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Review Article

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Efficacy of Interventions to Treat Anaemia in Women of Reproductive Age

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Abstract

Background: Anaemia, which affects all age groups more so women in many populations has become major public health problem, a global concern. It is mostly due to iron deficiency. Attempts continue to prevent and treat.

Objective was to know efficacy of allopathic, ayurvedic medication, nutritional advice on women with mild, moderate anaemia with no obvious disorders which could cause anaemia.

Material Methods: Institute based study was carried out after taking ethics committee's approval. Study subjects were of 15 to 49 years of age who had come to outpatient of obstetrics gynaecology with various disorders but not any which could have caused anaemia or chronic illnesses which could have affected haemoglobin formation. Volunteers, relatives or friends of patients of same age were explained and included after looking into inclusion criteria, willingness. No one refused. However most study subjects were patients (75%). After checking haemoglobin women with mild, moderate anaemia were given medication monthly for 6 months. Nutritional advocacy was done using booklet. Total 904 anaemic women were divided in 4 groups randomly, group A Allopathic medication, group An Allopathic medication with nutritional advice, group B: Ayurvedic medication, group Bn: Ayurvedic medication with nutritional advice.

Results: Of 1330 women screened, 904 (67.96%) were anaemia excluding severe anaemia 168(18.6%) moderately and 736(81.41%) mildly anaemic. Of them 562 (62.2%) took medicine for 180 days, 104 (61.90%) of moderately anaemic 458 (62.22%), mildly anaemic. After 180 days, of 104 moderately anaemic 72(69.21%) became nonanaemic, 32(30.8%) mildly anaemic. Of 458 mildly anaemic, 430 (93.9%) became non anaemic women 28 (6.1%) remained mildly anaemic. Subjective analysis revealed feeling very good in most, no change in few. No one talked of negative effects. Some had side effects.

Conclusion: It is essential to find ways of appropriate iron intake to prevent anaemia. In very small number anaemia did not change which needs research. Research on behavioural aspect is also needed as there was noncompliance in large numbers even for free medication for their own health.

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Background

Anemia, a major public health problem continues to affect all age groups specially women in many populations. It has become a global concern. According to Milman, the most common nutritional deficiency which causes anaemia in both developing as well as developed countries, is iron deficiency. Iron deficiency anemia (IDA) is a global public health problem. As per the World Health Organization's report, half of the total burden of anemia was due to ID (Samal 2018). Similar to other disease burden, low income countries and underprivileged populations suffered the most (1). Globally, the prevalence of anemia among women of reproductive age was estimated to be around 29% (2). Although the prevalence of anemia has declined in India, still more than half of the women in 11 States and Union Territories were found to be anaemic in the national survey (3) NFHS-4 2016. https://www.researchgate.net/publication/316527330_National_Family_Health_Survey-4_2015-16). There is ignorance in the communities about anaemia, its causes, effects on health as well as essentialities of prevention and therapy.

Objective

Objective was to know the efficacy of allopathic and ayurvedic medication and nutritional advice on mildly and moderately anaemic women of reproductive age with no obvious disorders which could cause anaemia.

Material and Methods

Institute based study was carried out after approval of the ethics committee of the institute. Study subjects were women of 15 to 49 years of age who had reported to outpatient of obstetrics gynaecology with various disorders but not any disorder which could directly be responsible for anaemia or chronic illnesses which affected occurrence of anaemia indirectly. Volunteers, relatives or friends who accompanied the patients were also explained about the service oriented research and were included if they were willing and fitted into inclusion criteria. However most study subjects were patients (75%). Informed consent was taken before inclusion.

As per inclusion criteria thirteen hundred and thirty women, who were eligible, were enrolled and screened for anaemia and 909 (68.3%) women were found to be anaemic (Hb less than 11 gm/dl). Of 909 anaemic women, 5 (0.4%) had severe anaemia (haemoglobin less than 7 gms/dl and 904 (67.9%) had moderate or mild anaemia. Severely anaemic women, irrespective whether patients or volunteers were advised to go to specialists for further investigations and therapy and were excluded from inclusion in study. All 904 anaemic women with mild or moderate anaemia were also advised investigations. However further investigations were not part of the study. They were enrolled for the planned iron intervention. These 904 women were divided in 2 major groups Allopathic medication, group A and Ayurvedic medicine, group B. Both groups were further divided into 2 sub groups each, group A Allopathic Medication, group An - Allopathic medication with nutritional advice, group B - Ayurvedic medication, and group Bn - Ayurvedic medication with nutritional advice . Of 904 anaemic women 226 were randomly put in group A, 226 group An, 226 group B, 226 and group Bn 226. In group A, 35 women had Hb% between >7 to <8.9 gm/dl and 191 between >9 to <10.9 gm/dl. In An, 42 had Hb% between >7 to < 8.9 gm/dl and 184 < 9 to >10.9 gm/dl. Under group B, 43 women had Hb between >7 to<8.9 gms/dl and 184 > 9 to <10.9 gm/dl. In group Bn 47 women had Hb% between <7 to >8.9 gm/dl and 179 women between 9 to <10.9 gm/dl. So all the groups were comparable.

In all the women of group A, B, An and Bn, awareness was tried with the help of a booklet, specially prepared for the study. Booklet had pictorial information about meaning of anaemia, its causes, symptoms, effects, prevention of anaemia and nutritional relationship with information about food items rich in iron and possible therapy. However food advocacy about nutrition with instructions to follow were given to only An and Bn groups. Women were called on 30th day and 60th day to check compliance to medication and advocacy. On 90th day, Hb% was rechecked in addition to compliance to medication and advocacy. It was followed by compliance visits on 120th and 150th day about taking the medication and whether they had any complaints. On 180th day Hb% was finally checked and recorded. Improvement if any was recorded. For qualitative assessment a scale of five was made on the basis of symptomatic response, deterioration, no change, little change, good & very good. At the initiation of study final inclusion criteria were decided, knowing that some women might not take medication for 180 days. Those who did comply to consumption of medication for 85%, duration (for at least 165 days) were part of the study. Hb was measured at the completion of 180 days. For those who reported at 195 days also remained in the study and Hb was estimated. So + 15 days of medication and reporting was included in compliance.

Results

Under group A 226 women were enrolled for study, of which 36 (15.93%) had Hb% between 7 to 7.9 gm/dl, 105 (46.46%) 8 to 9.9 gm/dl & 85 (37.61%) between 10 to 10.9 gm/dl. On 90th day of the 36 women with Hb% between 7 to 7.9 gm/dl, 13 did not report, 23

(64%) followed and all showed rise in Hb, 12 (52.2%) to 8 to 9.9 gm/dl, 7 (30.5%) to 10 to 10.9 gm/dl, and 4 (17.4%) became non anaemic. On 180th day, one more left the medication, 22 (95.6%) reported for final check up. and 19 (86.4%) of them had become nonanaemic. So in group A of 36 women with Hb of 7 to 7.9 gms/dl, 22 (61.11%) complied and 19 (86.4%) of them became nonanemic.

In the same group, 105 women had Hb% between 8 to 9.9 gm/dl, of which 36 did not report (drop outs) and 69 (65.8%) came for follow up. Around 90th day, 4 (5.8%) had same Hb% and 60 (87%) women showed rise in Hb% to 10 to 10.9 gm/dl and 5 (7.2%) had become non anaemic. On 180th day 2 more did not report and 67 (97.1%) came for final Hb check up. Of them 64 (95.2%) had become nonanaemic. So of. 105 women 67 (63.80%) complied and 95% of them had become nonanaemic.

In the same group 85 women had Hb% between 10 to 10.9 gm/dl, 52 (61.2%) reported for follow up on 90th day, 25 (48%) had no change in Hb% and 27 (52%) became non-anaemic. On 180th day 51 (98.0%) came for final check up. One had Hb% between 10 to 10.9 gm/dl and 50 (98%) had become non anaemic. So total 51 of 85(60.71%) took medication and of them 98% became nonanaemic. Finally, of 140 women who followed, 22(15.7%) remained moderately anaemic and 118(84.2%) were mildly anaemic at 3 months. On 180th day among moderately anaemic, 133 women (95%) became non-anaemic, 7 (5 %) had become mildly anaemic and among mildly anaemic 4(3.4%) remained mildly anaemic and rest 114(96.6%) became nonanaemic.

In the same group 2 women reported rash, 2 constipation 2 had diarrhoea , 3 had vomiting and 11 had pain in abdomen, a total of 16(7.07%) reported some side effects, with no difference in economic class or age or education.

Under group An also 226 women were enrolled. On day one, 41 (18.5%) had Hb% between 7 to 7.9 gm/dl, 101 (44.7%) between 8 to 9.9 gm/dl & 84 (37.2%) between 10 to 10.9 gm/dl. On 90th day of 41 women with Hb% between 7 to 7.9 gm/dl, 12 did not report, 29 (79%) came for follow up and all showed rise in Hb%, 17 (59%) to 8 to 9.9 gm/dl, 9 (31%) to 10 to 10.9 gm/dl and 3 (10.3%) had become non anaemic. On 180th day, 18 (62%) of 29 women had become non anaemic. So of 41 women with Hb 7 to 7.9% 29 (70.73 %) complied and 18 (62%) had become non anaemic.

In the same group at enrolment, 101 women had Hb% between 8 to 9.9 gm/dl. Around 90th day, 38 did not report and 63 (62.3%) came for follow up, 4 (6.34%) had same Hb%, 51(80.9%) showed rise to 10 to 10.9gm/dl and 8 (12.7%) became non anaemiac. On 180th day one more did not report and 62 (36.11%) came for final check up, 57 (92%) of them had become non anaemic. So of 101 women with Hb between 8 to 9.9gm/dl, 62 (61.38%) complied and 92% of them had become nonanaemic.

In the same group at enrolment 84 women had Hb% between 10 to 10.9 gm/dl. Of which 34 did not return and 50 (59.5%) came for follow up by 90th day, 21 (42%) of them had no change in Hb% and 29 (58%) had become non-anaemic. On 180th day 49 women came for check up and. 2 (4%) had same Hb and 47 (96%) became nonanaemic. So of 84 with very mild anaemia, 49 (59.52%) took therapy and 96% of them became nonanaemic. So under group An, on 180th day 140(61.9%) of 226 women came for final follow up 29(20.7%) moderately anaemic and 111(79.3%) mildly anaemic. Overall 122(87%) women became non-anaemic. Among moderately anaemic women, 37.9% became mildly anaemic and 62.1% became non anaemic. From mildly anaemic, 6.3% remained mildly anaemic and 93.7% became non anaemic.

In group An, total 12 (5.20%) women out of 226 reported adverse reactions, 4 had rash, 3 vomiting and 5 had pain in abdomen at various stages of follow up.

Under group B 226 women were enrolled for study. At enrolment 44 (19.46%) had Hb% between 7 to 7.9 gm/dl, 91 (40.26%) between 8 to 9.9 gm/dl & 91(40.26%) 10 to 10.9 gm/dl. On 90th day of 44 women with Hb% between 7 to 7.9 gm/dl, 15 did not turn up and 29 (66%) came for follow up, 14 (48.3%) of them showed rise in Hb% to 8 to 9.9 gm/dl, 8 (27.6%) to 10 to 10.9 gm/dl and 7 (24.2%) became non anaemic. On 180th day, of the 44 women, 29 (66%) came for final Hb and 17 (58.6%) of them had become non anaemic.

In the same group 90 women had Hb% between 8 to 9.9 gm/dl at enrolment. Of which 28 did not turn up and 62 (68.2%) came for follow up. Around 90th day, 9 (15%) had same Hb% and 46 (74.2%) had Hb between 10 to 10.9gm/dl and 7 (10.3%) had become nonanaemic. On 180th day 2 more did not report and 60 (66.66%) reported for final Hb. Of which 53 (88.4%) became nonanaemic. Final compliance was 66.66% and of them 88.8% had become nonanaemic. On day one 91 women had Hb% between 10

to 10.9 gm/dl of which 37 did not report and 54 (59.4%) came for follow up by 90th day, 25 (46.3%) had no change in Hb% and 29 (54%) became non-anaemic. On 180th day all 52 (96.3%) came for check up, one had same Hb% and 51 (98%) had become nonanaemic. Overall of 91 women 96.3% became non anaemic. Finally of 141 women who followed up, 180th day 63.12% were moderately anaemic and 36.87% were mildly anaemic. Among moderately anaemic women 41.4% became mildly anaemic and 58.6% became nonanaemic. From mildly anaemic 7.1% remained mildly anaemic and 92.9% had become nonanaemic. Total 85.8% had become non anaemic & 14.2 % mildly anaemic.

Under group Bn also, 226 women were enrolled in the study. At enrolment 47 (20.8%) had Hb% between 7 to 7.9 gm/dl, 99 (44%) between 8 to 9.9 gm/dl & 80 (35.4%) between 10 to 10.9 gm/dl. Of 47 women with Hb% between 7 to 7.9 gm/dl, 22 did not report and 25 (53.2%) came for follow up on 90th day. Of which 13 (52%) women showed rise in Hb to 8 to 9.9 gm/dl, 8 (32%) to 10 to 10.9 gm/dl and 4 (16%) had become non anaemic. On 180th day, one more woman didn't report, 24 reported, 18 (75%) of 24 had become non aanaemic. So of 47 women with Hb 7 to 7.9 gm/dl, compliance was by 24 (51.07%) and 75% of them had become non anaemic. On day one 99 women had Hb% between 8 to 9.9 gm/dl, 38 of them did not report and 61 (62%) came for follow up by 90th day, 4 (7%) had same Hb% and 49 (80.3%) showed rise in Hb% to 10 to 10.9 gm/dl and 8 (13%) became non anaemic. On 180th day 4 more did not report and 57 (31.66%) finally came for Hb check up. Of which 51 (89.5%) became non anaemic. So of 99 women in this group compliance was by 57 (63.33%). Of them 51 (89.5%) became non anaemic. On day one 80 had Hb% between 10 to 10.9 gm/dl. On 90th day, 18 of them did not report back and 62 (78%) came for follow up. Of them 24 (39%) had no change in Hb% and 38 (61.3%) became non-anaemic. On 180th day 60 (75.0%) came for final Hb check up and 3 had Hb% between 10 to 10.9 gm/dl and 57 (95%) had become non anaemic. So of 80 women 75% complied and 95% of them became nonanamic.

Finally of 141women of Bn group who followed, of 24(17.02%) with moderate anaemia, 25% became mildly anaemic and 75% became non anaemic and of 117(82.9%) mildly anaemic. 7.7% remained mildly anaemic and 92.3% became nonanaemic. Overall of 141anaemic women 89.4% became non anaemic.

Of total 904 study subjects, 168(18.6%) were moderately anaemic & 736(81.41%) were mildly anaemic. Overall 562 (62.2%) women took medication for 6 months 104 (61.90%) of moderately anaemic 72(69.23%) became non anaemic & 32(30.8%) became mild anaemic & 458 (62.22%) mildly anaemic. 430 (93.9%) became non anaemic & 28 (6.1%) remained mildly anaemic.

Subjective analysis revealed that of group A 18.57%, felt very good, 76.42% felt good, 4.28% had little change and 0.7% had no change. In group An 25 % felt very good, 62.14 % felt good, 10.7 % had little change and 2.14% had no change. In group B 20.56% felt very good, 65.24% felt good, 10.63 % had little change and 3.54% had no change. In group Bn 18.43% felt very good, 70.92 % felt good, 8.5% had little change and 2.12% had no change. No one said that there was a negative effect, though some did have side effects.

Discussion

Multiple causes and consequences of anemia have been reported in developing countries. On an average, globally, about 50% cases of anemia are assumed to be attributable to iron deficiency. A study was carried out in Abbottabad and the results showed that the most common type of anemia was IDA that affected 68% people, more common in women (4) the present study findings revealed that of the women who did not have any disorder which could caused anamia, most should not have been anaemic if they had enough iron intake. These statistics showed that this problem needs to be relooked into and interventions redesigned according to population needs. Before treatment of 904 study subjects, 168(18.6%) were moderately anaemic and 736 (81.41%) were mildly anaemic. Total 562 (62.2%) women took medication for 6 months, 104 (61.90% moderately anaemic and 458(62.22%) mildly anaemic. Finally from 104 moderately anaemic women, 72(69.23%) became non anaemic and 32(30.8%) became mild anaemic. Of 458 mildly anaemic women, 430(93.9%) became non anaemic and 28 (6.1%) remained mildly anaemic.

Over all efficacy of medication in group A was 95%, in An 87%, in B 85.8% and in Bn 89.4%. Overall, 89.32% anaemic women became non anaemic but not 100%. However they became mildly anaemic. Allopathic drug alone without nutritional advice had best efficacy. Ayurvedic drug with nutrition (Bn) had efficacy of 89.4% and only ayurvedic B drug efficacy was 85.8%. No side effects were reported with ayurvedic medication. It had little more cost and was little less effective compared to allopathic drug, Ayurvedic medication

was a good alternative which could be offered to those who refused iron preparation due to side effects. Samal (2018) (5) also reported that ayurveda offers several formulations for the management of IDA. A systematic review was carried out to understand the role of Ayurvedic formulations for the management of IDA. The response of most of the Ayurvedic formulations was better than Allopathic formulations and there was no untoward effect as observed with iron salts. Statistically significant results were obtained in favor of most of the Ayurvedic formulations in subjective and hematological parameters. It is essential that all attempts are made to prevent IDA.

Correct nutritional information in their language should help a lot in consuming the right diet and to make a difference. Over all analysis of adherence and side effects of iron supplements revealed that adverse drug reactions, the reasons of drop outs were in those women who took allopathic medication (A and An). Pain abdomen was the most common adverse reaction, apart from vomiting and rash. None of the women who took ayurvedic medication had adverse effects and the cause of the drop outs was distaste and bigger size of tablet.

However it was revealed that allopathic medication alone without nutritional advocacy had better efficacy, 95%, than An group 87%. Food with iron might have affected iron absorption of medication and this aspect needs more studies. However in Ayurveda preparation it was not so. It could be synergy of contents of medication with food items. This aspect also needs more research. On subjective analysis there was no negative effect. The main risk factors for IDA are low intake of iron, poor absorption of iron from diets, high phytate or phenolic compounds or increased requirements during childhood and pregnancy. Present study revealed that if iron intake was increased, women could remain non anaemic. Dietary modifications should range from primary prevention that involves a focus on a healthy diet which included iron. Good sources of iron, fruits, vegetables, whole grains, milk and milk products, lean meat, fish, dry beans, eggs, nuts have become too expensive for rural poor. For diet that can help in absorption of iron with good sources of vitamin C and non-haem iron, there is a need to expand the programs that are already working, effective and efficient, for the whole population. Work should be done for creating awareness, ensuring they know what is essential for them and find system so that they can get their requirements.

Free medication was given still many women did not comply. Very few had side effects, for others reasons were not clear. So socio behavioural research is also needed. However 100% did not become non anamic. So something other than availability of iron is responsible and more research is needed about this aspect too.

At entry Hb%	Total anaemic Pt. at entry	90 day follow up		Rise in Hb(%)				180 day follow up		Rise in Hb(%)			
Group G Group – A		Drop Out up to 90th day	Total anaemic follow up	7 to 7.9 gm/dl	8 to 9.9 gm/dl	10 to 10.9 g/dl	12.5 to > 14.1 gm/dl	Drop Out up to 180th day	Total anaemic follow up	7 to 7.9 gm/dl	8 to 9.9 gm/dl	10 to 10.9 g/dl	12.5 to > 14.1 g/dl
7 to 7.9 gm/dl	36 (15.93)												
105 (46.46%)	13	23	-	12	7	4	1	22	-	-	3	19	
8 to 9.9 gm/dl		36	69	-	4	60	5	2	67	-	-	3	64
10 to 10.9 g/dl	85 (37.61%)	33	52	-	-	25	27	1	51	-	-	1	50
Total	226	82	144	-	16	92	36	4	140 (100%)	-	-	7 (5%)	133 (95%)
Group An													

7 to 7.9 gm/dl	41 (18.14%) 101 (44.70%)	12	29	-	17	9	3	-	29	-	-	11	18
8 to 9.9 gm/dl		38	63	-	4	51	8	1	62	-	-	5	57
10 to 10.9 g/dl	84 (37.16%)	34	50	-	-	21	29	1	49	-	-	2	47
Total	226 (100%)	84 (37.16%)	142 (62.8%)	-	21	81	40	2	140 (100%)	-	-	18 (12.9%)	122 (87.1%)

Table 1: *Change In Haemoglobin A and An.*

At entry Hb%	Total anaemic Pt. at entry	90th day follow up		Rise in Hb(%)				180th day follow up		Rise in Hb(%)			
Group B		Drop Out up to 90th day	Total anaemic follow up	7 to 7.9 gm/dl	8 to 9.9 gm/dl	10 to 10.9 g/dl	12.5 to > 14.1 gm/dl	Drop Out up to 180th day	Total anaemic follow up	7 to 7.9 gm/dl	8 to 9.9 gm/dl	10 to 10.9 g/dl	12.5 to > 14.1 g/dl
7 to 7.9 gm/dl	44 (19.46%) 91 (40.26%)	15	29	-	14	8	7	-	29	-	-	12	17
8 to 9.9 gm/dl		29	62	-	9	46	7	2	60	-	-	7	53
10 to 10.9 g/dl	91 (40.26%)	37	54	-	-	25	29	2	52	-	-	1	51
Total	226 (100%)	81	145	-	23	79	43	4	141	-	-	20 (14.1%)	121 (85.8%)
Group Bn													
7 to 7.9 gm/dl	47 (20.8%) 99 (43.8%)	22	13	8	4								
8 to 9.9 gm/dl		38	4	49	8			1	24	-	-	6	18
10 to 10.9 gm/dl	80 (35.4%)	18	-	24	38			4	57	-	-	6	51
Total	226 (100%)	78	17	81	50			2	60	-	-	3	57
								7	141	-	-	15 (10.6%)	126 (89.4%)

Table 2: *Change in Anaemia in Group B and Bn.*

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