| Time | Narration |
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| 00:00 | Welcome to the **spoken tutorial** about the importance of **vitamin B12**. |
| 00:06 | In this tutorial, we will learn about: |
| 00:09 | Role of **vitamin B12** in the body. |
| 00:13 | Causes and symptoms of its deficiency. |
| 00:17 | Food sources rich in **vitamin B12**. |
| 00:21 | **Vitamin B12** is an important **B vitamin** and is naturally present in some foods. |
| 00:29 | It is water soluble and is also known as **cobalamin**. |
| 00:35 | Some amount of it can be produced by the good bacteria in our intestine. |
| 00:41 | Supplements of this **vitamin** are also available in the market. |
| 00:47 | Please consult your doctor before taking **vitamin B12** supplements. |
| 00:53 | **Vitamin B12** plays many important roles in our body. |
| 00:58 | It is required for proper red blood cell formation and for **DNA** synthesis. |
| 01:06 | This **vitamin** is particularly important for women of child bearing age. |
| 01:13 | Adequate **vitamin B12** intake helps to prevent **neural tube** defects. |
| 01:20 | **Neural tube** defects are birth defects of the brain or spinal cord. |
| 01:26 | To avoid this defect, along with **vitamin B12**, **folate** and **choline** are also needed. |
| 01:35 | Importance of **folate** and **choline** have been discussed in another tutorial. |
| 01:42 | To know more, please visit our website. |
| 01:46 | **Neural tube** defects can result in physical disabilities in the child. |
| 01:52 | Muscle weakness of the legs and |
| 01:55 | paralysis may also happen. |
| 01:58 | Curved spine and loss of urinary bladder control are other symptoms. |
| 02:06 | Difficulty in eating and swallowing is also found to be common. |
| 02:12 | Another function of **vitamin B12** is brain development in children. |
| 02:20 | It helps to improve many brain related functions. |
| 02:25 | For example: attention span, |
| 02:28 | memory,<br>planning and |
| 02:30 | problem solving. |
| 02:32 | **Vitamin B12** also converts **folate** into its active form. |
| 02:39 | **Folate** is required in its active form to carry out various roles in the body. |
| 02:46 | For example: growth, |
| 02:49 | repair and |
| 02:51 | production of new cells in the body. |
| 02:54 | The absorption of **B12** is also important for it to carry out all these functions. |
| 03:03 | I will briefly tell you the way it is absorbed in the body. |
| 03:08 | **Vitamin B12** in the food is attached to a **protein**. |
| 03:14 | For the body to absorb **vitamin B12**, two steps are essential. |
| 03:21 | Firstly, the acid in the stomach separates **vitamin B12** from that protein. |

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| 03:28 | The stomach then secretes another protein called **intrinsic factor**. |
| 03:34 | **B12** then attaches to the **intrinsic factor** |
| 03:38 | and gets absorbed in the intestine. |
| 03:42 | Inadequate absorption of **vitamin B12** can result in it’s deficiency. |
| 03:49 | For example, absorption is affected in people having **pernicious anemia**. |
| 03:57 | In this condition, the body is unable to produce the **intrinsic factor** protein. |
| 04:04 | **Intrinsic factor** is crucial for the absorption of **vitamin B12**, as explained earlier. |
| 04:13 | Inadequate absorption can be due to several other reasons also. |
| 04:19 | For example, due to growth of bad bacteria or |
| 04:24 | inflammation in the intestine. |
| 04:28 | Gastric bypass surgery also reduces absorption of **vitamin B12**. |
| 04:35 | Intestinal worms also affect the **vitamin B12** levels. |
| 04:41 | These worms take up **vitamin B12** from our blood |
| 04:46 | and cause its deficiency. |
| 04:49 | Hence, regular deworming should be done after consulting a doctor. |
| 04:54 | Another reason for **B12** deficiency is insufficient intake. |
| 05:02 | Older men and women above 65 years of age may have a very low intake. |
| 05:10 | Low intake is seen in vegetarians |
| 05:13 | and those who avoid milk and milk products. |
| 05:17 | **Vitamin B12** deficiency may sometimes go undetected in vegetarians. |
| 05:24 | This is because their diets can be usually rich in **folate**. |
| 05:30 | Excessive **folate** may mask the early symptoms of **B12** deficiency like anemia. |
| 05:38 | As a result, nerve damage may progress. |
| 05:42 | This might get detected only when deficiency gets severe. |
| 05:48 | Hence, adequate intake of both **folate** and **vitamin B12** is necessary. |
| 05:57 | Recommended **folate** intake and its food sources is explained in another tutorial. |
| 06:04 | Let us now look at the symptoms of **vitamin B12** deficiency. |
| 06:12 | Soreness of the tongue and mouth ulcers are common symptoms. |
| 06:17 | Inflammation of the stomach can also occur. |
| 06:21 | Anemia is another common symptom of **B12** deficiency. |
| 06:27 | It is a condition in which there is a lack of enough healthy red blood cells. |
| 06:35 | Red blood cells carry adequate **oxygen** to the body's tissues. |
| 06:41 | Pallor, fatigue and shortness of breath are indications of anemia. |
| 06:48 | Reduced appetite, |
| 06:51 | diarrhea |
| 06:54 | and jaundice is also seen. |
| 06:58 | Severe deficiency of **B12** damages the **myelin sheath**. |
| 07:04 | **Myelin sheath** is a protective layer surrounding the nerves. |
| 07:08 | Hence, the nervous system is affected. |
| 07:14 | In babies this can result in **Infantile tremor syndrome**, also known as **ITS**. |
| 07:23 | It occurs in babies breastfed by vegetarian mothers who also avoid dairy. |
| 07:31 | Dairy items include milk and milk products. |
| 07:37 | One of the main characteristics of **ITS** is tremors. |

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| 07:42 | These tremors are jerky and can be intermittent or continuous. |
| 07:49 | Pale face, thin and scattered dry hair are other characteristics. |
| 07:56 | Dark skin pigmentation is also seen on the knees, elbows and knuckles. |
| 08:04 | Such babies are irritable and show little interest in the surroundings. |
| 08:11 | They stare blankly without any expression. |
| 08:15 | **B12** deficiency can delay mental and physical development in children. |
| 08:23 | They may have difficulty in learning and paying attention. |
| 08:28 | In adults, there may be poor reflex action |
| 08:32 | and impaired balance and coordination. |
| 08:36 | Tingling or prickling sensation in hands or legs can also happen. |
| 08:42 | Confusion and seizures are other symptoms. |
| 08:47 | Vision and memory also get affected due to deficiency. |
| 08:54 | Hallucinations, lack of concentration and depression can also occur. |
| 09:00 | **Vitamin B12** deficiency increases the risk of heart diseases too. |
| 09:07 | Chest pain and slurred speech may occur. |
| 09:11 | I will explain to you how this occurs. |
| 09:17 | **Vitamin B12** is essential for conversion of **homocysteine** to **methionine**. |
| 09:25 | **Homocysteine** and **methionine** are types of **amino acids** used to make **protein**. |
| 09:33 | Elevated **homocysteine** levels can damage the heart. |
| 09:38 | With the help of **B12**, **homocysteine** gets converted to **methionine**. |
| 09:45 | In this way, **homocysteine** levels in the body gets lowered. |
| 09:52 | Thus, protecting our heart from damage. |
| 09:56 | To avoid deficiency, adequate intake of **vitamin B12** is recommended for all ages. |
| 10:06 | For babies of 6 to 12 months, 1.2 microgram per day is recommended. |
| 10:13 | 1.2 microgram is also recommended for 1 to 6 year old children. |
| 10:22 | For children above 7 years and for adolescents it is 2.2 micrograms. |
| 10:31 | Adult men and women should also have 2.2 micrograms per day. |
| 10:39 | The requirements are higher for pregnant and lactating women. |
| 10:46 | 2.45 micrograms per day is recommended for pregnant women. |
| 10:53 | 3.2 micrograms per day is recommended for lactating mothers. |
| 11:00 | The required amount of **vitamin B12** can be met through diet |
| 11:05 | and supplements. |
| 11:08 | **Vitamin B12** is found in animal based foods. |
| 11:13 | Fish, chicken, meat and eggs are good sources of **vitamin B12**. |
| 11:22 | One egg has about 0.6 microgram **vitamin B12**. |
| 11:28 | Eighty five grams of goat meat has about 2.3 micrograms of **vitamin B12**. |
| 11:38 | Eighty five grams of chicken has about 0.3 micrograms of **vitamin B12**. |
| 11:47 | Shellfish, liver, kidney, and heart are also excellent sources. |
| 11:54 | 50 grams of goat liver has about 45 micrograms of **vitamin B12**. |
| 12:02 | 50 grams of clams has 49 micrograms. |
| 12:08 | Please note that shellfish should not be given to children below 1 year of age. |
| 12:15 | Milk and milk products also contain **vitamin B12**. |
| 12:20 | A 250 millilitre glass of milk has about 0.3 microgram of **vitamin B12**. |

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| 12:30 | 150 grams or a bowl of curd has nearly 0.2 microgram. |
| 12:37 | Apart from food sources, maintaining a healthy gut is also important. |
| 12:44 | A healthy gut improves the **vitamin B12** absorption in the body. |
| 12:51 | Vegetarian foods have none or minimal amounts of **vitamin B12**. |
| 12:57 | However, it can be enhanced in some ways. |
| 13:02 | For example, by sprouting |
| 13:05 | and fermentation. |
| 13:07 | Soaking and roasting is also recommended. |
| 13:12 | All this helps in reducing the **antinutrients** from the food. |
| 13:18 | **Antinutrients** inhibit the absorption of some nutrients in our body. |
| 13:25 | Examples of **antinutrients** are **oxalates** and **phytates**. |
| 13:31 | Have adequate intake of **vitamin B12** |
| 13:35 | and maintain a healthy gut for a good health. |
| 13:39 | This brings us to the end of this tutorial.<br><br>Thanks for watching. |