Vitamin D and Depression: A patient friendly summary

What is depression?
The symptoms of depression can come on gradually and you may not realize how depressed you are. Sometimes a friend or family member will be the one to notice how your behavior and personality have changed. Sometimes the symptoms of depression can be physical and you may think you’re just under the weather or tired.

Below are some of the main symptoms of depression (you may not have all of these). You:
- Lose interest in life and can’t enjoy anything
- Find it difficult to make decisions or concentrate
- Feel unhappy most of the time
- Feel tired and have problems sleeping
- Lose confidence and self esteem
- Avoid being with other people
- Feel numb, despairing and empty

If you have these symptoms, and they have lasted for more than a few weeks, talk to your physician.

How common is depression?
Depression is a common condition. In the United States around one in 10 people has depression and around one in three of these will have it severely. Depression is more likely for some groups of people. You’re more likely to have depression if you:
- Have a long term health problem, such as diabetes, heart disease or arthritis.
- Lead an unhealthy lifestyle, for example if you smoke, drink heavily, are inactive or overweight.
- Are female
- Are between 45-64 years of age
- Are black or Hispanic

What causes depression?
Depression can be caused by a number of different things. Sometimes there is one main cause, such as the death of a loved one, but sometimes a number of different things may play a part. The causes are different for different people. The main causes of depression are:
- Major changes in your life, such as divorce, changing your job, moving home or the death of a loved one.
- Physical illness – particularly life threatening illness such as cancer, painful conditions such as arthritis and hormone problems such as an underactive thyroid gland.
- Your circumstances – being alone or stressed for example.
- Depression in your family – if your parent that has depression you’re much more likely to have it yourself.
- Your personality – some people seem to be more vulnerable to depression. This may be because of their early life experiences or their genes.
- Regular heavy drinking.

What is the link between depression and vitamin D?
Vitamin D is important for good bone health and researchers are now discovering that vitamin D may be important for many other reasons. It plays an important role in many of the functions of the body, including brain development.

Receptors for vitamin D have been found in many parts of the brain. Receptors are found on the surface of a cell where they receive chemical signals. By attaching themselves to a receptor, these chemical signals direct a cell to do something, for example to act in a certain way, or to divide or die.

Some of the receptors in your brain are receptors for vitamin D, which means that vitamin D is acting in some way in your brain. These receptors are found in the areas of your brain that are linked to the development of depression. For this reason vitamin D has been linked with depression and with other mental health problems.

Exactly how vitamin D works in your brain isn’t fully understood. One theory is that vitamin D affects the amount of chemicals called monoamines (such as serotonin) and how they work in your brain. Many anti-depressant medicines work by increasing the amount of monoamines in your brain. Therefore researchers have suggested that vitamin D may also increase the amount of monoamines, which has an effect on depression.

What does the research say in general about vitamin D and depression?
The amount of research about vitamin D and depression, and other mental health problems, is growing. This is a complex research area and it’s only recently that large studies on vitamin D and depression have been carried out.

The research in this area has given some mixed and conflicting results. One of the reasons for this is that there are very few research studies where it’s possible to compare like with like. Researchers:
- use different amounts of vitamin D supplements for different lengths of time
- judge the effectiveness of treatment using different vitamin D blood levels
- test different groups of people in their studies
- measure depression and mental health in different ways
- give vitamin D at different frequencies- in some studies people are asked to take vitamin D every day, where as in other studies people take vitamin once a week.

In some research studies, the amount of vitamin D given has been small, much less that the 5000 IU a day that the Vitamin D Council recommends. This means that in these research studies the small dose may affect whether there is any effect on the symptoms of depression.

Because of all the differences in research studies, and because this is a relatively new area of research, it’s very difficult to say with any certainty what role vitamin D has in either preventing or treating depression.
So, what does recent research say?

These are three good quality research studies from the last few years that look specifically at vitamin D and depression.

A **2008 research study from Norway** looked at whether there were any links between the level of vitamin D in someone’s blood and depression, and whether taking vitamin D supplements had any effect on the symptoms of depression. The main results were:

- Those who started the study with a low level of vitamin D in their blood had more symptoms of depression.
- Those people who were given vitamin D found that their symptoms of depression improved, though the improvement was small.
- Those who were given the larger amount of vitamin D had the largest improvement in their symptoms. The improvement in symptoms was biggest in those people who had the highest scores for depression at the start of the study.

A good amount of vitamin D supplement was used in the study. However, the research only looked at people that were overweight, so it’s not possible to say whether the results would be similar for everyone. All of the participants also took a calcium supplement, and the researchers suggest that this could have affected the results, for example that it is vitamin D and calcium working together, rather than just vitamin D, that effects depression.

A **second research study from Norway** looked at whether the symptoms of depression were related to vitamin D blood levels. The study also looked at whether taking a vitamin D supplement affected the symptoms of depression in people that had low vitamin D levels. The results showed that:

- low levels of vitamin D in the body are linked to the symptoms of depression
- when people with low vitamin D levels took a supplement, it improved their vitamin D levels, but had no effect on their symptoms of depression
- low vitamin D levels could be the result, rather than the cause of depression

Although this study used a good amount of vitamin D supplement, it lasted for only six months. The researchers suggest that because depression is a condition that tends to develop slowly and last a long time, a longer study might have shown different results. Those who took part also had either no symptoms of depression or very mild symptoms, and this may have influenced the results.

A study published in 2012 from researchers in the United States looked at the effects of a daily dose of vitamin D and calcium on the symptoms of depression in older women. The results showed that:

- although levels of vitamin D had increased in those women taking a supplement, there was no difference in depression symptoms between those women who took vitamin D and those women who took dummy tablets.

This study looked at a very large group of women and is the first study of this kind to do so. The researchers suggest that the amount of vitamin D that the women took may have been too small to have an effect on the symptoms of depression. The participants taking vitamin D also took a calcium supplement, and the researchers suggest that this could have affected the results, for example that it is vitamin D and calcium together, rather than just vitamin D, that effects depression.

**Key points from research**

- Research hasn’t yet shown clearly whether low vitamin D levels cause depression, or whether low vitamin D levels develop because someone is depressed.
- Lack of vitamin D may be one of many factors that contribute to a depressed mood. There may be many other things that cause depression, which means it’s difficult to say for certain that when depression improves it is vitamin D that is causing the improvement.
- The effects of vitamin D on depression may take a long time to work, years for example. This means that research carried out over short periods of time may not show any impact of vitamin D on depression.
- People who have depression go outdoors less, so they are less likely to have good amounts of vitamin D in their blood.
- Some researchers have suggested that giving vitamin D supplements may work for depression when someone has very low levels of vitamin D to begin with. Taking a vitamin D supplement may work less well for people who already have good vitamin D levels.
- Taking vitamin D may only have a role to play if you’re already depressed.

**What does this mean for me?**

Research does seem to show that there is a link between vitamin D and depression. However, we don’t know exactly what that link is.

Research has not yet shown clearly whether low levels of vitamin D cause depression, or whether depression causes low levels of vitamin D. This means that we don’t know whether taking a vitamin D supplement, or getting more vitamin D by exposing your skin, will help to ease the symptoms of depression or prevent depression.

If you have depression and want to take vitamin D, it is unlikely to make your symptoms worse or cause you any harm (as long as you’re taking less than 10,000 IU/day). However, you may not see any improvement in your symptoms either.

If you have depression you shouldn’t take vitamin D in place of other treatments or anti-depressant medicines. Speak to your physician for more advice about treatments and taking supplements.

3. Depression. MIND. http://www.mind.org.uk/help/diagnoses_and_conditions/depression