

The Influence of Work Environment on Vitamin D Levels A among Radiologists in Jeddah and Yanbu- Saudi Arabia: A Comparative Study

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Abstract: ***Objectives:** The aims of the study were to compare level of vitamin D deficiency between radiologists and a control group of non-radiologists. A dark, daylight-deprived work environment may increase the risk for radiologists having vitamin D deficiency. **Materials and Methods:** A comparative study containing a total of 66 participants divided into two groups (radiologist group) and (non radiologist group). This study was done in Jeddah and Yanbu industrial city. **Result:** The study revealed that the distribution of the Non-Radiologist according to vitamin D level signified as Normal level, Deficiency, severe Deficiency; 91.7%, 41.3% and 37.5% respectively. the distribution of Radiologist according to vitamin D level signified as Normal level, Deficiency, severe Deficiency; 8.3%, 58.7% and 62.5% respectively. A comparison between females and males radiologists on their vitamin D levels, Females radiologists were 21 participants , while the males radiologists were only 12 participants. It reveals 5 participants of Females suffer from severe vitamin D deficiency(< 10 Ng/ml) by a percentage of 15.1% , while in males were 0%. and 15 of females had vitamin D deficiency (10-29 Ng/ml) by a percentage of 45.4% , while in males vitamin D deficiency were 36.4%, and 3.0% of females were normal (30-100 Ng/ml) , while it was 0% in males. Increasing of age increases the risk of vitamin D deficiency , radiologists who are age between (18-29) only 3.0% of them had severe vitamin D deficiency (< 10 Ng/ml) , while radiologists age between (30-49) 12.1% of them had severe vitamin D deficiency . Radiologists who works 12 hours a day has high severe vitamin D deficiency(<10 Ng/ml) by percent of 20% comparing with 11.1% of radiologists who work 6-8h a day , although radiologists who work 6-8h a day had higher vitamin D deficiency (10-29 Ng/ml) (83.3%) , while radiologist who work 12h a day were (80.0%). **Conclusion:** Radiologists have a high risk of vitamin D deficiency more than the non radiology group due to their dark, no sun exposure work environment.*

Keywords: Vitamin D, Radiologist, Non Radiologist

1. Introduction

Vitamin D is essential for the proper absorption of calcium, and it's been shown to greatly reduce fracture risk in two ways, first, it helps with the formation of stronger bones; second, Vitamin D helps improve balance and prevent falls by enhancing muscle contraction [1].

Vitamin D deficiency has been shown to play a role in almost every major disease such as 17 varieties of cancer (including breast, prostate and colon), hypertension, diabetes, osteoarthritis, autoimmune diseases and Alzheimer's disease, these conditions are major public health problems worldwide. [2] [3]

Vitamin D is naturally present in very few foods, such as fish. It's also produced in response to the ultraviolet B spectrum striking the skin and trigger vitamin D synthesis, and it's available as a dietary supplement. Vitamin D insufficiency is very common in the general population, over 60% of the population have insufficient vitamin D levels [4]

For the interpretation of 25-hydroxyvitamin D levels, we used the definition by the World Health Organization (WHO), which levels (below 10 ng/ml) were considered deficient, levels (between 10-29 ng/ml) were classified as insufficient, and vitamin D level (between 30 to 100ng/m) were considered normal (World Health Organization, 2003).

A growing number of studies have been outlining the importance of vitamin D in human health and metabolism. Radiologist are known of working in a dark, daylight-deprived work environment, compared to other professional groups with a different work environment, therefore we hypothesized that radiologists have a high risk for low vitamin D levels.

2. Methodology

A comparative study containing a total of 66 participants divided into two groups 33 radiologists and 33 non radiologists to compare their vitamin D levels, samples are collected from Jeddah and Yunbu industrial city, duration of the study was between July 2018 to December 2018. Data collection methods was conducted by interviewing participants , or using an online survey by Google Forms, the survey was distributed using social media, such as Whats App and Twitter. Data was submitted only after sending a copy of each participants vitamin D blood test .This study was analyzed by the use of the SPSS program. The variables which included in this research are: Vitamin D level, profession, Age, Gender, City of residence, working hours/Day, Eating fish, vitamin D supplementation. We include Radiologist Male and Female age from 18-49, Non radiology profession male and female age from 18-49 and Radiologist from Jeddah and Yunbu. And Exclude all participant who are over 50 years old, pregnant and

breastfeeding woman, participant who eat fish two times a week and participant on supplements.

3. Results

This study intended to evaluate the awareness among radiologists who might be more sensitive to health issues compared to the non-radiologists group, according to their dark, daylight-deprived work environment that may increase their risk for vitamin D deficiency. Also to increase responsibility among radiologist to prevents any causes of vitamin D deficiency such as work environments.

Table 1: Frequency distribution of the Non- Radiologist according to the vitamin D level

Non-Radiologist	Frequency	Percentage%
Normal	11	91.7
Deficiency	19	41.3
Severe Deficiency	3	37.5
Total	33	

Table 2: Frequency distribution of Radiologist according to the vitamin D level

Radiologist	Frequency	Percentage%
Normal	1	8.3
Deficiency	27	58.7
Severe Deficiency	5	37.5
Total	33	

Table 3: Frequency distribution of Radiologist (male) according to the vitamin D level

Radiologist	Frequency	Percentage%
Normal	0	0
Deficiency	12	36.4
Severe Deficiency	0	0

Table 4: Frequency distribution of Radiologist (female) according to the vitamin D level

Radiologist	Frequency	Percentage%
Normal	1	3.0
Deficiency	15	45.4
Severe Deficiency	5	15.1

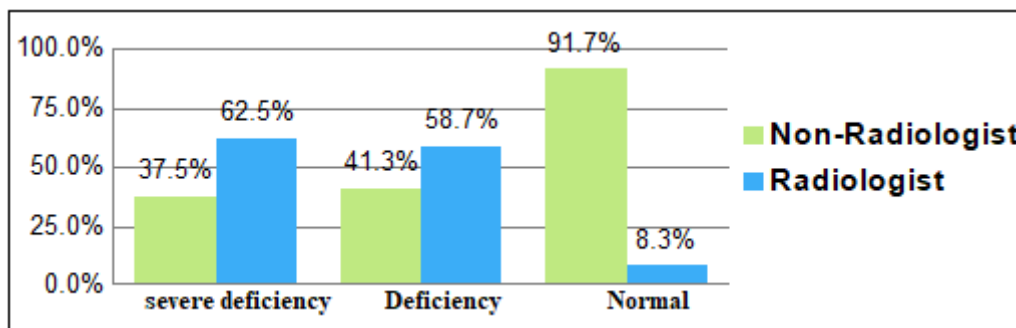


Figure 1: Percentage of Radiologists Comparing to Non-Radiologists

4. Discussion

The statistical analyses of the above results showed as the following: In table 1 and figure 1 shows a comparison between radiology and non radiology group on their vitamin D levels, it reveals radiologists suffer from severe vitamin D deficiency (< 10 Ng/ml) by a percentage of 62.5% , while the non radiology group was only 37.5%. Also vitamin D Deficiency (10-29 Ng/ml) was lower among radiologists by a percent of 58.7% comparison with 41.3% in the non radiology group. Normal vitamin D levels (30-100 Ng/ml) were higher in non radiology group by 91.7% comparing with only 8.3% in the radiology group, this indicates that being a radiologist has an impact on vitamin D levels and that's due to their dark, no sun exposure work environment, and this result agreed with a similar study was done in Switzerland February 2018 , compared the prevalence of vitamin D insufficiency between radiologists and a control group of non-radiologists, shows that vitamin D deficiency in radiologists was high [6][7][8].

Table 3, 4 shows a comparison between females and males radiologists on their vitamin D levels, Females radiologists were 21 participants , while the males radiologists were only 12 participants. It reveals 5 participants of Females suffer from severe vitamin D deficiency (< 10 Ng/ml) by a percentage of 15.1%, while in males were 0%. and 15 of females had vitamin D deficiency (10-29 Ng/ml) by a percentage of 45.4% , while in males vitamin D deficiency

were 36.4%, and 3.0% of females were normal (30-100 Ng/ml) , while it was 0% in males .This indicates that female radiologists have a high risk of severe vitamin D deficiency more than males radiologists, that's due to lack of sun exposure, indoor lifestyle and religious reasons by covering all body parts regardless of their profession, this result agreed with a study done in Saudi Arabia, Jeddah 2018 shows that women in Jeddah have insufficient vitamin D and calcium intakes. [9]

A comparisons between radiologists ages (18-29) and (30-49) , it's shows that the increasing of age increases the risk of vitamin D deficiency , radiologists who are age between (18-29) only 3.0% of them had severe vitamin D deficiency (< 10 Ng/ml) , while radiologists age between (30-49) 12.1% of them had severe vitamin D deficiency . Vitamin D deficiency (10-29 Ng/ml) was high among radiologists age between (30-49) by a percent of 63.6% comparing with only 18.2% among radiologists age between (18-29). Although 3% of radiologists age between (30-49) vitamin D level was normal.

A comparison between working hours among radiologists and the reflect on their vitamin D levels , It reveals radiologists who works 12 hours a day has high severe vitamin D deficiency(<10 Ng/ml) by percent of 20% comparing with 11.1% of radiologists who work 6-8h a day , although radiologists who work 6-8h a day had higher

vitamin D deficiency (10-29 Ng/ml) (83.3%) , while radiologist who work 12h a day were (80.0%) , this indicates that working hour doesn't have a big effect of vitamin D level according to the resemblance of the results . 5.6% of radiologists who work 6-8h a day vitamin D level was consider normal .

5. Conclusion

Vitamin D plays many essential roles in your body. The best-understood function is to keep your bones strong. The results in this study showed that radiologists have a high risk of vitamin D deficiency more than the non radiology group due to their dark, no sun exposure work environment.

We also found that female radiologists have a high risk of severe vitamin D deficiency more than males radiologists, that's due to lack of sun exposure, indoor lifestyle and religious reasons by covering all body parts regardless of their profession.

Also the result of this study showed that with increasing of age it increases the risk of vitamin D deficiency, it reveals radiologists who are ages between (30-49) have a higher risk of vitamin D deficiency more than radiologists ages between (18-29) due to long years working under a dark work environment.

We also compared between radiologists according to their working hours (12h) and (6-8h) and it's reflect on their vitamin D levels, it shows that working hours doesn't have a big effect on vitamin D level according to the resemblance of the results.

6. Recommendations

We recommend improving knowledge and public health education especially among radiologists who might be more sensitive to health issues due to low vitamin D levels compared to the non-radiologists group.

Increase responsibility among radiologist to prevent any causes of vitamin d deficiency such as work environments, by taking an annual blood test of their vitamin D level to avoid all health problems and complications.

We recommend to increase the awareness and the importance of vitamin D and the consequences of its deficiency, whether by adding extra time in the clinic to educate them more, sharing simple complete medical information's.

We recommend radiologist on their hour break should step outdoors and expose to sunlight as much as possible.

Design open area for women to allow greater exposure to sunlight where women can uncover freely, since they have more risk of vitamin D deficiency.

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