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Planned teaching program creates awareness regarding prevention of Vitamin-D and Calcium deficiency in Children

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Effectiveness, knowledge, prevention of Vitamin D and Calcium Deficiency, mothers of under five children.

A B S T R A C T

Children are the most precious possessions of mankind and special gift to the world. Vitamin D deficiency is a common problem in India. The present study conducted to assess the effectiveness of planned teaching programme on knowledge regarding prevention of Vitamin D and Calcium deficiency in children among the mothers of under five children in selected urban area at Mangalore Dakshina Kannada. The sample size was 100 mothers of under five children. The sample selected by non-probability convenience sampling technique. The tool was used demographic proforma and structured knowledge questionnaire. The result showed that the mean and standard deviation of post test knowledge score of mothers of under five children (20.30 ± 3.040) was much greater than (8.41 ± 1.854) pre test. The calculated value $t_{99} = 35.31$ was greater than the table value $t = 1.66$ which indicates that planned teaching programme was effective on level of under five mothers knowledge and also study found that there was a significant association between the levels of knowledge with selected demographic variables. Hence the null hypothesis was rejected and research hypothesis was accepted.

Introduction

A child is a precious gift, who has lots of potential within, who can be the best resource of the nation if raised and molded in a good manner. The parents concern is great towards the health of a growing child. The physical health of a child is associated with the mental and social development.

Most of the children have not been protected over years and they remain as a group that is now most vulnerable, dependent and least powerful in India (Vidya R, 2004). Vitamin D is a vitamin that is important for good health. Like other vitamins we do get vitamin D from food.

Vitamin D is mostly made in the skin by exposure to sunlight. This is a good thing because; most of the food contains no or little vitamin D naturally. Foods that contain vitamin D include oily fish, cod-liver oil, egg yolk, liver. The main action of vitamin D is to help calcium and phosphorus in our diet, get absorbed into the gut. Calcium and Phosphorus are important to keep the bones healthy and strong. Growing children, pregnant women, breast feeding women need extra vitamin D for the growth. Calcium is a mineral that is essential for many aspects of health, including health of bones, teeth, and normal heart rhythm. The calcium is also required for muscle contractions and relaxation, hormone function and nerve stimulation, and blood pressure monitor. Calcium must be ingested daily and observed effectively in order to maintain optimal health. Foods that naturally contain calcium include dairy products and, green leafy vegetables, seafood, dried beans and nuts. High dietary calcium intake is necessary for infants, children and adolescents. Thus Vitamin D is an important hormone necessary not only for maintaining calcium balance and safeguarding skeletal integrity but also essential for overall well being of the health (SurajGupte,2010)

Vitamin-D deficiency causes rickets and osteomalacia due to inadequate exposure of sunlight, dietary calcium deficiency and fluoride interaction syndromes, these are commonest disorders responsible for bone disease and deformities, besides Vitamin D deficiency caused by endemic skeletal fluorosis. Vitamin-D deficiency causes rickets in children and osteomalacia in the mothers that are commonest disorders prevalent in the rural population of India(Bakhru HK,Bishoff FH,Boucher BJ et.al,1997).

Karnataka has a population of 45 million, the state has a literacy rate of (56%). The food consumption patterns reveal that cereals and millets are the main food items. The protective foods are consumed in less amounts. When compared with the Indian recommended dietary intake (RDI), the intake of energy in adults was found to be higher in the form of protein. The intake of vitamins was (50%) less than the recommended dietary intake(Vieth R,Bishoff FH,2007).

Nutritional Factors play a vital role in the bone homeostasis. Adequate calcium intake along with Vitamin D helps to maintain bone mineral mass attained at the period of growth. During infancy, childhood and adolescents, vitamin D and calcium status co- relate with increased bone mineral density and have the potential to increase the peak bone mass. Vitamin D deficiency in children is common and represents a global health problem. The deficiency of vitamin D causes “Rickets” in under five children. It reduces calcification of bones which affect the growth of bones and causes deformity of bones, such as- Curved legs, Pigeon chest, Rickets rosary and deformed pelvis. And also delay in teething, walking and standing. The term “Rickets” is thought to be derived from either the English word ‘Wrick’ meaning to twist or from the Greek word ‘Rachitic’. The essential lesion is an excess of osteoid tissue, which lacks mineralization in growing bones. The two main factors that are responsible for causing rickets-(Vitamin-D and Non-vitamin deficiency rickets)(Parul data,2007).

From last 20 years nutritional rickets has been described in atleast 59 countries. It causes spectrum change in different regions of the world. A systematic review of articles on nutritional rickets from various

geographical regions published in the last 20 years. The information about prevalence and causes of rickets were extracted. Calcium deficiency is the major cause of rickets in Africa and parts of Asia(Wagner CL. Greer FR,2008).

India has drawn attention towards the wide prevalence of vitamin D deficiency (VDD) in our country. It is reported in all age groups including the newborn to the old age residing in rural and urban India. It is also reviewed from Indian studies on skeletal health implications of VDD in our population based on the preliminary data. And also beside a brief review is made on the importance of VDD in various other disorders prevalent in equivalent proportion among Indians such as type 2 diabetes mellitus (DM), cardiovascular diseases (CVD), immune suppressive infection like tuberculosis and osteo arthritis. Data reveals that the west is also associated to VDD with higher prevalence in type 2 DM, auto-immune disorders, tuberculosis, prostate, breast and colon cancer. Overall results of various studies conducted to date in urban and rural Indian studies indicate a widely prevalent deficiency in skeletal health including osteomalacia and rickets. Hence there is a need to explore its association with osteoporosis related fractures and various other non skeletal disorders linked with VDD (Goswami R. Misra K. Kochupillai N,2008).

Vitamins are important for maintaining normal growth, regulating cellular proliferation, controlling development and reproductive function. It is essential for children because Vitamin D promotes growth and development both physical and mentally (Gulani K.K,2005)

Vitamin D deficiency causes Rickets, it is the classical disease in children. It is also

essential for absorption of calcium from gut, maintaining adequate serum calcium concentration that enables normal mineralization of bone and prevents hypocalcemic tetany in children. It results in dietary inadequacy, impaired absorption when usual intake is lower than recommended time, exposure to sunlight is less and kidneys cannot convert Vitamin D to its active form or absorption of vitamin D from the digestive tract is less (Indrani TK,2007).

Prolonged exclusive breastfeeding without the AAP-recommended vitamin D supplementation is a significant cause of rickets, particularly in dark-skinned infants breastfed by mothers. Other causes of rickets include more use of sunscreen and keeping of children in the day care centre. It is more in immigrants from countries like Middle East, because of genetic difference (Balasubramanian S.Ganeshan.,2008)

Vitamin D requirements may not be met by human milk alone, it provides only about 25 IU/L. A recent study shows that nutritional rickets found that in majority of cases occurred among infants in African Americans. The sun is a potential source and AAP advises keeping infants out of direct sunlight and protecting them by clothing and sunscreen. As AAP recommends that exclusively and partially breastfed infants be supplemented with 400 IU of vitamin D per day. Homely individuals, people living in Northern latitudes women wearing a long sleeves and head covering for religious reasons, occupations which protect to get adequate vitamin D (Bhalala U. Desai p. Mokel R,et.al,2007).

Nutritional rickets is gaining the attention of public health professionals and individual clinicians worldwide especially in the developing countries, and has re-occurred in developed countries where it is

eradicated. Interest has been heightened by considerable discussion currently taking place about what should be the ideal or appropriate circulating levels of 25-hydroxy Vitamin D in the developing countries and habitual calcium intakes of (25-33%) are the recommended intakes(Fischer PR, Thatcher TP, et al 2008)

Vitamins are micronutrients required as nutrients in tiny amounts which are essential for proper body functioning. They aid the body in functions that promote growth, development, reproduction, digestion, disease reduction, and overall health and life maintenance. Each vitamin has its own role. If the body is deficient in any one of them, it comes at risk for a host of diseases and disorder (Teotia SP,Teotia,2008)

Vitamin D deficiency is a common problem in India due to several factors: they are changing food fads and food habits that contribute to low dietary calcium and Vitamin D intake and high fiber diet containing phosphates and phytates which can deplete Vitamin D stores and increase calcium requirement. Vitamin D deficiency causes Rickets, manifestations are bowed legs, muscle spasms, pain in the pelvis, lower back and legs, and abnormal bone shape, size, and calcification (Miyako K. Kinjo S,2005)

Under five children focus an important segment of the Indian population. Under five contribute to the vital human potential and impart strength to the National economy and development (Jones G,2008). Vitamin D maintains blood calcium level in normal range, which is vital for normal function. Breast milk is a perfect food, since it contains all nutrients in adequate quantities including Vitamin D and

calcium. Exclusive breast feeding is recommended upto six months of age with all its beneficial effects on child survival globally as many as 1.45 million lives are lost due to suboptimal, 1.3 million deaths can be prevented in 42 high mortality countries by increasing the level of breast feeding amongst infants. Lack of awareness about food, ignorance about nutritious food and neglect caused by malnutrition affects many children. Children of poor family may grow up properly if they had sufficient breast-feeding at first six months after birth. After the first six months, the infants should be given sufficient nutrients for their growth, otherwise growth may hamper causing physical and psychological problems (AgarwalKS.,Mughal MZet al, 2002).

Calcium is the most abundant mineral in the human body and has several important functions, and it is called top macro mineral of the bones. It helps to build strong bones and is the primary structural constituent of the skeleton. Dietitians and dentists recommend that children should meet their calcium needs by eating dairy foods and having a balanced diet. Severe calcium deficiency will lead to diseases like rickets and osteoporosis (Suraj Gupta,2010).

An article on Nutritional bone diseases in Indian population reveals that there were 47,500 calcium deficient children in 22 states of India during the period of 2005. Calcium deficiency, rickets in children and osteomalacia any mothers are the commonest disorders prevalent in the urban population of India. These disorders are largely responsible for the morbidity and mortality in the young and promising individuals, with economic consequences (Ford JA,1974).

A descriptive study conducted to estimate the daily dietary calcium intake of both urban and rural population was compared with that of recommended daily dietary allowance (RDA) issued by Indian Council Of Medical Research(ICMR) Dietary calcium and phosphorus were significantly lower ($p < 0.0001$) in both rural and urban children. The Vitamin D 25 (OH) in blood levels of both the urban and rural children were low (Brehm,2010)

In developing countries, over one million humans have insufficient circulating levels of calcium and the dietary insufficiency of calcium is common. Globally nutritional rickets is most common non-communicable disease of children. Rickets is due to the primary deficiency of calcium. It is also linked to non-skeletal complications. Even without laboratory and radiological resources, the diagnosis of rickets is considered clinically, when a child presents with limb deformities and has beaded ribs and widened wrists and ankles. Prevention is possible through dietary enhancement (Huckleberry J. Marilyn, 2008).

It has been estimated that one million children worldwide have vitamin-D deficiency. Studies found that the prevalence of rickets in under five children in UK, The prevalence of vitamin-D insufficiency in under five children is 14.5%. 76% of pregnant mother are severely causing vitamin D deficiency in their unborn children which predisposes them to type one-Diabetes, Arthritis, Multiple-sclerosis and it has been estimated that one million children worldwide have vitamin-D deficiency. Rickets is a public health problem in Bangladesh during the past two decades. Upto eight percent of children are clinically affected in some areas. Effective preventive measures that can feasibly reach entire communities are

needed and these may differ between various affected regions (Huckleberry J. Marilyn.2008)

Vitamin-D deficiency rickets and osteomalacia caused by inadequate exposure of sunlight, dietary calcium deficiency and fluoride interaction syndromes, were commonest disorders responsible for bone disease and deformities, besides caused by endemic skeletal flurosis as a single entity in endemic flurosis villages.Vitamin-D deficiency that causes rickets in children and osteomalacia in the mothers that are commonest disorders prevalent in the rural as well as urban population of India(Khandare AL,Sivakumar B 2005).

Objectivs of the Study

To assess the pre-test knowledge score regarding prevention of Vitamin D and Calcium deficiency in children among the mothers of under five children.

To find out the effectiveness of Planned Teaching Programme on knowledge regarding prevention of Vitamin D and Calcium deficiency in children among the mothers of under five children.

To find out association between pre-test knowledge score of the mothers regarding prevention of Vitamin D and Calcium deficiency in children with Demographic variables.

Hypothesis

H₁: There will be significant difference between the mean pre-test and mean post-test knowledge score of mothers regarding prevention of Vitamin D and Calcium deficiency.

H₂: There will be significant association between the pre-test knowledge score with selected demographic variables.

Materials and Methods

An evaluative approach with pre-experimental, one group pre-test and post-test design was adopted to assess effectiveness of planned teaching programme on knowledge regarding prevention of Vitamin D and Calcium deficiency in children among the mothers of under five children. The sample comprised of 100 mothers in selected urban area of Mangalore. The ethical clearance obtained from concerned authority. The samples were selected using convenience sampling technique. The reliability coefficient was calculated by using Karl Pearson's co-relation co-efficient, split half method. The reliability co-efficient was found to be ($r_{(10)} = 0.9$) to get the co-operation of the mothers of under five mothers, self-introduction and orientation about the investigators study topic. The participants were explained and consent was obtained from the study participants. The participants were assured about confidentiality of their responses. Data was collected using demographic proforma and structured knowledge questionnaire. Data was analyzed using descriptive and inferential statistics.

Results

Section I: Sample Characteristics

Majority (36%) of under five mothers age is between 26-30 years and were of Muslim religion (62%) Majority (63%) of under five mothers had primary education and were house wife (51%). Majority (70%) of mothers monthly income was between Rs.5, 001-10,000 and were of belongs to nuclear family. Majority (72%) of mothers had one under five child and all were Non-

vegetarian. (72%) majority (42%) of mothers received information from mass media.

Section II: Level of knowledge of the samples on prevention of Vitamin D and Calcium deficiency in children

The data in table 1 represent that in pre-test (88%) mothers were had inadequate knowledge and (12%) were had moderate knowledge and none of them were had adequate knowledge.

In post-test (50%) mothers were had adequate knowledge, (49%) were had moderate knowledge and (1%) were had inadequate knowledge

Figure 1 denotes that in the pre-test mean score was highest in the knowledge aspect of calcium (37.75%) and lowest in the aspect of Prevention of vitamin D and calcium deficiency (26.36%).

Figure 2 denotes that in the post-test mean score was highest in the knowledge aspect of calcium (71.25%) and lowest in the aspect of Vitamin D (62.38%).

Section III: Effectiveness of planned teaching programme on prevention of Vitamin D and Calcium deficiency in terms of gain in knowledge scores

Table.2 shows that the mean and standard deviation of post-test knowledge score of mothers (20.30 ± 3.040) was much greater than pre-test value (8.42 ± 3.040). The calculated' value ($t_{99} = 35.31$) was greater than the table value 1.66 at 0.05 level of significance. The result found that calculated' value is greater than table value. This indicates that planned teaching programme was effective in improving knowledge of samples. Hence the research hypothesis is accepted and null hypothesis was rejected.

Table .1 Frequency and percentage distribution of pretest and post-test knowledge scores of the samples

SL.No	Level of knowledge	Score	Pre-test		Post-test	
			f	%	f	%
1	Inadequate	0-10 (0-33%)	88	88	1	1
2.	Moderate	11-20 (34-66%)	12	12	49	49
3.	Adequate	21-30 (67-100%)	-	-	50	50

Fig.1 Distribution of pre-test knowledge scores of the samples

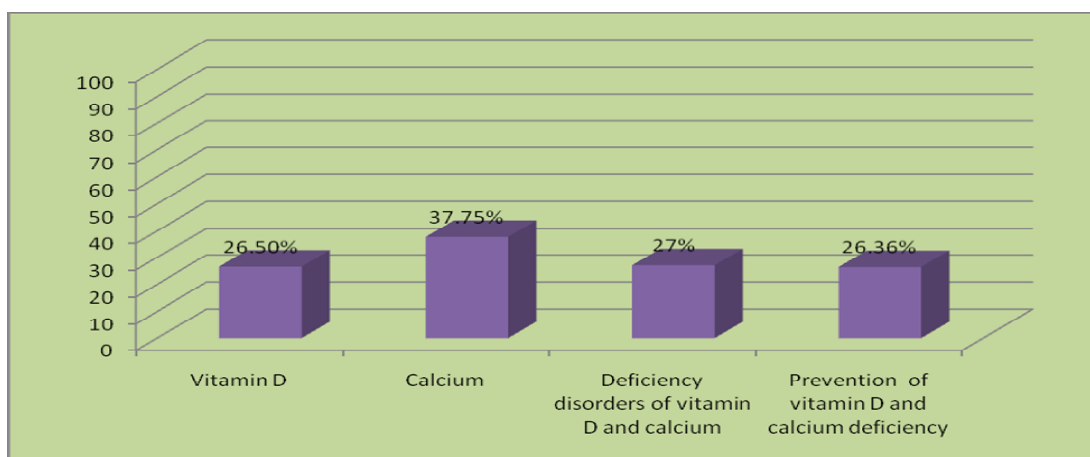


Fig.2 Area wise distribution of post-test knowledge scores of the samples

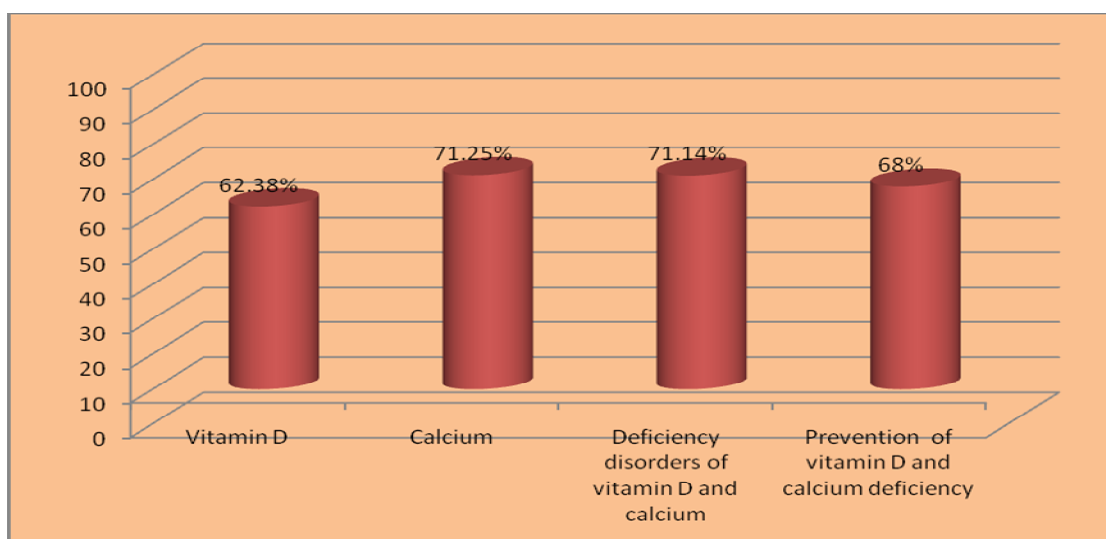


Table.2 Comparison of overall Mean, Standard deviation, Mean percentage and ‘t’ value of pre- test and post-test knowledge scores

Groups	Mean	±S.D	Mean%	‘t’ value
Pre- test	8.42	1.854	28.06	35.31*
Post- test	20.30	3.040	67.66	

N=100

$t_{(99)} = 1.66; p < 0.05; *$ significant

Section IV: Association between level of knowledge of sample on prevention of Vitamin D and Calcium deficiency in children and the selected variables

There was an association between pre-test knowledge scores with selected demographic variables on sources of information. Hence the null hypothesis is rejected and research hypothesis is accepted.

The findings of the study were discussed under Sample characteristics. Findings related to effectiveness of planned teaching programme and association between knowledge scores and selected demographic variables. It was supported by similar study conducted to assess the Vitamin D deficiency in a Manitoba community. Result showed that majority (34%) of the under-five mother’s between 22-34 years and were majority (67%) of the under-five mother had education upto graduate level. Majority (78%) were consuming non-vegetarian(Lebrun JB.1993)

It was supported by a similar study conducted to assess the effectiveness of planned teaching programme on mothers, which revealed that the obtained, the mean percentage of response was 44.6% with the mean SD 13.38±1.93 was increased to 93.23 with mean and SD of 27.97±71 in the post-test. The PTP was effective in improving the knowledge of the mothers

(Suraj Gupte.2010)It was supported by study conducted in Bihar and it was found that the Predictors of knowledge of mothers on Vitamin D and Calcium deficiency in children were low. It shows that there is an association between knowledge of mothers with source of information Khandare AL, Harikumar. *et al.*, 2005).

Conclusion

In the present study, samples were benefited with planned teaching programme on Vitamin- D and Calcium deficiency in children. This study concludes, that the planned teaching programme was effective in altering the knowledge of the mothers of under five children. Awareness campaigns can be conducted on regular basis with more emphasis on Vitamin D and Calcium deficiency and its prevention. Nurses must have responsibilities to create awareness among mothers to meet the challenges in preventing such deficiencies.

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