

Risks of Vitamin B12 Deficiency in Pregnancy

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Vitamin B12 is an essential water-soluble vitamin which is of crucial importance for blood formation, the functions of the nervous system, the integrity of the mucous membranes of the gastrointestinal tract and the regulation of numerous other B12-dependent metabolic processes. This applies to all stages of life and it is therefore not surprising that a deficiency of vitamin B12 during pregnancy can also have significant effects on the development of the child.

It is well-known that the frequency of vitamin B12 deficiency is underestimated in practice. This is based primarily on the repeated statements that the population in Germany has a sufficient supply of vitamin B12.

Representative data on the current status of the eating habits in Germany is provided by the National Nutrition Survey II (2008) [6]. In this study the vitamin supply in Germany was also analysed. The analyses show that for women of all age groups there are a significant proportion of individuals whose intake of vitamin B12 is insufficient.

Number of women in per cent whose intake of vitamin B12 in their food is below the reference values [6]

Gender	Age in Years				
	19-24	25-34	35-50	51-64	65-80
Women	32.7	26.4	24.5	23.0	26.3

This means that the daily diet of a significant number of women of childbearing age represents a risk of B12 deficiency states of clinical significance due to malnutrition. In addition, there are risk groups for B12 deficiency resulting from disturbances to the intake and/or utilisation of vitamin B12. Furthermore, it has to be taken into account that vitamin B12 requirements during pregnancy - at 3.5 µg/day - and when breastfeeding - at 4.0 µg/day - are significantly higher than those of 3.0 µg/day for women of the same age who are not pregnant.

Vitamin B12 deficiency during pregnancy has significant impacts on the development of the foetus and the health status of the newborn child [2][3][5]. Due to the insufficient availability of vitamin B12, the infant may suffer from serious haematological and neurological disorders, which may be associated with lasting consequences for the development of such children. The resulting disorders are non-specific and initially only become apparent during pregnancy as a result of delays to fetal development. The neurological symptoms of such infants may be irritability, apathy, lack of appetite, vomiting, a lemony discolouration of the skin, as well as disturbed motor and mental development. The haematological disorders consist in

the development of megaloblastic anaemia, or even serious blood formation disorders in the form of pancytopenia. The symptoms are pronounced to a very different extent from case to case and are often not associated with vitamin B deficiency early enough.

It is essential to bear in mind the consequences of pernicious anaemia of the mother during pregnancy with respect to neurological disorders in the infant. *Korenke et al.* [4] provided an overview of this, describing a case of severe acute encephalopathy, epilepsy, microcephaly and megaloblastic anaemia in a four-month-old infant. The vitamin B12 deficiency of this infant was attributable to subclinical pernicious anaemia of the mother. As a result of the immediate treatment of the infant with vitamin B12, the epileptic seizures disappeared within 24 hours. However, considerable cerebral damage had already occurred with a reduction in the myelin. Numerous other cases underline the importance of these consequences of vitamin B12 deficiency [1].

The underlying mechanisms are the delayed myelination or demyelination of nerves, changes to the S-adenosylmethionine/S-adenosylhomocysteine ratio. Furthermore, an imbalance in neurotrophic and neurotoxic cytokines and / or the accumulation of lactate in the brain cells are under discussion as possible causes.

The disorders can be largely corrected by treating the infants with vitamin B12. Unfortunately, in the case of serious B12 deficiency and delayed treatment, it is possible that further developmental disturbances will occur which are then more difficult to treat. It is therefore more important to prevent B12 deficiency during pregnancy by the adequate supply of this vitamin than to subsequently correct the undesirable developments once they have occurred.

While for cyanocobalamin and methylcobalamin no risks are to be expected as a result of a possible overdose, the intravenous administration of hydroxycobalamin should be more restrained, as it has a long half life and is retained for a long time.

Bibliography:

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