REVIEW OF LITERATURE
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The review of literature increases the value of research by creating imparting a critical and brief analysis of the research problem and an evaluation of related studies. Review of literature means the consultation of previous works in order to understand. It holds significances for the existing research as it provides a critical look at the previous research.

The importance of review of literature in words of Goode, Barr and Scates "The component physician must keep abreast of the latest discoveries in the field of medicine obviously; the careful research worker should become familiar with the location and use of research literature."

Past knowledge helps the researcher to minimize duplicates of what had been done and provides useful hypothesis, assumptions and useful suggestions for citing studies that show substantial agreement and those that seem to present conflicting conclusion help to sharpen and define understanding of the existing knowledge in the problem area which provide a background for research.

Existing literature imparts essential knowledge and background that provides a basic framework for new research work. Basic framework also helps the researcher to minimize the dead ends, rejected studies and anomalies in research field.
It is essential that survey of literature should be relevant with the present one, made by other with this view in mind; following literature surveys have been collected.

In a study on 9000 school children conducted by Vijayaraghavan et. al. (1971) it was reported that children from well to do families were taller and heavier than the children belonging to poor families.

Vijayaraghavan et. al. (1971) stated that for age group 12-13, 13-14,14-15 years, the mean mid arm circumference(in cm) for well to do girls was 21.04, 25.669, 21.628, and 22.06, 26.008 respectively.
Rath et. al. (1978) reported the mean height for athletes at 13, 14 and 15 years of age were 154.83 cm, 158.83 cm, and 158.31 cm respectively and mean gain in height occurs between 9 to 12 years.

Sathayavati et al. (1981) study demonstrated that the chest measurement taken on 2707 school going adolescent boys and girls of Andhra Pradesh average age between 10 years the chest circumference values were similar in both rural and urban adolescents.

Agrawal et al. (1987) found that such programmes ‘did not result in any measurable improvement in physical growth, stamina or mental functions’. However, as discussed earlier there is evidence that nutritious Mid-day meal combined with micronutrient supplementation do have a major impact on child nutrition.

Babu and Hallam(1989) Cited the Ramchandran (2003) who did an evaluation of Tamilnadu Mid-day meal scheme in 1984 and found a highly significant increase in school enrolment due to school nutrition. Under this programme the HRD ministry in the central government allocates free food grains for the school central at the rate of 100gm per child for ten months in a year.

According to a personal communication from Sunil Kumar, secretary of chief minister in Chhattisgarh, Class-1 enrollment in Chhattisgarh rose by 19% for girls and 9% for the boys between 2001-02 and 2002-03.
Rao et al. (1989) in their study on school girls from poor families recorded the weight (in kg.) at 13, 14 and 15 years of age as 33.4±5.6, 36.2±3.4, and 37.4±3.7 respectively.

A study on (5-15) years old healthy girl by Qamra et al. (1990) showed that the mean weight in the age group 12-13, 13-14, 14-15 years in the upper socio economic echelon were 37.6 kg, 41.8 kg, and 44.2 kg respectively where as In the low socio economic group were 31.7 kg, 35.8 kg and 38.8 kg respectively.

Bhasin et al. (1990) conducted a study in five public schools of Haryana. Height and weight of 4405 well to do school children between the ages of 5 to 15 years were measured using standard accepted techniques. height and weight of the children were compared with Indian Council of Medical Research (ICMR) standards; mean height and weight of the children at 13, 14 and 15 years of age were 152.88 cm, 154.79 cm and 161 cm respectively and 43.89 kg, 45.44 kg, and 48.52 kg respectively; the values of the mean height and weight of the Haryana children were significantly higher at all age.

Awate et al (1997) in their study conducted in rural south west Maharashtra found the prevalence of vitamin A deficiency to be 9.8%.

A. Laxmaiah et al. (1999): Conducted a study on total of 2,694 children (MDM: 1361; Non-MDM : 1333) from 60 schools were covered in the study. Results of the study indicated better enrolment (p <0.05) and attendance (p <0.001), higher retention rate with reduced dropout rate (p <0.001) a marginally higher scholastic performance and marginally higher growth performance of MDM.
children. They concluded that MDM program is associated with a better educational and nutritional status of school children in Karnataka.

Mishra & Retherford (2000): Children whose mothers have little or no education tend to have lower nutritional status than children of more educated mothers, even after controlling potentially confounding demographic and socio-economic variables.

Sonia Sinha (2002) “while the administration claims the increase [in enrolment] is because of its push for primary education villagers say the main attraction is the free Mid-day meals the children get in the government-run schools.” School meals were particularly attractive at that time because of the severe drought conditions prevailing in Rajasthan.

Duraisamy (2002) concludes that parental education, family income, and availability of middle schools within the village have a significant positive effect on child school enrolment decisions in India. Dreze and Kingdon (2001) and Leclercq (2001a, 2001b) find similar results for north India. However, they stress school quality as the key determinant of enrolment and grade attainment.

Survey in rural population of India, by National Nutrition Monitoring Bureau in 2002, reported prevalence of malnutrition, (using Gomez classification) to be 94.6% among 6-9 year and 97.1% in 10-13 year old. The prevalence is slightly more than that reported in our study. The report did not show any difference in prevalence of malnutrition among males and females, as also seen in the present study.


Rajivan (2003) presented a comprehensive amount of the history of school feeding programmes in Tamilnadu.

Sethi (2003) this study focuses on Ryagada district (Orissa), where cooked Mid-day meals have been provided since 1995. The author find evidence not only of an increase in class-1 enrolment, but also of the improved retention throughout the primary scale.

Ramachandran(2003) In an experiment aimed at stimulating ‘the general run of the school meals programmes in the country’

Ramachandran (2003) observed that the full extent of this phenomenon is yet to be rigorously investigated but it does seem to be very common, judging from recent studies of ‘classroom hunger’ in underprivileged neighborhoods of Delhi (Janaki personal communication ) as well as deprived areas of rural India.

Menon and S. Rao (2003) observed that there are significant pockets of upper- caste resistance to the appointment of dalit cooks. This came to light in the context of the recent extension (in July 2003) of mid-day meals of the southern part of state, which is said to be more conservative in the respect than the northern
region. In village Chikkaturuvekere of Tumkur district. Some children apparently had to go through purifying rituals after eating food prepared by a dalit cook at school. Opposition to dalit cooks was also reported in the number of other villages and even led to children being withdrawn from school in some cases.

Ramchandran et. al. (2003) author note (pp 12 and 17): ‘…the community and teachers were all praise for the mid–day meal programme in Karnataka and the Mid-day meal programme in the Andhra Pradesh that commence on January 1, 2003. No Wonder the Supreme Court’s judgment on serving cooked meals in school instead of distributing dry rations was welcomed by parents and children.

Gopaldas and Ravi (2003) found well worth emulating (particularly in terms of the combination of Mid-day meal with Macronutrient supplementation and deworming), is that of Gujrat.

Dreze and Goyal (2003) conducted a survey(in Chattisgarh, Karnataka and Rajasthan) between January and April 2003 in three sample states: Chattisgarh, Karnataka and Rajasthan. The survey included 81 randomly selected villages (i.e. 27 villages in each state) and involved interviews with teachers, parents, cooks and others. Even though they found the presence of a mid-day meal scheme in all three states, they argued that well-devised school meals could contribute to the advancement of elementary education, child nutrition and social equity and a badly devised scheme might do more harm than good. The negative findings included:

• very poor infrastructure facilities (e.g. cooking shed, water supply and utensils);
• repetition of the same menu every day (i.e. in Rajasthan, ghoogri14, in Chattisgarh, rice with dal or vegetables and in Karnataka, a better menu of rice and sambar15 with vegetables, pongal,16 lemon rice and even sweets like kshira17);

• overt and covert forms of caste prejudices and discrimination toward lower caste children and cooks in some areas;

• serious health hazards including children falling sick after meals;

• disruption of classroom processes because teachers had to oversee the operation (e.g. in one place there were soot-covered classrooms using make-shift stoves and inadequate utensils with help from young children to cut vegetables which resulted in no teaching after lunch);

• Very low allocation of funds per meal (50 paise18, US$0.01).

Positive effects included:

• improved school enrolment (from 15-29 percent), especially in girls;

• improved school attendance and retention through the day;

• socialization to overcome caste and gender prejudices in some cases;

• non-income support to poor families;

• good management of food logistics in terms of delivery and supply;

• Comparatively good financial allocation (i.e. 1 rupee) and management in Some states such as Karnataka and Tamil Nadu.
Parikh and Yasmeen (2004) Dr. A. S. Seetharamu, Professor of education at the Institute of Social & Economic Change, Bangalore, cited the Parikh and Yasmeen. However, report suggests that people have found a way round the scheme to divide money to their own coffers.


Thorat, Sukhdeo and Lee, Joel (2004) Dalit and right to food: Discrimination and exclusion in food related government programme; Indian Institute of Dalit Studies (IIDS)

Bhattacharya et. al. (2004) reported prevalence of Vitamin A deficiency to be 8.16% in primary school children in Naxalbari area of Darjeeling district. In the same study, Bitot’s spot prevalence was found to be 3.63%.

A Study conducted by Thorat and Lee (2004) at Indian Institute of Dalit Studies (IIDS), New Delhi shows Utter Pradesh and Bihar, where one third of India’s dalit live, deny dalit and other poor children access to their legislated entitlements from the very beginning, by simply refusing to implement the shared cooked, Mid-day meal.

West Bengal: the Pratichi research team (2004) conducted a study in the Birbhum District comparing 15 schools chosen randomly from a block that ran the mid-day programme with 15 schools chosen randomly from a block that did not run the programme. Parents and children from ten households in each of the 15 schools were interviewed along with teachers, parent-teacher associations, panchayat
members, Anganwadi Sahayaks, others involved in cooking and political and social activists. The findings were also corroborated through a workshop where respondent parents and teachers were assembled.

The team found that attendance was up by more than 10 percent in schools where the mid-day meal programme was run, while it was constant for the others. This impact was much higher among the SC (12.6 percent), ST (19.9 percent) and Muslim (13.2 percent) populations and the greatest impact was for ST girls (25.4 percent). Perceptions of impact varied. While the majority of the Hindu households felt that there was no positive impact, the wage earners and small cultivators (i.e. with SC, ST and Muslim background) saw important impacts of the programme, including the ability to provide a second meal during the day. It was also felt that social taboos and inhibitions were reduced by sharing a meal. Teacher attendance was also reported as being more regular due to increased responsibility. While 80 percent of the parents were in favour of the programme, 20 percent who were caste Hindus were opposed to it, mainly because they did not really benefit from it because their children had a meal anyway and also because the increased attendance brought in more SC, ST and Muslim students. Eighty-two percent of the parents were willing to contribute and help in the programme either in cash, kind or labor.

The meal served consisted of khichuri23 and 80 percent found the food attractive, though there were also suggestions for improvements. Before coming to school, 74.4 percent of the children did not have any food, with a few having just tea. Most children (88 percent) wanted the programme to continue. In the areas without a mid-
day meal programme, most parents wanted the scheme to be introduced and were inclined to participate in making that happen.

The study also reported on the following problems:

- poor quality and variety of food;
- poor hygiene (including reports of sickness after meals);
- inadequate infrastructure (e.g. food was prepared in the open with the possibility of accidents and without adequate utensils);
- inadequate payment of salaries to cooks;
- insufficient budgetary allocation toward conversion costs which reportedly resulted in the fixed menu;
- caste and religious bias among some parents in some places;
- limited opportunities for parental participation in the programme;
- disturbance in teaching activity due to time demands on teachers, even though their participation was whole-hearted and parents were sometimes involved as well.

De, Anuradha, Noronha, Claire and Samson, Meera (2005) presented report towards more benefits from Delhi’s Mid-day meal scheme CORD (Collaborative Research and dissemination, New Delhi.)

Thorat and Lee (2005) presented that reports have come in from both Karnataka and Rajasthan. A study done by IIDS which documents how dalit cooks
were proposed in a majority of the village in the Rajasthan and in a substantial proportion of villages in AP and TN.

Zaidi (2005) observed that free mid-day meal for school Children were first introduced in a Japanese Private schools in late 1800s. In Brazil in the year 1938 and in the united states in the year 1946(Parikh and Yasmeen, 2004). Seeing the experiences of the countries like Brazil United States and Japan, the Mid-day meals should not be discarded by Government.

Afridi (2005) is the only paper that looks at the nutritional impact of the program in India. Using a 24-hour recall of food intake in a randomized evaluation in Madhya Pradesh she found that “daily nutrient intake of program participants increases by 49% to 100% of the transfers. For as low a cost as 3 cents per child, the program reduces daily protein deficiency of participants by 100% and calorie deficiency by almost 30%.”

Afridi (2005) reports on a survey conducted in January-February 2004 in 41 randomly sampled villages in the non-tribal block of the Chindwara District of Madhya Pradesh. Within each village, 15 households with a child from ages 5-12 were surveyed through systematic random sampling. The enrolled child was then linked to the school he or she attended. Information on the scheme was collected from 615 households, 74 primary schools (public and private) and 35 village panchayats.

Afridi (2005) calculated the caloric and protein content of the school meal in samples collected from 63 schools in Madhya Pradesh. He found that variety in
meals served the purpose of meeting the requirement of recommended allowance rather than serving the same menu on all days. A programme which serves a varied menu was found to meet 22 percent of the daily recommended allowance for children, whereas wheat porridge (the same menu every day) met only 11 percent of the daily recommended allowance of energy intake. One common problem with meeting the nutritional requirements of children was found to be the substitute nature of the meal. Most studies reported that the MDM actually serves as a substitute for home food rather than a supplement (Blue, 2005).

Gopaldas et al (2005) reported a decrease in night blindness and vitamin A deficiency from 67% to 34%, as an impact of improved Mid-day meal program in Gujarat.

Blue (2005) conducted a study in Rajasthan in eight schools (recommended by Block Education Coordinators) in rural Rajasthan among subsistence farming tribal communities. She conducted personal observation and semi-structured interviews using a local translator with teachers, cooks, primary school children, parents and Seva Mandir para workers. She reported that in Rajasthan it was difficult to draw conclusions on the programme’s effect on school enrolment because the mid-day meal programme was launched concurrently with the Shiksha Aapke Dwar programme which required teachers to identify non-enrolled students in villages and persuade them to attend school. In support of this argument, she points out that the summer meal programme conducted during holidays attracted far fewer children than had been expected, causing food to be thrown away. Blue
reports a widely held belief that retention had improved due to the introduction of the mid-day meal scheme, but she questions the net impact of the scheme.

The problems she identified include:

- children and teachers spending long hours fetching firewood and stirring pots of ghoogri and sometimes, in the case of older children, even helping with actual cooking;
- large amounts of time spent by teachers supervising meal preparation and maintaining records;
- the inadequacy of funds to provide quality meals;
- cooks’ dissatisfaction with the meagre salaries paid to them;
- children’s boredom with monotonous menus;
- lack of enough plates in some cases, resulting in children eating off leaves or paper;
- irregular and delayed delivery of wheat and funding in some cases.

Delhi: De et al. (2005) looked at the implementation of the mid-day meal programme in an urban setting. The main difference in the implementation of the programme in Delhi is that (as in Bangalore and Hyderabad) the food is cooked in a central kitchen. The study concentrated on the Municipal Corporation of Delhi (MCD) schools which included the highest proportion of children from slum areas.
and disadvantaged socioeconomic backgrounds. In January 2003, MCD invited expressions of interest from NGOs and caterers to supply cooked food. The financial allocation was INR 2.40 (US$0.06) per child per day. INR 2 (US$0.05) was given as cash (for pulses, vegetables, oil and condiments) and 0.40 paise (US$0.0001) was given as food grains (i.e. rice and wheat to be lifted from the FCI godowns in equal proportion). District Education Officers (DEOs) in different zones in Delhi were given the responsibility of selecting the NGOs and caterers to cook, distribute the food grains to selected NGOs and caterers and reimburse their expenses. There were 11 NGOs running 13 kitchens feeding 25,000-100,000 children annually. To monitor the programme, the Nutrition Foundation of India, an independent organization, conducted surprise visits and the Sri Ram Industrial Research Institute tested samples from the kitchen. The survey included a school survey and a household survey and was supplemented by visits to some of the kitchens. The school sample consisted of 12 schools in six outlying areas of Delhi where the slum proportion is high. Since school use is maximized through two shifts, both were studied with the research team observing pre-meal, meal and post-meal dynamics. The household sample consisted of ten households from each site selected on the basis of having a child who was enrolled.

The main discrepancies between the programme and the Supreme Court guidelines were that:

- the quantity and quality of food were likely to be less than the minimum stipulated by the court;
low quality rice was provided by FCI, which required suppliers to exchange it for better quality rice from the market;

infrastructure facilities (e.g. drinking water supply) to enable the scheme to function well at the school level were not present. The study found that there were questions about whether the meal was to be considered as a substitute for a child’s daily food intake or a supplement to it, given the meal’s small size and limited nutrition. It also needed to be linked to other health initiatives. Other possible supplementary benefits, such as inculcating greater nutritional awareness in children and enabling parental involvement, were not being fully explored. The study highlighted a concurrent problem, which was the need to improve educational standards and give attention to children in areas relating to child security. The cooked mid-day meal was having an impact, however, by improving equity and reducing the gender gap. Parents and teachers expressed misunderstandings regarding the scope of the impact of the mid-day meal programme.

Gangadahran (2006) observed according to study of Mid-day meals (termed as noon-meal scheme in Kerala) running in Kerala. The physical facilities for Mid-day meals are available only in 50% schools; 94% schools depend on firewood for cooking; separate building for kitchen outside class rooms are rare; adequate space is not there in 50% schools with less schools. Schools verandah is the main venue for serving food.
Khera (2006) is the best review article of these surveys; it lists nine surveys done in the period 2003-2005 focusing on MDMS and reviews their major findings. In general the surveys focused on the effect of the scheme on enrolment, attendance and retention as well as aspects of infrastructure change, caste discrimination and opinions of stake-holders (teachers and parents) about the scheme. The surveys were almost unanimous in documenting a rise in attendance rates as well as enrolment rates especially benefiting girls and in one study children from the scheduled castes. Afridi (2007) confirms these findings using a difference-indifferences estimator, finding large benefits in school participation especially for girls.

Caste discrimination in the school meals programme has been reported by Thorat and Lee (2005), the Dalit Study Circle (2005), Sreenivas (2003), Sainath (2001), Menon (2003) and Ravi (2006).

Lack of education of mothers is a significant underlying cause of malnutrition in children (UNICEF, 2006). Data from NFHS–3 were analyzed to see whether there was an association between the level of maternal schooling and prevalence of malnutrition in children. A definite negative relationship between underweight and stunting in children with the level of education of mother is discernible. Incidence of malnutrition is seen to be much higher among children of illiterate mothers. Completed education of more than 8-9 years is positively associated with malnutrition. Other than wasting, all forms of malnutrition including anaemia seem to reduce with increase in education of mother.
Nair (2007) found that complete absence of education in women was the only one that had a significant co-efficient of correlation with malnutrition at all the three points of time.

Pandey (2007): A longitudinal study conducted in West Bengal found that educated mothers (primary level education) made a significant difference as they ‘took better care’ of their children as reflected in the children’s nutritional status.

A number of investigators have analyzed the NFHS data on child malnutrition to understand the determinants of malnutrition (Radhakrishnan & Ravi, 2004a; Ramakrishnan et al, 1999; Mishra & Retherford, 2000; Nair, 2007). Using NFHS-2 data, a multivariate analysis of the effects of selected demographic and socio-economic factors on child malnutrition by Mishra et al (1999) indicates that the strongest predictors of child malnutrition are a child’s age, the child’s birth order, the mother’s education and the household’s standard of living.

CUTS (2007) Measuring effectiveness of Mid-day meal Scheme in Rajasthan, India, CUTS Centre for Consumer Action, Research & Training (CUTS CART) in partnership with the World Bank. A study of Mid-day meals in Rajasthan concluded that

a) Initially, Childrens were distributed boiled wheat supplemented with ground nut and jaggery (Gur) under Mid-day meals;

b) more than 90% parents and Childrens were satisfied with Mid-day meals;
c) each school is required to send a monthly expenditure statement and vouchers to Panchayat Samiti which is supposed to reimbursed the amount within 15 days;

d) Only 21% of the school received the funds every month.

Ms. Renuka Chaudhari (2008) reported that the union minister of state for women and child development has become keen on public private partnership for delivering ready to eat food.

Baru et.al.(2008) observed that reports at the department of public instruction show that school attendance has improve since the introduction of Mid-day meals by to 10% across Karnataka (Ravi, 2006).

SSMI (2008) presented the Brief report on the National Seminar on feeding the child. Organized by the Swami Sivananda Memorial Institute (SSMI), India International Centre(IIC), New Delhi.

Abhijeet Singh (2008) reported positive impact of school meals on school participation; daily nutrient intake and cognitive learning provide a strong justification for the program in India.

Some researchers (Ghai OP et. al. (2009), Devdas RP(1978) etc.) in the past noted some improvement in the distribution of weight for age of MDM schools compared to non-MDM schools.

Arun Sharma (2010) reported that MDM provided by any modality affects the growth rate of the primary school children. MDM provided by NGO has no
better impact on growth of the primary school children; however, it reduced prevalence of vitamin deficiency significantly in comparison to the MDM run by Village Panchayats. It may be concluded that children who presented with conjunctival xerosis at base line, some of them advanced to the stage of Bitot’s spot due to lack of therapeutic intervention, whereas reduction in prevalence of conjunctival xerosis occurred as an impact of the Mid-day meals.

Neelam Sood (October, 2010) concluded that malnutrition in early childhood is linked to deficits in the cognitive development of children. These effects have been found to persist through school and result in impaired learning capacities. Stunting in children delays school enrolment and is found to be associated with grade repetition and a higher dropout in primary school children. Children who suffered from early malnutrition were also found to have greater behavioral problems. Deficiency of micronutrients such as iron, iodine and zinc is associated with a lower attention span, poor memory, mental retardation and poor school achievement. Continuous low nutritional intake combined with poor access to healthcare is likely to impact on children’s psychological development in terms of attentiveness, emotional expression, motivation, learning ability and school performance. Nutrition is interconnected with the environment, psychological health, health and education.

Pallavi, Dr. Kacha Kulshrestha, Prof. Rita Bakshi (October, 2010) observed nutritional evaluation of mid day meal in selected Govt. schools in Ghaziabad district (India). The mean values of the nutrients were found as follows: Calories-
458.12±33.31 Kcal, Protein: 10.58±4.35 grams, Calcium: 40.18±22.72 mg), Vitamin A: 31.03±28.78 µg, Vitamin B: 0.11 ±0.02 mg, Vitamin-C: 6.57±4.68 mg, Iron: 2.90 ±2.18 mg, Fat: 5.26±2.15 gram, Riboflavin:0.05±0.01 mg, Niacin:-2.00±0.72 mg, Carbohydrate:-92.01±8.89 grams, Fiber: 0.85±0.55 gram, Sodium: 684.78 ±298.94 mg.

Pallavi, Dr. Kachan Kulshrestha, Prof. Rita Bakshi (December, 2010): observed Impact of mid day meal programme on health status of children.