ijergs
Open Access
International Journal of Engineering Research and Generic Science (IJERGS)
Available Online at www.ijergs.in
ISSN: 2455 - 1597
Volume -3, Issue-1, January – February 2017, Page No. 48 - 57

Impact of Mid-Day Meal Programme on Nutritional Status of School Children

Mukul Sinha[1] , Afsha Jamal[2], Swiny Sandhvi[3]
[1]Associate Professor, [2,3]Ex-Msc student Department of food & Nutrition
College of Home Science, Dr. Rajendra Prasad Central Agricultural University, Pusa, Samastipur (848125).
E-mail: swinysandhvi@gmail.com

Abstract

The Mid-Day Meal programme was launched with the objective of improving attendance of children, social equity and simultaneously improving nutritional status of children. There are so many studies which shows mid-day meal improve the attendance of the student but about its impact on nutritional status of children is almost negligible. Hence, present study lies on the objective that what is the impact of mid day meal on nutritional status of school children. For this study, three schools of Pusa Block were selected purposely where mid-day meal programme was running regularly. 40 subjects including 20 experimental and 20 control of age group 13-14 yrs of the schools were selected.

Status of mid day meal programme in the schools were observed. Anthropometric measurement, i.e. measurement of height and weight was done before and after three months of mid-day meal/home lunch consumption. Initial height and weight of all experimental and control subjects were less than NCHS (2001) standard .After three months a slight increment in measurement was observed, however they were still below NCHS standard. Based on these measurement nutritional status of both experimental and control subjects were categorized in to Gomez and Water low classification. All subjects were interviewed for the dietary intake in lunch time and for a week by recall method and noted in a developed performa. The mean intake of nutrients were compared with the Recommended Dietary Allowances (RDA) given by ICMR (1989) to find out the percentage adequacy of nutrients in the diet of children.

Though Mid day meal programme was running regularly, but the norms set for providing protein and energy to the children was not strictly followed. No micronutrient supplementation in the form of fruit and medicine was provided to the children. It was found during the study that socio economic status of experimental and control subjects were almost similar. Dietary intake by both group were less than R.D.A. A slight improvement in the nutritional status of experimental subjects based on Gomez classification (weight/age) was observed as compared to control group. Stunting was the major nutritional disorder which was observed in both group and prevalent after three months too. School authorities found difficulty in running MDM regularly due to inadequate funding facility. It may be suggested from the above observation that menu suggested for mid day meal should be strictly followed. There should be regular monitoring system for improving quality and Quantity of meal.

Keywords: Mid-Day Meal, Anthropometric measurement**,** RDA, NCHS, ICMR, Gomez classification.

1. Introduction

"Future of the nation depends on healthy children." Hence children and their wellbeing's are basic concern of every nation. School age group spans the period between preschool years and adult life. It is therefore essential that over the

decade efforts be focused on improving health and nutritional status of school age children, irrespective of the fact whether they are studying in school or school drop out. India is one of the fastest growing countries in terms of population and economics, sitting at a population of 1.34 billion (2017) and growing at 1-4% annually from 2001-2007 (World Bank 2009).The World Bank estimates that India is ranked second in the world of the number of children suffering from malnutrition, after Bangladesh, where 47 percent of the children exhibit a degree of malnutrition. The prevalence of underweight children in India is among the highest in the world, and is nearly double that of Sub- Saharan Africa.(world bank 2014). According to the World Food Programme and the M .S. Swaminathan Research Foundation (MSSRF) over the past decade there has been a decrease in stunting among children in rural India, but inadequate calorie intake and chronic energy deficiency levels remain steady (World Food Programme 2009).It is estimated that approx 12 percent of total population are children in the age group of 10-14 yrs in India (2001) but concluded that this percentage will decrease to approx 8 percent in 2026 (Census of India, 2001). It was found that 2.6 and 36 percent (10-13 yrs) and 6 and 32 percent of children (14-17 yrs) suffered from severe and moderate underweight respectively. Stunting is also prevalent in this age group of children. 8.6 and 25 percent (10-13 yrs) and 7 and 27 percent of children (14-17 yrs) found in severe and moderate stunting category respectively(NNMB-2006).

In the context of Bihar 49.8 percent of the total population lives below poverty line and 55.9 percent of the children are malnourished.(Indian Express 2015).For improving nutritional status of children Mid Day Meal programme (MDM) firstly introduced for disadvantaged children in Madras municipal corporation in 1925.After that Government of India launched National Programme of Nutritional Support to Primary Education (NP-NSPE) all over the country.

The number of children enrolled during 2003-04 in India was 72,826,689.At the moment the midday meal programme is the world's largest school feeding programme reaching out to about twelve crore children in over 12.65 lakh school/EGS centre across the country.(MDM scheme 2013). The state government notified to implement the MDM in all primary schools in Bihar from January 2005. By October 2007 the scheme has been further revised to cover children in upper primary classes(6^{th} to 8^{th}). In Bihar total number of children enrolled in primary school 17,495 and upper primary school 22,132. (IIndHalf yearly monitoring report of Bihar 2014). In the present situation 450 Calories and 12 g protein and 700 Calories and 20 g protein along with micronutrient supplementation are given to each primary and upper primary class children per day . (Fighting "Classroom Hunger''Achivements of Midday meal Scheme 2013). Impact of mid day meal programme on growth and development provide indications of more long term effects on child health. Therefore present investigation lies with the objective that what is the impact of mid day meal programme on nutritional status of school children.

2. Materials and Methods

Selection of block and schools

Study on Mid Day Meal programme was done in Dr. Rajendra Prasad Central Agricultural University, Bihar; hence Pusa block of Samastipur district was selected purposely for this study. The number of schools in Pusa where MDM programme was running was five. During study period in one school MDM was not running due to inadequate funding facility and in another school it was started from different year May.2008.Hence three schools in the Pusa block were

selected, where MDM started from same year and were running regularly. Out of these three schools one was basic school (up to VIII) and two were primary schools (up to V).

Observation of mid day meal programme in the schools.

A very care full observation was done for MDM running in these schools. Questions related to MDM programme running in the schools were asked to subjects as well as school authority through the developed questionnaire. During regular visit critical observation about the interest of students for the mid day meal was made. Whether menu prescribed for MDM were strictly followed or it was hygienic or not was checked during study. Freshness and accuracy of mid day meal and impact of variety on different days for sustaining the interest of children were also checked. Its capability to remove class room hunger and increase interest in class room and other activities were examined during study.

Selection of subjects

Initially a large number of subjects of the age group 13-14 yrs were selected but due to their irregularity in attendance, the number was sticked to 40 only who were regular till the end of study. These 40 subjects included 20 experimental who enjoyed mid day meal and 20 control who preferred home lunch.

Anthropometric measurement of subjects

Measurement of height and weight of all 40 subjects were taken according to the procedure suggested by Jelliffe (1966).The measurement were taken before and after three months of mid day meal/ home lunch consumption. Based on this measurement, nutritional status of subjects (by Gomez and Waterlows classification) were judged and compared with standard.

Dietary intake of subjects

All subjects were interviewed for the dietary intake in lunch time and during whole day by recall method and noted in developed performa. Daily dietary intake at the time of breakfast, mid morning, lunch, tea, dinner and at bed time was noted in the performa. To assess the quantity of food consumed, subjects were shown the standardized utensils and asked to express the amount of food consumed. In addition, for eating habit of subjects consistency and size of cooked food for e.g. rice, dhal, vegetable and chapatti were also shown to the subject. At the time of lunch, amount of consuming MDM by subjects were also evaluated. Any specific food items if consumed weekly were also noted. The different food items consumed were converted into their raw equivalents. Average daily intake of all nutrients was calculated from the value per 100 gms of edible portion given in the “Food Composition Tables” (Gopalan *et al.*, 1989). The mean intake of nutrients was compared with the Recommended Dietary Allowances (RDA) given by ICMR (1989) to find out the percentage adequacy of nutrients in the diet of children.

3. Result and Discussion

Back ground details of selected children

Sixty percent of experimental subjects belonged to schedule cast followed by 40 percent in backward cast, where as 80 percent of control subjects belonged to schedule cast followed by 20 percent in backward cast. Majority of experimental subjects (65 %) had monthly family income in the range of rupees 2001 to 5000 followed by 35 percent had monthly

family income in the range of rupees 5001 to 7000. Where as in control group 60 and 40 percent of children had monthly family income in the range of rupees 5001 to 7000 and 2001 to 5000 respectively.

Status of mid day meal programme in the schools under study

During the study period it was found that mid day meal programme was running regularly in the schools. The meal was prepared by the cook in the kitchen hygienically and then served hot to the students. However, quality and quantity of food served to the children were below prescribed level in the mid day meal menu, so nutrient intake through mid day meals was also below prescribed level in mid day meal and also less than one third of R.D.A. value. However, it was noted that sufficient quantity of rice were provided to the children but with it quality of dhal or vegetable was not so good. In fact often watery consistency in the dhal (cooked) was observed. No micro nutrients supplementation in the forms of fruits or medicines was provided to the children. For purchasing food ingredients, the amount was deposited in the account of school authorities. For each primary and upper primary class children 4.8 and 6.7 rupees were spended per day respectively in the schools. School authorities found difficulty in running of mid day meal programme due to inadequate funding facility. There was a need to regularly monitoring of the mid day meal programme in the schools.

Anthropometric measurement of subjects

Initial height and weight of all experimental and control subjects were less than NCHS (2001) standard. After three months of mid day meal and home lunch consumption, height and weight of experimental and control subjects were increased by 4 and 7 percent and 2.1 and 3 percent respectively. However their measurement was still below NCHS standard.

Dietary intake of Subjects

The mean value of nutrient intake through mid-day meal, home lunch and whole day respectively by subjects of experimental and control group are presented in separate tables. Since protein and energy are major nutrient which are provided through mid day meal hence these tables compared the intake of these nutrients by experimental and control group. Although the supplementation of micronutrient through mid day meal was not so good. However for the query about the iron supplementation its intake is also showing in the following tables

Nutrient intake through mid day meal Vs. home lunch

Table 1-2 illustrates the nutrient intake through mid day meal Vs home lunch for the boys and girls in experimental and control subjects.

Table-1.Nutrient intake through mid-day meal vs. home lunch (Boys)

Nutrient intake	Mid-Day Meal	Home Lunch	Prescribed in MDM*	1/3rd of RDA**	% RDA of consumption	
	Mean ± SD	Mean ± SD			Exp.	Cont.
Protein (g)	10.73±1.29	11.63 ± 1.62	19.07	23.30	46.00	49.84
Energy (K cal)	478.00±46.00	451.21±57.52	712.62	816.60	58.52	55.25
Iron (mg)	1.30±0.20	2.21±0.98	2.87	13.66	8.93	16.18

* Average value derived from menu of MDM in School, Bihar (2009).

** Recommended Dietary Allowances (ICMR, 1989).

Table-2.Nutrient intake through mid-day meal Vs. home lunch (Girls)

Nutrient intake	Mid-Day Meal	Home Lunch	Prescribed in MDM*	1/3rd of RDA**	% RDA of consumption	
	Mean ± SD	Mean ± SD			Exp.	Cont.
Protein (g)	10.60±1.03	11.00±1.50	19.07	21.66	49.50	51.20
Energy (K cal)	471.81±44.28	415.52±26.64	712.62	686.66	69.05	51.00
Iron (mg)	1.61±1.01	3.88±0.77	2.87	9.33	17.00	41.58

* Average value derived from menu of MDM in School, Bihar (2009).

** Recommended Dietary Allowances (ICMR, 1989).

These reflects the intake of mean protein, energy and iron through MDM/home lunch by experimental and control subjects. Since RDA for boys and girls for the age group 13-15 yrs are different, hence individual table represents the dietary intake by boys and girls respectively. The protein (11.63g) intake by control boys was slightly greater than experimental boys (10.73g). Although energy intake by experimental boys (478 Kcal) was greater than energy intake by control boys (451.25 Kcal).Iron intake by experimental and control boys were 1.61 and 3.88 mg respectively.When compared with the amount that should be given through MDM, the protein, energy and iron intake by experimental group was less than prescribed value in MDM i.e. 19.07 g protein, 712.62 Kcal energy and 2.87 mg iron. In comparison with the value of 1/3rd R.D.A. of protein, energy and iron it was only 46, 58.52 and 8.93 per cent. Nutrient intake by control group was also less than one third value of R.D.A.

In the case of girls too protein, energy and iron provided to the experimental group were 10.6 g, 471.81 Kcal 1.61 mg respectively which was very much less than prescribed value i.e 19.07 g protein, 712.62 K cal energy and 2.87 mg iron in the menu of school meal. However the protein intake in control group through home lunch (11.0 g) was slightly greater than protein intake in experimental group (10.6g) through school lunch but energy intake by experimental group (471.81 K cal) was greater than energy intake (415.52 Kcal) by control group. Iron intake by experimental group (1.61 mg) was also less than control group (3.88 mg).All nutrients provided to both groups were less than 1/3rd of R.D.A. value. Contrary to this Narula (2008) studied the best practices adopted in mid day meal scheme in Haryana and found that upper primary class children were supplemented by 20 g protein and 716.2 Kcal energy. Kaushal (2009) also observed the best practices in the implementation of MDM programme in Rajasthan and found that in the menu of school meal for upper primary class children a minimum level of 700 Kcal energy and 20 g protein were maintained.

Whole day nutrients intake by subjects

Table 3-4 shows the whole day average intake of nutrients by experimental and control group. Individual table represents nutrient intake by boys and girls respectively.

Table-3 .Whole day nutrient intake by Subjects (Boys)

Nutrient intake	Exp. Group	Cont. group	RDA*	% RDA of consumption	
	Mean ± SD	Mean ± SD		Exp.	Cont.
Protein (g)	30.71±3.44	34.61±6.40	65.00	47.24	53.24
Energy (K cal)	1362.33±165.61	1353.90±113.35	2450.00	55.60	55.26
Iron (mg)	7.1±6.91	8.73±3.82	41.00	17.00	21.00

* Recommended Dietary Allowances (ICMR, 1989).

Table -4 .Whole day nutrient intake by Subjects (Girls)

Nutrient intake	Exp. Group	Cont. group	RDA*	% RDA of consumption	
	Mean ± SD	Mean ± SD		Exp.	Cont.
Protein (g)	27.54±4.40	30.61±1.5	65	43	47
Energy (K cal)	1100.12±182.31	1185.17±110.64	2060	53	58
Iron (mg)	8.37±1.72	10.19±0.26	28	30	36.39

* Recommended Dietary Allowances (ICMR, 1989).

The mean ± SD value of energy intake by experimental boys i.e. 1362.33 ± 165.61 (K cal) were slightly greater than control group i.e. 1353.90 ± 113.35 (Kcal) However the mean ± SD value of protein (g) and iron (mg) intake by control boys i.e. 34.61±6.4 (g) and 8.73±3.82 (mg) were greater than experimental boys i.e. 30.71 ±3.44 (g) and 7.1 ± 6.91(mg) respectively. When compared to the RDA value of protein (65g),energy (2450 Kcal) and iron (41mg) 47.24 and 53.24 per cent of protein, 55.60and 55.24 percent of energy and 17 and 21 percent of iron were consumed by the experimental and control boys respectively. Almost similar results were found by National Nutrition Monitoring Bureau (NNMB).According to report (2004-05) average intake of protein (g), energy (Kcal) and iron (mg) by boys of the age group was 13-15 (yrs) are 44.6 (g), 1645 (Kcal) and13.3 (mg) respectively. In the case of girls too, mean ± SD value of protein (g), energy (Kcal) and iron (mg) intake by control group i.e. 30.61±1.5 (g), 1185.17±110.64 (Kcal) and 10.19 ± 0.26 (mg) was slightly greater than experimental group i.e.27.54 ±4.40 (g),1100.12 ± 182.31 (Kcal) and 8.37 ± 1.72 (mg) respectively. When compared to the RDA value of protein (65g), energy (2060 kcal) and iron (28 mg), 43 and 47 percent of protein , 53 and 58 percent of energy and 30 and 36.39 percent of iron were consumed by the experimental and control girls. Similar results were also presented in NNMB report (2004-05) that intake of protein (g), energy (Kcal) and iron (mg) by girls of the age group 13-15 (yrs) are 42(g),1566 (Kcal) and 13 (mg) respectively.

Nutritional status of Subjects

Based on the changes found in the anthropometric measurement of subjects after three months of mid day meal and home lunch consumption, they were further categorized into type/degree of malnutrition .These categorization were based on Gomez and Waterlow classification which are presented in table 5 and 6 respectively.

Table-5 .Nutritional status of Children

Based on Gomez classification		Experimental (N=20)		Control (N=20)	
Weight/age		Percentage		Percentage	
% of NCHS median	Type/degree of malnutrition	Initial	After 3 month	Initial	After 3 month
<60	Severe	10	10	15	15
60-75	Moderate	35	35	45	45
>75-90	Mild	45	40	30	30
>90	Normal	10	15	10	10

Table-6.**Nutritional status of Children**

Based on Waterlow classification			Experimental (N=20)		Control (N=20)	
% of NCHS median		Degree of malnutrition	Percentage		Percentage	
% weight/age	% weight/ht.		Initial	After 3 month	Initial	After 3 month
>90	>80	Normal	10	10	10	10
>90	<80	Wasted	-	-	-	-
<90	>80	Stunted	90	90	85	85
<90	<80	Stunted & wasted	-	-	5	5

Changes in the extent of malnutrition (based on Gomez & Waterlow classification) found in experimental and control subjects initially and after three months of mid-day meal and home lunch consumption were presented separately.

Based on Gomez classification

Severe (<60% of NCHS median)

Initially 10 and 15 percent of experimental and control subjects suffered from severe malnutrition which remained same after three months of MDM/ home lunch consumption.

Moderate (60-75% of NCHS median)

Initially 35 percent of experimental subjects suffered from moderate malnutrition & the situation remained same after three months of mid day meal consumption. Where as in control group majority of subjects (45%) remained same after three months of home lunch consumption.

Mild (>75-90% of NCHS median)

A decline in the percentage of mild malnutrition from 45 to 40 were observed in experimental group after three months of mid day meal consumption. Where as in control group no changes in the nutritional status of subjects were observed. Initially 30 percent of control subjects were found in mild malnutrition category which remained same after three months of home lunch consumption.

Normal (>90% of NCHS median)

An increment in the percentage of normal nutritional status of experimental subjects from 10 to 15 percent were observed after three months of mid day meal where as in control group no change were found in normal nutritional status category.

Based on Waterlow classification

The table-4 clearly depicts that on the basis of Waterlow classification no change in the nutritional status of both experimental and control subjects were found after three months of mid day meal and home lunch consumption respectively.

Normal

Only 10 percent of both experimental and control subjects were found in the normal nutritional status, initially and after three months too.

Wasted (Short duration malnutrition)

No subjects in experimental and control group were found in this category.

Stunted (Long duration malnutrition)

Stunting was the major nutritional disorder by which greater percentage of both experimental (90%) and control (85%) subjects suffered. Percentage of these children found in this category remained same after three months of consuming MDM and home lunch respectively.

Stunted and Wasted (Current and long duration malnutrition)

No experimental subjects were found in this category. Although 5 percent of control subjects initially and after three months were suffered from stunting and wasting. i.e. current and long duration malnutrition. Similar results were found by Laxmaiah et al. (1999) who studied the impact of mid-day meal programme on nutritional status of children in Karnataka and found that mid-day meal programme improved marginally the nutritional status of children based on weight for age and Waterlow classification in the children of MDM schools as compared with non-MDM schools. Agarwal et al (1987) also found that the problems of mal nutrition and ill health can not be overcome by the school meal programme which provides less than 15 percent of the recommended dietary allowances for calories. Manjula (2004) also found that there was no significant difference between those who availing the mid day meal and those who do not.

Contrary to this Satato et al. (1993) found that school children supplemented with school lunch and with the combined intervention (lunch and deworming) improved the nutritional status based on weight for age and best result found when both intervention was combined i.e. food with deworming of the students. Ahmad *et al.* (2004) evaluated the school feeding programme (SFP) in Bangladesh and concluded that SFP improved the nutritional status of children. Musamali (2007) conducted a study to determine the role of school lunch programme in improving the nutritional status of children in Emuhaya Division of Vihiga Dist. of Kenya and found that nutritional status of participants were significantly higher than that of the non-participants. According to annual work plan and budget for MDMs in West Bengal (2009-10) evaluation done by DIETS in five district of state during April-June, 2007 showed that MDM has raised the health and nutritional status of primary school children. Based upon the result of present investigation it may be suggested that for obtaining good results, the schools managing mid day meal should have freedom to buy foods from local market otherwise delay in transportation negatively effect the health of children. Money should be deposited in the account of school authority for purchasing food grains when needed because due to irregular supply of food grains the programme was hindered for so many days and sometimes poor quality of grains were also provided to the school children. The menu suggested for mid day meal in Government plan is sufficient for growth of children hence it should be strictly followed. Regular micronutrient supplements should be provided to the children. There should be regular monitoring system for improving quality of meal.

4. References

[1]. Agarwal, D.K.; Upadhyay, S.K.; Tripathi, A.M. & Agarwal, K.N. (1987). Nutritional Status, Physical Work Capacity and Mental Function in School Children. *Nutrition Foundation of India,* Scientific Report .

[2]. Ahmed, A.U. (2004). Impact of Feeding children in School: Evidence From Bangladesh. Commissioned by The United Nations University International Food Policy Research Institute 2033 K Street, N.W. Washington, D.C. 20006-1002, U.S.A.

[3]. Anonymous, 2008-09, Annual work plan and work for mid day meal program in West Bengal.

[4]. Anonymous, 2009, India country over view in *The World Bank,* P: 141137-141127.

[5]. Anonymous, 2009, Less stunting but malnutrition remains in rural India, New report says in *World Food Program*.

[6]. Anonymous, 2001, Population projection report in *Census of India*.

[7]. Anonymous, 2004, Status of mid day meals and provision for conversion costs of different states in *Ministry of Human Resource Development (MoHRD) report.*

[8]. Anonymous, 2006, Study by National Nutrition Monitoring Bureau, NNMB.

[9]. Anonymous, 2005-06, Study by National Family Health Survey (NFHS)-3.

[10]. Anonymous, 2009, World Bank Report on Malnutrition in India in *The WorldBank,* P: 146736-146830.

[11]. Gomez, F.; Ramos, G.R.; Frenk, S; Cravioto, J; Chavez, R; Vazquez, J. (1956). Mortality in second and third degree malnutrition, *J. Trop. Pediatrics*. **2** : 77-83.

[12]. Gopalan, C.; Ramasastri, B.V. and Balasubramanaiam, S.C.1989. *Nutritive Value of Indian Foods*. National Institute of Nutrition, ICMR, Hyderabad , India.

[13]. ICMR,1989. Nutrient Requirement and Recommended Dietary Allowances for Indians. A report of the Expert group of the ICMR, NIN, Hyderabad, India

[14]. James, G.(2013).Fighting " classroom Hunger"Achivements of "Mid day meal Scheme" Yojana.

[15]. Jelliffee,D.B.1966.The assessment of the nutritional status of the community. Monograph series, No. 53, WHO, Geneva.

[16]. Laxmaiah, A.; Sarma, K.V.; Rao, D.H.; Reddy, G.; Ravindranath, M.; Rao, M.V. and Vijayaraghavan, K.1999. Impact of mid-day meal programme on educational and nutritional status of school children in Karnataka. *Ind. Pediatrics*, .**36** (12) : 1221-1228

[17]. Kaushal, S. 2009. A Study of Best Practices in the Implementation of Mid Day Meal Programme in Rajasthan.National University of Educational Planning and Administration New Delhi.

[18]. Manjula, A. 2004. Nutritional Status of Children in Different Types of Schools. Medical College, Calicut, Kerala.

[19]. Musamali, B. (2007). Impact of School Lunch Programmes on Nutritional Status of Children in Vihiga District, Western Kenya .*Afr. Jr. of Food Agriculture Nutrition and Development*, **7** (6) ISSN:1684-5358 EISSN: 1684-5374.

[20]. Narula, M. 2008. Best Practices Adopted in Mid Day Meal Scheme : Case study of Haryana. Department of Educational Administration, National University of Educational Planning and Administration , New Delhi.

[21]. NCHS, 2001 Third National and Health Examination Survey, Centre for Disease Control and Prevalence.

[22]. NNMB,2004-05.Age wise distribution of average intake of nutrients.

[23]. Satoto 1993. Preliminary Executive Report Evaluation of School Feeding Program (PMT-AS) in Lombok. (Unpublished).

[24]. Save the children Indian .(2016).Malnutrition in Indian statistics state wise.

[25]. Shalini Nair.(2015).The Indian express.35% urban Indian is BPL, says unreleased data.

[26]. Waterlow, J.C. (1972). Classification and definition of protein-calorie malnutrition, *Br. Med. J*., **3** : 566-569.

[27]. World bank .India, undernourished children :A call for reform and action.(last accessed on 2014apr 05).

[28]. India guide poplution of india (2017) .www.indiaonlinepages.com