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Effect to Iron Deficiency Anemia on Cognitive Functions of Young Females

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ABSTRACT
Evidence suggests that in brain, iron deficiency may disrupt metabolic processes , causes hypoxia and subsequently changes cognitive functions. Women of reproductive age are most vulnerable to iron deficiency and may be at high risk for cognitive alterations. So to examine the relation between iron status and cognitive functions in young women, a cross sectional observational study is conducted on 60 women aged 18-30 year, from which 30 women have iron deficiency anemia(HB level-<12 g / dL, ferrit in level-<15 mcg/L), another 30 are selected randomly from obstetrics and gynaecology department who do not have anemia. Cognitive function test-MMSE (Mini Mental State Examination) is performed. Descriptive statistic are used (mean and standard deviation) and results are compared using unpaired t test. There is significant difference between both groups. According to this study, iron deficiency anemia has negative effect on cognitive functions of brain.

INTRODUCTION

Despitead vances in there duction of a number of nutrient deficiencies world wide, iron deficiency (ID) remains the most prevalent single utrient deficiency, and it affects those in both developing and developed countries[1]. >50% anemic people are having iron deficiency anemia. Women of reproductive age are most vulnerable to iron deficiency anemia because of the irgreater physiological requirements, combined with in creased losses and poor dietary in take. We have strong evidence that iron deficiency anemia is associated with poorer perform ancien development alra tings in infants, with lower score son cognitive function test sand educational achievement tests in children. In adolescents, ID has been shown to impair cognitive abilities due to past studies[2,3]. But aga pexists in our understand in go of this Same relation in adults. Therefore, here we have studied there lation between iron status and cognition in women of reproductive age to examine the effects of ID Aoncognitive perform ance in young women. A strong relation between iron status and cognitive abilities after the study, could provide bas is for early in terventions[4].

Aims and Objectives:

- To examine the relation between iron status and cognitive functions in young women.
- How different facets of cognition are affected by iron deficiency anemia.

MATERIALS AND METHODS

Across sectional observational study is conducted in medicine and obstetrics and gynecologyde partment P.D.U. government medical college and civil hospital campus Rajkot. In for medic on sent is taken from each participant. 60 women aged between 18-30 years, free from any chronically nasser serious health problems or pregnancy are selected by asking basic health questionnaire. Out of which 30 women have iron deficiency anemia. (HB-<12gm/dL, serum ferrit in level-<15mcg/L). This group is compared with another 30 women group who are non anemic (HB->12gm/dL). Both groups are matched with regards of age, ethnicity, Residential are a, minimumedu cational level Etc. HB and serum ferrit in is measured with the help of automated analyzer. Gujarati/Hindi are the primary language spoken in their home. For cognitive function assessment, Mini Mental State Examination (MMSE) test is performed. It is easy to perform, take less time, highly sensitive for screening of cognitive function impairment and give idea about different facets of cognition.

MMSE Scores: 24-30=normal, 20-23=mild cognitive impairment, 10-19=mode rate cognitive impairment, <10=severe cognitive impairment.

For comparison, Descriptive statistic are used (mean and standard deviation) and results are compared using unpaired test. P<0.05 suggests that study is statistically significant.

RESULTS AND DISCUSSIONS

Table 1: Non Anemic and Iron Deficiency Anemia

	Non anemic		Iron deficiency anemia		
	Mean	SD	Mean	SD	p-value
Age	25	--	26	--	--
Hemoglobin	12.57	0.4	9.8	0.79	<0.0001*
Serum ferreting	46.7	3.3	11.9	0.89	<0.0001*
MMSE score	25.47	1.87	22.96	3	0.0004*

*As the P<0.05, study is significant.

(Age of Both the Group Women: 18-30 years. Here we have taken HB<12 asgm/dLanemia. Serum ferrit in level-<15mcg/L as iron deficiency.

Mini Mental State Examination Score: 24-30= normal, 20-23=mild, 10-19=moderate, <10= severe cognitive impairment.) Here, we have used unpaired t test to compare the groups. In this study we have p<0.05 that suggests the study is significant.

In MMSE Score: Attention span and calculation tasks, orientation are more affected and other tasks are less affected in iron deficiency anemia group women. Overall MMSE score is more affected in iron deficiency anemia group. Time taken to answer is also more in iron deficiency anemia group than non anemic group. So, We can say that iron deficiency anemia negatively affects cognitive functions of young women. According to this study, iron deficiency anemia has negative effect on cognitive functions of brain[5,6]. As Iron deficiency anemia cases reduced oxygen carrying capacity of blood and causes hypoxic in jury in brain, impair immune response, cause changes in metabolism, neurotransmitter liked opamine is also affected. This changes causes decreased cognitive performance. We need other studies with different methods to test cognition to confirm the result. As Mini Mental State Examination is based purely on question nares, so participant's interest level, education and understanding level etc[7,8]. Might have affected the results. We need further studies to know how this cognitive deficits affect every day life, how sever it yand duration of anemia affects cognition, whether different age group shows different results and whether the se changes are reversible with iron the rapy or not[9].

CONCLUSION

This study suggests strong relation between iron status and cognitive function in women of reproductive age. Iron deficiency anemia negatively affects cognitive functions of young females. Esp. Attention span and calculation tasks, orientation, recall, copying tasks,

language and command tasks-ovall aspects are negatively affected. Better iron status surveillance practices are encouraged, to identify persons who may beat risk of cognitive deficits and start early treatment to prevent it.

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