout pregnancy (De-Regil, L. M. *et al.*, 2014). However, rickets and wheezing are both more common in children with mothers who are deficient in vitamin D (Tavera-Mendoza, L. E., & White, J. H., 2007).

Vitamin D status was higher among supplement users women than in those who did not use supplements women. Supplementation did not prevent the underlying vitamin D deficit. Vitamin D supplementation, maybe at higher dosages than are now available, is required to enhance maternal vitamin D status due to the possible effects of hypovitaminosis D on health outcomes (Holmes, V. A. *et al.*, 2009).

In early life or in utero, vitamin D deficiency has been associated with an increased risk of respiratory infection, multiple sclerosis, schizophrenia, diabetes type 1, and placental development and function (Evans, K. N. *et al.*, 2004). Adult vitamin D deficiency has also been associated with cardiovascular disease, upper respiratory infection (D'Agostino, R. B. *et al.*, 2008; Ginde, A. A. *et al.*, 2009), cancer (Khammissa, R. A. G. *et al.*, 2018), and osteomalacia (Shapses, S. A. *et al.*, 2011). While low doses of vitamin D prevent nutritional rickets, higher blood 25-hydroxyvitamin D (25(OH)D) levels appear to be required for excellent general health outcomes (Vieth, R. *et al.*, 2007). The predominant circulating biomarker for assessing vitamin D levels is 25-hydroxyvitamin D (25(OH)D), which exhibits a longer half-life of approximately 25 days in comparison to the active metabolite, 1,25-dihydroxyvitamin D, but sunlight provides the most (Hossein-nezhad, A., & Holick, M. F. 2013). Some sun rich countries have significant rates of Vitamin D insufficiency during pregnancy (Hamilton, S. A. *et al.*, 2010; Al-Faris, N. 2016).

The most important source of vitamin D is skin production by UV B sun radiation (Holick, M. F. 2004). Cholecalciferol (vitamin  $D_3$ ) production will decrease if the skin's epidermis is protected from ultraviolet B rays in any way. The production of vitamin D-3 can be inhibited by more than 90% due to the absorption of UV B photons by the skin pigment melanin (Clemens, T. L. *et al.*, 2019). Understanding what factors affect a country's citizens' vitamin D status is crucial. This knowledge can be applied to the development of vitamin D population-level optimization health promotion programmers. This will prevent patients from taking vitamin D supplements unless they need them, saving them money (Morrissey, H. *et al.*, 2019). This study aimed to examine the incidence of vitamin D deficiency and related behaviours among pregnant women in the Municipality of Qaser Bin Ghashir in Libya. Recently, a large percentage of pregnant women in Libya have started taking vitamin D supplements. The outcomes may show how effective efforts were to raise vitamin D levels. The study's secondary objective was to identify risk and protective factors related to vitamin D levels during pregnancy.

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#### Materials and methods:

### **Research Design and Respondents:**

Since this is primarily an exploratory study, a descriptive research strategy was used. The main purpose of the study is to determine and identify the prevalence of Vitamin D insufficiency and related behaviors among pregnant women in selected clinics in Municipality of Qaser Bin Ghashir, Libya. Descriptive research design is appropriate for this study since it used procedures in quantitative research in which the researcher administers a survey or a questionnaire in collecting data. The cases of the study were pregnant women in Municipality of Qaser Bin Ghashir, Libya. A total of 140 pregnant women were included in this study over a period of six months from 1<sup>st</sup> January 2023 to 30<sup>th</sup> June 2023.

## Data collection and statistical analysis:

A built questionnaire was used to collect the necessary information for this analysis. study was conducted a questionnaire was formulated to reflect the prevalence of Vitamin D insufficiency and related behaviors among pregnant women in selected clinics in Municipality of Qaser Bin Ghashir, Libya. among 10 subjects (140 pregnant women) in Municipality of Qaser Bin Ghashir, Libya, over a period of six months from  $1^{st}$  January 2023 to  $30^{th}$  June 2023.

The data gathered were classified, tabulated and analyzed using Statistical Package for Social Science (SPSS) software (version 20.0; IBM Corp., Armonk, NY, USA). The Chi-square test was used to measure the statistically significant differences at p<0.05.

# Serum 25(OH) D quantification:

It was determined that serum 25 (OH) D levels, the main circulating form with a half-life of two to three weeks, are the most trustworthy test of adequate vitamin D. because it represents both food absorption and cutaneous synthesis. At the conclusion of the health visit, 5 mL of fasting blood was taken from each participant. Using the readily accessible ELISA kit 25-OH vitamin D Serum Quantification (EUROIMMUN-Medizinische Labordiagnostika AG), all tests were carried out in the hospital clinical laboratory. The method's sensitivity for 25-OH vitamins D2 and D3 is 1.6 ng/mL. In summary, peroxidase activity, which is assessed as substrate OD at 450 nm, is the indicator of the presence of 25-OH vitamin D, which is detected by anti-25-OH vitamin D3 antibodies. The expressed results are in ng/mL.

# **Results:**

The present study investigates that vitamin D deficiency, was defined as (serum concentration of 25 (OH)D  $\leq$ 30 ng/ml or less), (Evatt, M. L., *et al.*, 2019). In total 140 pregnant women were participants in this study.

Table (1), was reported vitamin D deficiency in about (40.7%) of pregnant women, as compared with (32.1%) insufficiency, while the rest which is about (36.6%) had Vitamin D sufficiency.

Moreover, the present results showed that influence lifestyle choices that involve sun exposure and sunscreen use education and regular exercise. Accordance with the present observations.

Table (2), shows significant increases of cases (45.8%) of them are highly education, as compared with the majority of cases were the life style as secondary students while, (55.2%) of pregnant women sunscreen use, as compared with (52.3%) of pregnant women were did not use sunscreen.

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Furthermore; was observed significant increases of cases (60.8%) deficiency, as compared with (32.6%) insufficiency while (9.6%) of pregnant women play regular exercises.

Data tabulated in (fig. 1) showed that vitamin D deficiency among to age pregnant women (47.8%) of cases had vitamin D deficiency as compared with (30.4%) insufficiency, and the rest which is about (21.7%) had Vitamin D sufficiency were aged 40-50 years.

Moreover, (fig.2) showed that highly prevalence of vitamin D deficiency (51.9) in their Second trimester age of Gestation, (55.6%) as compared with 3rd trimester age of Gestation, (53.3%).

Also, prim gravida, showed in (fig.3) significant increases of cases (55.6%) deficiency, as compared with (54.9%) multigravida.

Furthermore; (fig.4,) showed significant increase in (69.5%) of pregnant women with no Vitamin D supplements, as compared with (25.3%) insufficiency vitamin D supplement per day, as well as (5.3%) of pregnant women with vitamin D sufficiency.

The same pattern (fig.5,6) the present results showed that vitamin D deficiency among pregnant mothers which includes: No milk intake, butter and omega-3 fish oil supplement, (68.3%), as compared with (55.2%) Yes milk intake. While, (54.8%) were fair skinned pregnant mothers, as compared with dark or brown (52.4%, 46.8%) respectively.

· /			1					-
All Women = 140	Total		Deficiency		Insufficiency		Sufficient	
			10-20ng/ml		20-30ng/ml		>30ng/ml	
	N	%	N	%	N	%	Ν	%
Age	140	100	57	40.7	45	32.1	38	36.6
≤20	24	17.1	5	20.8	8	33.3	11	45.8
21-29	52	37.1	22	42.3	17	32.7	13	25.0
30-39	41	29.3	19	46.3	13	31.7	9	21.9
40-50	23	16.4	11	47.8	7	30.4	5	21.7

(Table 1) Profile of the variable prevalence of vitamin D deficiency.

(Table	2) Prot	file of the	variable	the life	e style	characteristics
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All Women = 140	Total		Deficiency		Insufficiency		Sufficient	
			10-20ng/ml		20-30ng/ml		>30ng/ml	
	N	%	N	%	N	%	N	%
Life Style								
Employed	44	31.5	21	47.8	13	29.6	10	22.7
House wife	66	47.2	32	48.5	27	40.9	7	10.6
Students	30	21.4	17	56.7	5	16.7	8	26.7
Education								
Secondary	81	57.9	33	40.9	27	33.4	21	25.9
High education	59	42.2	27	45.8	18	30.5	14	23.7
Use Sun Screen								
Yes	96	68.6	53	55.2	38	39.6	5	5.2
No	44	31.5	23	52.3	17	38.6	4	9.1
Regular Exercise								
Yes	46	32.9	28	60.8	15	32.6	3	6.5
No	94	67.2	57	60.6	28	29.8	9	9.6

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50 40 30 20 10 0 1 2 3 • Denciency10-20ng/ml • Insufficiency20-30ng/ml • Sufficient > 30ng/ml

Deficiency10-20ng/ml

Age of gestation



Fig. 4. Vit. D Levels among to Vit. D Supplementation



#### **Discussion:**

The present study is an attempt to assess vitamin D deficiency and related behaviors among pregnant women in Municipality of Qaser Bin Ghashir; The results of the present study showed that high prevalence of vitamin D deficiency in pregnant women, which agreed with numerous studies have indicated a high frequency of vitamin D insufficiency among women in Libya, about 75% of women in the Benghazi region had 25(OH) D < 50 nmol/l, according to one study (Omar, M. *et al.*, 2017), 55% of nursing moms in Misurata and 61% of mothers in Tripoli reported the same (Benhamed, M. M. *et al.*, 2017).



A blood concentration of  $25(OH)D \le 30$  ng/ml indicates vitamin D deficiency, which was recorded in around 40.7% of the individuals in this study. Even through this proportion indicates an improvement in vitamin D status over previous research, a region with abundant sunshine throughout the year is still thought to have high levels of vitamin D deficiency.

Numerous factors often influence vitamin D status, particularly those that influence the rate of dermal synthesis of the nutrient, like skin color and lifestyle choices that involve sun exposure and sunscreen use. Accordance with the present observations shows significant increases of cases had vitamin D deficiency were aged 40-50 years.

Vitamin D shortage and insufficiency are common during pregnancy in some sun rich areas (Hamilton, S. A. *et al.*, 2010; Al-Faris, N. 2016), despite the fact that the majority of vitamin D is obtained through sun exposure between around 09.00 and 15.00 (Webb, A. R., & Engelsen, O. 2006).

Prevalence estimates for vitamin D insufficiency in North Africa and the Middle East range from 40 to 97%. Hypovitaminosis vitamin D was surprisingly common in people living in sunny countries and where the body is not covered entirely, such as the European countries bordering the Mediterranean. This discrepancy has been explained largely by the custom of covering almost the entire body (Mishal, A. A. 2001).

Some research has found a decline in vitamin D levels after applying sunscreen (Matsuoka, l. Y. *et al.*, 1987), but the vast majority has not (Singh, S. *et al.*, 2019) This could be due to sloppy sunscreen application (Hansen, L. *et al.*, 2016).

Some foods, such as fatty fish, eggs, organ meats, and UV-irradiated mushrooms, contain small amounts of vitamin D naturally. While there aren't many fortified foods in Libya (Benhamed, M. M. *et al.*, 2017; Faid F. *et al.*, 2018), this study shows relatively high consumption of supplements rich in vitamin D, reflecting less vitamin D insufficiency than other studies. Fortified food and vitamin supplements are needed (Holick, Michael, F. 2007). There are few studies conducted in Libya that report on low vitamin D status in women and very low consumption of vitamin D supplements and vitamin D rich food.

Study participants whose serum vitamin D level was elevated to sufficient range suggest that vitamin D supplementation may assist to improve the vitamin D serum level in cases of severe vitamin D shortage (Kalra, P. *et al.*, 2012). It was observed pregnant women and their babies in the north of the United States may be at risk of vitamin D deficiency even when their mothers take prenatal vitamins, according to research by Bandar and colleagues (Bodnar, L. M. *et al.*, 2007). This suggests that higher dose supplementation is required to improve maternal and neonatal vitamin D nutriture. Our study's limitations include its small sample size and the absence of information regarding the prenatal vitamin brand and dosage utilized by the individuals. Such data would have helped us establish whether women were using vitamin  $D_2$  or vitamin  $D_3$  supplements, and at what dosages.

## **Conclusion & Recommendation:**

This study was conducted to investigate prevalence of Vitamin D deficiency and related behaviors among pregnant women in Municipality of Qaser Bin Ghashir. It is reasonable to draw the conclusion that a lack of vitamin D is a prevalent health problem in the Municipality of Qaser Bin Ghashir. In spite of the growing knowledge of the



significance of vitamin D in the recent period, and in spite of the fact that pregnant women in the clinics of the Municipality of Qaser Bin Ghashir are generally subjected to a course of supplements, suboptimal levels of vitamin D are still common.

There is a need for additional research to be conducted in order to enhance the vitamin D status of pregnant women throughout Libya. Therefore, we recommended making lifestyle changes, including extending the exposure time to the sunlight, fortifying foods as well as milk, milk products, cod liver oil, and omega-3 and taking supplementary doses of vitamin D to reduce the high incidence of vitamin D deficiency.

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