Research Article

Demystifying prevalence of anemia in female spouses of army personnel in an Army's Corps zone: A multicentric cross-sectional study

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ABSTRACT

Background: Anemia is an important public health problem all over the world, both in rich and poor countries. The present study is a cross-sectional multicentric study where data from 10 different stations by 16 different medical establishments were collected. **Objective:** The present study was conducted to determine the prevalence of anemia in female spouses of army personnel in an Army's Corps zone. **Materials and Methods:** The total size of the sample was 14,273 which covered female spouses of army personnel of five different formations under an Army's Corps zone. All the non-pregnant female spouses of army personnel were screened for anemia using hemoglobin level estimation. Uniform instructions for screening were given from the medical branch of Army's Corps Headquarters to medical units. **Results:** The prevalence of anemia found in this study was 21.54% which is much below the national prevalence of 55% as per National Family Health Survey-3 data. **Conclusions:** Our study with a large sample size demonstrates that the prevalence of anemia in female spouses of army personnel is almost half of national prevalence. This is indeed a landmark achievement of the Army Medical Corps where success was achieved in reducing the burden of anemia.

KEY WORDS: Anemia; Army Personnel Female Spouses in Reproductive Age Group; Non-pregnant Non-lactating Female Spouses of Army Personnel; Hemoglobin

INTRODUCTION

Anemia is an important public health problem all over the world, both in rich and poor countries.[1] This worldwide public health problem has a huge impact on human health and also on the socioeconomic growth of a country. As various prevalence estimates of anemia differ from each other and due to lack of realistic data in underdeveloped countries, it can be presumed that a very large segment of population comprising young children and women of reproductive age group are anemic.[2] Over a third of the global prevalence of anemia is contributed by India. Women and young children bear the highest burden. More broadly, India continues to suffer an enormous burden of undernutrition.

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Diverse studies from all parts of India have concluded >50% prevalence among women of reproductive age group. 2005/6 National Family Health Survey (NFHS) 3 survey data declare the prevalence of anemia to the extent of 55.3% among women of reproductive age group and 53.2% in non-pregnant non-lactating women.[3] When comparing NFHS 2 and NFHS 3 survey figures, it is shocking to observe that the prevalence of anemia has increased beyond 51.8%.[3] Within India also, tremendous difference in the prevalence rates of anemia varying from 32.8% in Kerala to highest of 69.5% in Jharkhand and Assam requires significant cognizance.[4] National strategies to control anemia are not being effectively implemented in the field.

In this context, some differences have been observed in the prevalence of anemia in different settings/regions. One such

example is the settings in Indian Army. The female spouses of Indian army personnel, though they hail from various parts of the country, they share similar socioeconomic status, living conditions, provision of good quality rations, and accessibility to and availability of Medical Services. Various National Health Programmes are implemented in armed forces through Military Hospitals and Station Health Organizations. Health promotional activities are a strong part of welfare concept in this organization. Initiatives are taken to create awareness among female spouses of army personnel, who come mostly from a village background, regarding prevention of diseases, and promotion of health. This helps in ensuring better enforcement of National Health Programmes and hence better health and nutritional status.

There have been pilot studies during various medical camps which also emphasized on the finding of the low prevalence of anemia in female spouses of army personnel.[5] However, no major study could be conducted to substantiate these findings. In view of above, the present study was conducted to determine the prevalence of anemia in female spouses of army personnel in an Army's Corps zone. The expected findings could definitely identify various factors responsible for differing prevalence of anemia in diverse settings/regions. Successful strategies of anemia control programs would also stand out for suitable replication in other settings/regions.

MATERIALS AND METHODS

The present study is a cross-sectional multicentric study where data from 10 different stations by 16 different medical establishments were collected. In army, there is a welfare organization, called Army Wives Welfare Association which constantly monitors and supervises optimal health care of all army families. Periodically, health promotion, specific protection, and screening programs are conducted to ensure optimal healthy status of all families. Uniform instructions for screening were given from the medical branch of an Army's Corps Headquarters to all medical units under its command after obtaining requisite go-ahead (Ethical Approval and concurrence) from the wife of Army's Corps Commander. The total size of the sample was 14,273 which covered families of five different formations under the Army's Corps zone. All the non-pregnant female spouses of army personnel were screened for anemia using hemoglobin level estimation. Informed consent was also taken from the subjects to suffice the requirement of ethical approval. The data were compiled from February 2014 to March 2015. Appropriate investigations, referrals, and treatment were offered to those found anemic.

Hemoglobin levels for diagnosing anemia at sea level (g/l) ± as have been presented in Table 1 above, were published in 1968 by the WHO study group on nutritional anemia;[6] the cutoffs for labeling mild, moderate, and severe anemia were first presented in 1989 guide, preventing and controlling anemia through primary health care,[7] and then later were modified for pregnant women, non-pregnant women, and children <5 years of age as per the management of nutrition in major emergencies.[8] Anemia cutoffs have more or less remained unchanged since 1968, with the exception that the original age group of children 5–14 years of age was split, and a cutoff of 5 gm/L lower was applied to children 5–11 years of age to reflect findings among non-iron deficient children in the USA.[9] Although these cutoffs were first published in the late 1960s, they have been included in numerous subsequent WHO publications[7,9] and were additionally validated by findings among participants in the Second National Health and Nutrition Examination Survey II who were unlikely to have iron deficiency based on a number of additional biochemical tests[10]. The hemoglobin cutoff of 110 g/l for pregnant women was first presented in 1968.[6] It was also observed that in healthy, iron-sufficient women, hemoglobin concentrations changed a lot during pregnancy.

RESULTS

The observed prevalence of anemia in this study was 21.54% which is much below the national prevalence of 55% as per NFHS-3 data. The observations are presented in Tables 2-4.

DISCUSSION

Our study with a large sample size demonstrates that the prevalence of anemia in female spouses of army personnel is almost half of national prevalence. This is indeed a landmark achievement by the Army Medical Corps which was successful in reducing the burden of anemia. When these women are a part of civil setup, they are dependent on the rural health-care setup which throughout India suffers from

Table 1: Hemoglobin levels for diagnosing anemia at sea level (g/l)

Population	Non-anemia	Anemia		
		Mild	Moderate	Severe
Children between 6 and 59 months of age	110 or high	100–109	70–99	<70
Children between 5 and 11 years of age	115 or high	110–114	80–109	<80
Children between 12 and 14 years of age	120 or high	110–119	80–109	<80
Non-pregnant women (15 years of age or more)	120 or high	110–119	80–109	<80
Pregnant women	110 or high	100–109	70–99	<70
Men (15 years of age or more)	130 or high	110–129	80–109	<80

poor public infrastructure and human resources. However, when they become the female spouse of army personnel, they are offered comprehensive health services at all levels and at all places.

Most decisive factor which favored low prevalence was a strong political will and commitment toward health from the senior administrative authorities. Political will superimposed with society's commitment to support or to change preventive strategies is most essential for securing the required resources for a gainful policy change.[11] Political will is often only discussed in terms of its absence. However, we present these findings from a formation where a strong political will formed the backbone of all health-care activities. A strong political will by the senior officers undoubtedly leads to willingness and momentum in the medical service setup.

Study Limitation

The eligible participants in our research study were non-pregnant female spouses of army personnel who were screened for anemia using hemoglobin level estimation. Although this may limit the generalization of the results to other subgroups as good quality ration (free and procured) by the Army Supply Corps definitely has a positive effect on the health of the families. Therefore, we strongly recommend the conduct of future prospective multicenter

Table 2: Formation-wise prevalence of anemia in an Army's Corps zone

Formations	Families examined	Anemic	Prevalence of anemia (%)
A	4580	869	18.97
B	2684	685	25.52
C	4283	943	22.02
D	2706	573	21.17
E	20	05	25.00
Total	14.273	3075	21.54

Table 3: Station-wise prevalence of anemia in an Army's Corps zone

Location	Families	Anemic	Prevalence of anemia (%)
Jhansi	2225	394	17.71
Babina	2633	559	21.23
Saugor	911	382	41.93
Dhana	297	136	45.79
Jodhpur	610	99	16.23
Gwalior	2594	530	20.43
Bhopal	2277	399	17.52
Golconda	1029	252	24.49
Secunderabad	1677	319	19.02
Pune	20	05	25.00
Total	14,273	3075	21.54

Table 4: Station-wise severity of anemia in an Army's Corps zone

Station and total examined		Anemic														Non-anemic					
		Severe			Moderate			Mild			Borderline			Healthy							
		50–79 g/l			80–89 g/l			109 g/l			110–119 g/l and above			120–129 g/l			130 g/l and above		
		OF	JF	OR	T	OF	JF	OR	T	OF	JF	OR	T	OF	JF	OR	T	OF	JF	OR	T
JHS	2225	-	-	-	-	-	-	25	25	-	40	199	239	-	60	70	130	-	97	944	1041	83	707	790
BAB	2533	-	-	9	9	-	-	-	-	-	-	130	130	-	118	302	420	-	136	1740	1876	91	107	198
SGR	911	-	-	-	-	-	-	15	15	-	12	32	44	-	40	283	323	-	167	230	397	23	109	132
DHN	297	-	-	-	-	-	3	-	3	-	24	91	115	-	5	13	18	-	4	72	76	47	38	85
JDH	610	-	-	-	-	-	-	12	12	-	-	21	21	-	13	53	66	2	28	410	440	8	63	71
GWL	2594	-	-	-	-	-	-	6	6	-	18	120	138	-	9	377	386	-	119	1801	1920	12	132	144
BPL	2277	-	-	-	-	-	-	8	8	-	-	135	135	-	53	203	256	-	462	872	1334	306	238	544
GOL	1029	-	-	4	4	-	-	15	15	-	2	117	119	-	21	93	114	-	22	319	341	27	409	436
SEC	1677	-	-	5	5	-	-	25	25	-	-	117	117	-	27	145	172	-	342	794	1136	12	210	222
PUN	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	5	3	3	1	7	5	3	8
TOTAL	14273	-	-	18	18	-	3	106	109	-	96	962	1058	-	346	1544	1890	5	1380	7183	8568	614	2016	972

OF: Officer families, JF: Jco families, OR: Other rank families, T: Total, JHS: Jhansi, BAB: Babina, SGR: Saugor, DHN: Dhana, JDH: Jodhpur, GWL: Gwalior, BPL: Bhopal, GOL: Golconda, SEC: Secunderabad, PUN: Pune

investigations to have clear estimates for future interventions and implementation of preventive strategies.

CONCLUSIONS

Our results also highlight excellent intersectoral coordination for the achievement of better health status in the families. There is no substitute for hygiene, sanitation, and good nutrition. The complementary efforts of Military Engineering Services authorities in providing sufficient safe and potable water supply, timely disposal of waste and necessary repairs contributed to the provision of a congenial environ for the families. Along with this good quality rations (free and procured) by the Army Supply Corps had a positive effect on the health of the families. Our study demonstrates the optimal translation of experience and knowledge for desired overall improvement in health.

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