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MID DAY MEAL SCHEME AND ITS IMPACT ON THE NUTRITIONAL STATUS OF CHILDREN IN INDIA – A SYSTEMATIC REVIEW

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ABSTRACT

Aim: *To evaluate the effect of Mid-Day Meal scheme and its impact on the nutritional status of children in India.*
Materials and Methods: *Database search was done in PubMed, Scopus, Cochrane Library, Ovid Medline, Elsevier science direct, Wiley online library, Grey literature, Embase. MeSH terms used to collect the articles for this systematic review are 'Mid Day Meal' AND 'nutritional status' AND 'school children'. Of 135 articles 107 were screened and eight studies were eligible for this systematic review. PICO model and PRISMA guidelines was used. Cochrane risk assessment tool was used for bias analysis.*
Results: *Eight studies were reviewed. Studies showed that there is a reduction in stunting another study showed that there is a gender differences, MDM showed underweight whereas non MDM school showed nutritional deficiency.*
Conclusion: *This study concludes that the MDM scheme is effective in reducing the number of nutritional deficiencies with the presence of stunting and wasting diseases. Hence encouraging a more nutritious food should be included in the MDM scheme.*
KEYWORDS: *Mid-day meal, nutrition, school children.*

INTRODUCTION

India has one of the world's highest demographics of children suffering from various types of malnutrition, which is double that in Sub-Saharan Africa [1]. A total of 44% of children under the age of five are underweight, while 72% of infants have anaemia [2]. In particular, the rate of undernutrition from lack of micronutrients, especially iron deficiency anaemia, is high in India. According to India's National Family Health Survey [3], more than half the women (55%) have iron deficiency anaemia. In addition, underweight, wasting, and stunting are also prevalent in children under five (36%, 21% and 38%, respectively) [3]. These figures hint at serious long-term consequences for human capital

development and the productivity potential of the nation. More importantly, they also imply the denial of basic human rights of children, such as access to food. Education and nutrition are two important pillars of child development. Lack of proper nutrition during childhood can result in impaired physical, intellectual and mental growth. Nutrition has a direct impact on education and learning among children. Moreover, inadequate nutrition during childhood may lead to malnutrition, growth retardation, reduced work capacity and poor mental and social development (Awasthi, Kumar, Tiwari & Singh, 2000). It is also observed that despite the World Bank's inclusion of school health as an essential component of the public health package for cost-effective health programmes, the health of school-going children has received little attention in the developing world (World Bank, 1993). The prevalence of underweight children is highest in India and child malnutrition among school-going children is accountable for 22 per cent of the country's burden of disease (National Institute of Nutrition, 2000). Malnutrition is one of the most serious health problems concerning children and is the single biggest contributor to child mortality. Nearly one-third of the children in developing countries are either underweight or stunted. In India, malnutrition is a 'silent emergency' that deserves greater attention and action for the development and well-being of the nation (Government of India, 1993). Furthermore, it is observed that despite India's free primary education policy, a large percentage of children, especially from the rural and under-

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privileged sections, do not attend school. This is mainly due to lack of awareness about the value of education in these areas (Chutani, 2012). In this backdrop, the Government of India launched the National Programme of Nutritional Support to Primary Education (NP-NSPE) on 15 August 2015 to enhance enrolment, retention and attendance rates and simultaneously improve nutritional levels among children. Implemented first in 2,408 blocks in the country, this scheme was later extended to other blocks and is now known as the mid-day meal (MDM) scheme (Government of India, 2006). This systematic review aims to identify the effectiveness of Mid day Meal programme on the nutrition status of the school children.

RESULTS

Flow chart: 1 Flow chart diagram showing the number of studies identified, screened, assessed for eligibility, excluded, and included in the systematic review

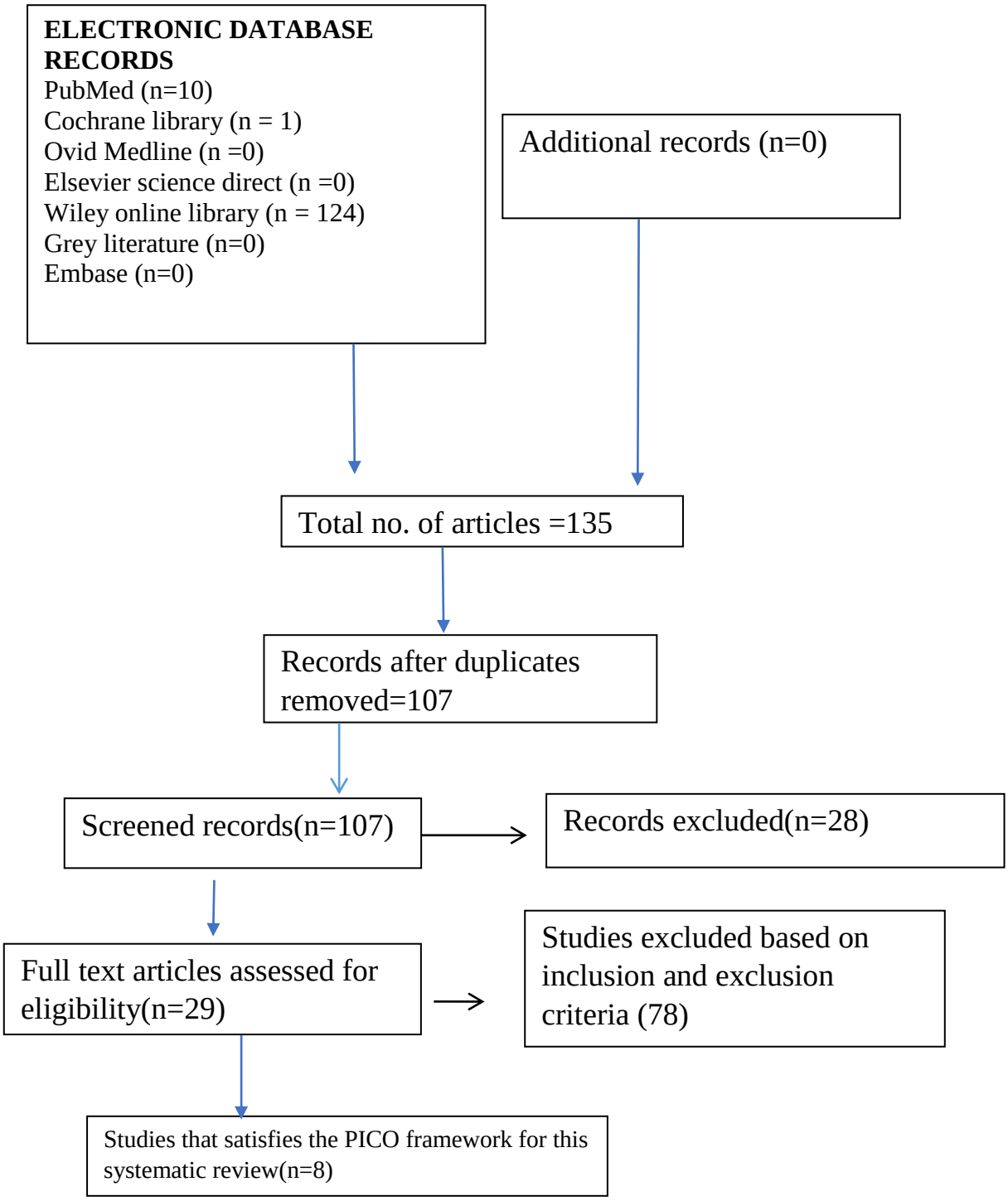

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TABLE:1 CHARACTERISTICS OF INTERVENTIONS INCLUDED IN THE STUDY

S.NO	AUTHOR	YEAR	TARGET POPULATION	PREPARATIONS USED
1	Christie Minj et al	2017	children aged 6-12 years in 4 Primary Schools	National Programme of Nutritional Support to Primary Education (NP-NSPE) MID DAY MEAL PROGRAMME
2	Janmejaya Samal et al	2009	SCHOOL CHILDREN	mid-day meal (MDM) scheme.
3	Randeep Kaur et al	2012	SCHOOL CHILDREN	mid-day meal (MDM) scheme.
4	Seetha Anitha et al	2019	SCHOOL CHILDREN	mid-day meal (MDM) scheme.
5	Palanisamy Navaneethan et al	2011	children between 11 and 18 years old	Mid-Day Meal schemes
6	KV Rameshwar Sarma et al	1995	6 to 1l years old school children	mid-day meal (MDM) scheme.
7	F.Alim et al	2012	6- 14years old school children	Mid Day Meal scheme
8	Prerna P Patel1,	2016	10 to 14 years old school children	Mid Day Meal scheme

TABLE: 2 OUTCOME OF THE DATA INCLUDED IN THE STUDIES

S.NO	AUTHOR	METHODS USED	RESULTS	OUTCOME
1	Christie Minj et al	CDC (Center for Disease Control, Atlanta, USA) growth charts were used to calculate the weight for age percentile, and height for age percentiles.	Comparison of nutritional status of boys before and after the introduction of the MDM program revealed improved nutritional status	Post MDM there was reduction in the proportion of stunting and in addition was a reduction in the proportion of children with undernutrition (grade 2 and grade 3).
2	Janmejaya Samal et al			There are a good number of intended consequences of MDM scheme which include enrolment, retention, attendance, eradication of school hunger, family stability, improvement of malnutrition, employment to women of disadvantaged communities, improvement of girl child education,
3	Randeep Kaur et al			Specifically, the analysis found the effect of the mid-day meal program on girls to be almost twice its effect on boys for primary school enrollment, suggesting that the program had a positive impact on reducing the gender gap in school participation

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4	Seetha Anitha et al			significant potential for millets to replace or supplement rice in school feeding programs for improved nutritional outcomes of children
5	Palanisamy Navaneethan et al	Body Mass Index (BMI)	malnutrition among school children can be eliminated by providing additional healthy foods and by improving the Socio Economic Back-ground (SEB) of the region.	83% of the students were underwei- ght (BMI < 18.5).
6	KV Rameshwar Sarma et al	clinical examination for deficiency signs and through anthropometry by using standard methodsand equipment.	nutritional status revealed better growth performance among the regular beneficiaries in the program	15% of the children in MDM schoolsand 23% in non-MDM schools were showing one or more signs of nutritional deficiency.
7	F.Alim et al	Anthropometric measurement and clinical examination	Nutritional status of the MDM school children under study was found to be lower than those of NMDM	The prevalence of stunting among MDM boys and girls were 75.37% and 74.68% respectively and wasting was observed 86.3% for boys and 76.53% for girls
8	Prerna P Patel1,	Anthropometric measurement and clinical examination and BMI was measured	MDM receiving adolescents were still vulnerable to energy, protein, and micronutrient deficiencies. Our study shows that though the MDM program acts as a supplement, however, it is not the sole source of RDA	Percentage of stunting (24% boys and 19% girls) and wasting (17% boys and 18% girls) was significantly higher in adolescents receiving MDM

TABLE: 3 BIAS ANALYSIS FOR THE INCLUDED STUDIES

S. No	Author	Random Sequence Generation	Allocation Concealment	Selective Reporting	Incomplete Outcome Data	Blinding Of Outcome Assessment	Blinding Participants And Personals
1	Christie Minj et al	+	-	-	-	?	+
2	Janmejaya Samal et al	+	-	-	-	?	+
3	Randeep Kaur et al	+	-	?	-	?	+
4	Seetha Anitha et al	+	-	-	-	?	+
5	Palanisamy Navaneethan et al	-	-	-	-	-	-
6	KV Rameshwar Sarma et al	-	-	-	-	-	+
7	F.Alim et al	-	+	-	-	-	-
8	Prerna P Patel1,	-	-	-	-	-	+

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DISCUSSION

With the aims to improve the nutritional status of children, and enhance retention and attendance rates in schools, the Scheme provides prepared lunches on working days to every child enrolled in Government and Government aided primary and upper primary schools. Here in our systematic review, we have taken few articles which evaluated the effect of Mid-Day Meal program on the nutritional status of the school children.

Christie Minj et al compared the nutritional status of children aged 6-12 years in 4 Primary Schools two years before and after the introduction of the MDM Programme. Children enrolled in 4 Government Lower Primary Schools in Sarjapura PHC area were studied. Children belonged to the age group of 6 to12 years. The CDC (Centre for Disease Control, Atlanta, USA) growth charts were used to calculate the weight for age percentile, and height for age percentiles. Comparison of nutritional status of boys before and after the introduction of the MDM program revealed improved nutritional status. Percentage of stunting and grade 3 malnutrition had reduced in all age groups except among 6 years. The inter gender comparison of the heights before and after the MDM programme showed, a greater proportion of girls were stunted before the

MDM programme. Post MDM there was reduction in the proportion of stunting and in addition was a reduction in the proportion of children with undernutrition (grade 2 and grade 3). The improvement in the nutritional status post MDM in girls was more.

Janmejaya Samal et al developed a checklist by the Family Criteria (Ad Hoc) Task Force of the Consortium of Family Organizations (COFO) for assessing the intended and unintended impact of public policies, proposals and social programmes on families is used. This checklist, which was later revised by the Policy Institute for Family Impact Seminars, outlines six principles to guide analyses of the family supportiveness of policies and programmes: family support and responsibilities, family membership and stability, family involvement and interdependence, family partnership and empowerment, family diversity and support of vulnerable families. There are a good number of intended consequences of MDM scheme which include enrolment, retention, attendance, eradication of school hunger, family stability, improvement of malnutrition, employment to women of disadvantaged communities, improvement of girl child education, etc. However, it also has some unintended consequences, including food contamination or food poisoning. Social discrimination can also be seen as an intended or unintended consequence of MDM.

Randeep Kaur et al suggested that the mid-day meal scheme increased the probability of enrolment in primary school and on-time enrolment in first grade. An analysis of heterogeneity in results shows that the program had larger effect on socially disadvantaged groups and on girls. Specifically, the analysis found the effect of the mid-day meal program on girls to be almost twice its effect on boys for primary school enrolment, suggesting that the program had a positive impact on reducing the gender gap in school participation.

Seetha Anitha et al founded that there was statistically significant improvement in stunting ($p = 0.000$) and the body mass index ($p = 0.003$) in the intervention group and not in the control group ($p = 0.351$ and $p = 0.511$, respectively). The sensory evaluation revealed that all the millet-based menu items had high acceptability, with the highest scores for the following three items: finger millet idly, a steam cooked fermented savoury cake; little and pearl millet bisi belle bath, a millet-lentil hot meal; and upma, a pearl and little millet-vegetable meal. These results suggest significant potential for millets to replace or supplement rice in school feeding programs for improved nutritional outcomes of children.

CONFLICTS OF INTEREST: NONE

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