



Knowledge and Awareness on Vitamin D Deficiency among IT Employees

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Authors' contributions

This work was carried out in collaboration among all authors. Author AB designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Author MJ managed the analyses of the study. Author SP managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Vitamin D is well known for its essential role in maintaining healthy bones. Deficiency of this causes the bones to become soft and weak, a disease known as rickets in children and osteomalacia in adults. Vitamin D is produced via skin under the action of sunlight, with smaller amounts from dietary sources. A self-administered questionnaire was prepared consisting of 10 questions. The questionnaire consisted of open ended and close ended type of questions. The survey was conducted among the IT (Information Technology) employees of a particular region. The survey was conducted via online platform. The results were collected, analysed and interpreted. The results conveyed that a majority (83%) of the IT employees were aware that the vitamin D deficiency mainly causes obesity. 50% of the IT employees were aware that vitamin D deficiency causes mainly skin cancer. 52.1% of the IT employees were aware that vitamin D levels support lung function and cardiovascular health. The present study concluded that the IT employees were well aware about the vitamin D deficiency and its risk factors. They had a good knowledge on the fact that vitamin D deficiency causes obesity and many other health issues.

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Keywords: Awareness; IT employees; knowledge; vitamin D deficiency.

1. INTRODUCTION

Vitamin D is known as the sunshine vitamin. Vitamin D is produced by the body in response to skin being exposed to sunlight [1]. It also occurs naturally in few foods, including some fish, fish liver oils and egg yolks, and in fortified dairy and grain products. Vitamin D is essential for strong bones, because it helps the body to use calcium [2] Vitamin D deficiency causes heart attacks, congestive heart failure, renal diseases and many health issues [3,4]. The vitamin D receptor (VDR) found in human skeletal muscle cells is involved in various physiological functions. The renin-angiotensin-aldosterone system (RAAS) is an important factor that controls hypertension. Li et al observed an increase in renin gene expression and plasma angiotensin II caused by the absence of vitamin D signalling in experimental animals lacking VDR [5]. The anti-inflammatory effect of vitamin D modulating toll-like receptors (TLRs) leading to decrease in the gene expression of proinflammatory mediators also has been linked with development of hypertension [6]. If the intake of vitamin D fortified milk or formula is less than 500ml, vitamin D supplements are provided instead [7]. The previous researches reported that people with low levels of vitamin D and metabolites are at high risk of osteoporosis and fractures [8,9,10]. The physical environment can influence physical and mental health of people through a variety of routes that relate to environmental hazards (e.g. poor air quality) and the positive aspects of the environment can create and nurture health [11]. The clinicians and the patients should be aware of the potential risks of vitamin D deficiency [12]. Vitamin D₃ can result in obesity, diabetes, hypertension, depression, fibromyalgia and fatigue syndrome [13]. It has been suggested that as the vitamin D levels are reduced by disease processes, low levels may be the result rather than the cause of various illnesses. The potential risks of an excessive sun exposure must also be considered in the context of attempts to increase vitamin D levels. Some of the available observational evidence suggests that mortality is higher in individuals with both the lowest and highest levels of vitamin D and that health benefits are greatest at moderate concentrations in the body. The vitamin D levels among the IT (Information Technology) employees may have high possible chances to get lowered due to various factors. The changing nature of work, the amount of work, shifts in work

and duration of exposure to sunlight becomes more critical and these subjects are most likely to be affected. Previous research on nanoparticles [14,15] and this epidemiological survey would help in the future studies in application of nanoparticles as drug delivery systems. The aim of the present study is to assess the awareness of vitamin D deficiency among IT employees.

2. MATERIALS AND METHODS

A cross-sectional survey was conducted among the IT Employees using a questionnaire via online google form. 100 subjects (46 male participants and 54 female participants) were included in the study. The questionnaire was based on awareness of ill-effects of vitamin D deficiency, daily exposure to sunlight and practice of intake of vitamin D supplements. The questionnaire consisted of 10 open ended and closed ended questions. The questionnaire also included the demographic details of the participants. The results were collected and analysed.

3. RESULTS AND DISCUSSION

The present study included 100 participants out of which, 46 were male participants and 54 were female participants. The results conveyed that the majority of the IT employees were aware of the vitamin D deficiency. The results also conveyed that the female participants have more knowledge on vitamin D deficiency.

In the present study, 80.8% of the participants replied that people who work indoors were at a high risk of vitamin D deficiency and 19.2% of the participants replied that they do not think so (Fig. 1). 70.4% of the participants were aware that the most of the vitamin D required by the body is produced by direct exposure to the sunlight and 29.6% of the participants were not aware that most of the vitamin D required for the body is produced by direct exposure to sunlight (Fig. 2). 54.5% of the participants often face a lot of muscle pain during their work and 45.5% of the participants do not face muscle pain during their work (Fig. 3). 50% of the participants had knowledge that vitamin D deficiency causes skin cancer and 50% of the participants had no knowledge that vitamin D deficiency causes skin cancer (Fig. 4). 49.5% of the participants always felt tired and lazy at their working hours and 50.5% of the participants never felt tired or lazy

during the working hours (Fig. 5). 52.1% of the participants were aware that vitamin D supports lung function and cardiovascular health and 47.9% of the participants were not aware that vitamin D supports lung function and cardiovascular health (Fig. 6). 56.4% of the participants were not aware that vitamin D deficiency causes infertility problems and

43.6% of the participants were aware of infertility problems (Fig. 7). 77.6% of the participants responded that vitamin D supplements are required for vitamin D deficiency and 22.4% of the participants were not aware that vitamin D supplements are not required for vitamin D deficiency (Fig. 8).

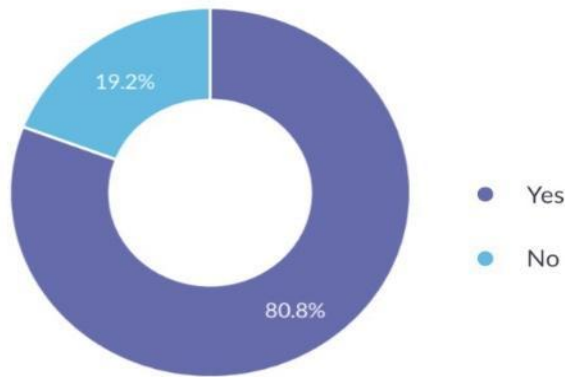


Fig. 1. Pie chart showing responses to the question about the people who stay indoors are prone to vitamin D deficiency. 80.8% of the respondents were aware that people who stay indoors are prone to vitamin D deficiency

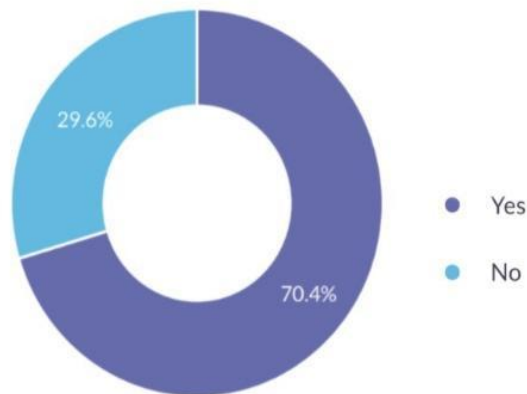


Fig. 2. Pie chart showing responses to the question about the awareness that most of the vitamin D required for the body is produced by direct exposure to sunlight. 70.4% of the respondents are aware that the vitamin D required for the body is produced by direct exposure to sunlight

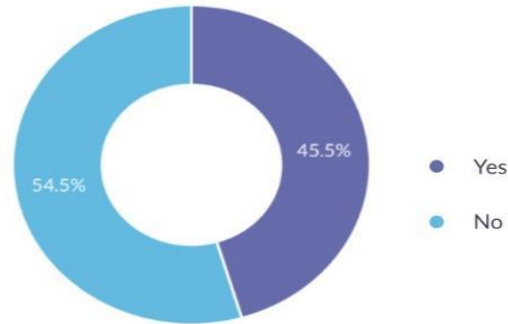


Fig. 3. Pie chart showing responses to the question about the muscle pain faced by the participants during the working hours. 54.5% of the respondents replied that they do not face muscle pain during the working hours

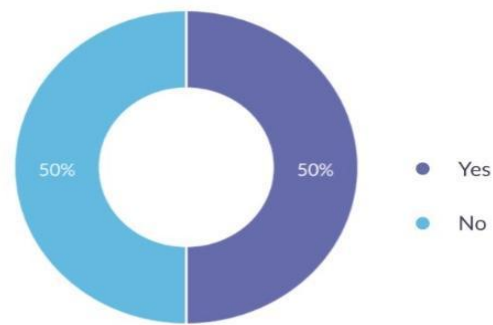


Fig. 4. Pie chart showing responses to the question about awareness on vitamin D deficiency causing skin cancer. 50% of the respondents were aware that vitamin D deficiency causes skin cancer

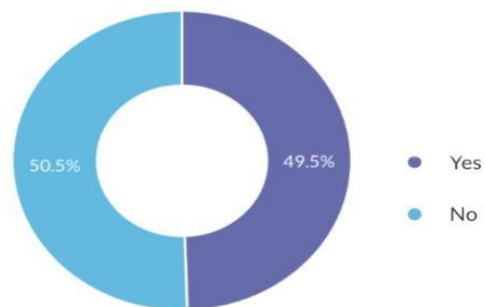


Fig. 5. Pie chart showing responses to the question about feeling of tiredness and laziness among the participants during the working hours. 50.5% of the respondents replied that they do not feel tired or lazy during the working hours

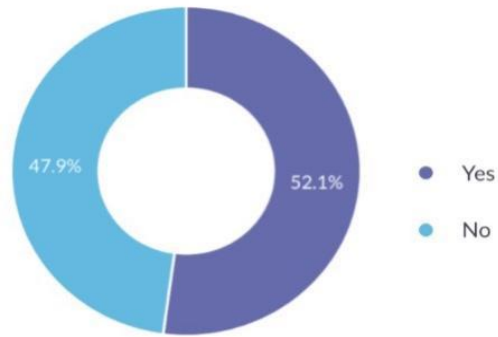


Fig. 6. Pie chart showing responses to the question about awareness on vitamin D supporting lung function and cardiovascular health. 52.1% of the respondents were aware that vitamin D supports lung function and cardiovascular health

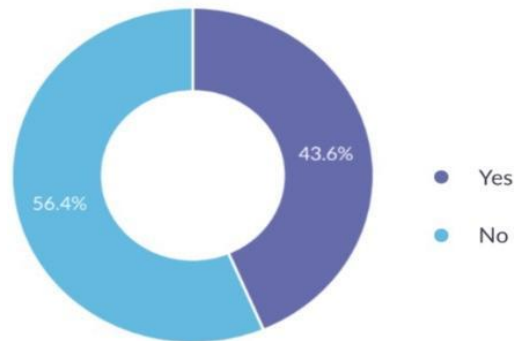


Fig. 7. Pie chart showing responses to the question about awareness on vitamin D deficiency causing infertility problems. 56.4% of the respondents are not aware that vitamin D deficiency causes infertility problems

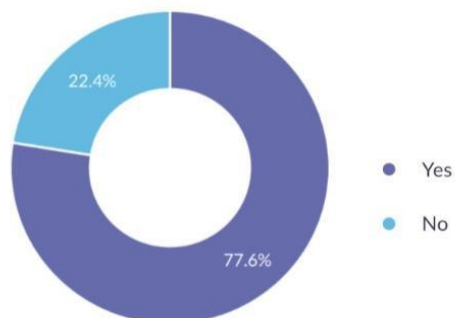


Fig. 8. Pie chart showing responses to the question about the intake of vitamin D supplements when the person is vitamin D deficient. 77.6% of the respondents are aware that vitamin D supplements can be taken when a person is vitamin D deficient

Vitamin D deficiency has been one of the major disease causing factors these days and maintaining the vitamin D levels has been a major issue in the current scenario. In the previous study conducted, 58.6% of the participants thought that people who work indoors are at a high risk of vitamin D deficiency than the people who work outdoors [15]. Difference considering the gender and the age of the person could be the result of biological differences but might also reflect behavioral differences, dressing styles, and especially, the eating habits are often mentioned as the reason for a higher prevalence of vitamin D deficiency among the IT employees. According to the previous research done based on the level of tiredness faced by the workers, majority of the workers (75%) always felt tired and lazy during the working hours [17]. Previous studies has also shown that the majority of the employees suffered from muscle pain frequently [18].

Researches based on the association between the vitamin D levels and the Covid-19 conveyed that the high levels of vitamin D strengthens the innate immunity and prevents overactive immune responses [19]. The recent researches suggest that the people who lack vitamin D are prone to Covid-19 [20].

4. CONCLUSION

Majority of the participants have a good knowledge and were aware of the vitamin D deficiency and its risk factors. Nearly half of the IT employees faced issues like muscle pain and laziness or tiredness during the working hours. The IT employees were not much aware that vitamin D deficiency causes infertility problems. A majority of the IT employees were well aware that vitamin D deficiency causes obesity and leads to depression.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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