Impact of Integrated Child Development Scheme (ICDS) on morbidity status of children and knowledge, attitude, and practice of mothers towards ICDS: A comparative study

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ABSTRACT

Background: Nutrition during the early age of life has a prominent impact on growth and development during childhood period and serves as a key determinant of health and nutritional status in adolescent and adulthood life. **Objectives:** The objectives of the study were to assess the health status and morbidity pattern of children attending and not attending Integrated Child Development Services (ICDS) center and to find out the knowledge, attitude, and practice (KAP) of the respective mothers regarding ICDS scheme. **Materials and Methods:** A community-based cross-sectional study was carried among children between 0 and 6 years of age residing in an urban slum area of Karad Municipal Corporation of district Satara, attending and not attending Anganwadies. The study was conducted over a period of 6 months during the year 2017. A total of 500 children were studied for clinical examination and anthropometric measurements with pre-tested, self-administered, and structured questionnaire. The data were computerized in a rational database management system and analyzed using Chi-square tests for statistical significance. **Results:** Out of a total of 500 children, maximum 58.8% were from age group 37 to 72 months with apparent differences in male and female proportions. The prevalence of undernutrition was significantly high among children not attending Anganwadis (32.4%) and showed 1.8 times the risk of developing under-malnutrition as compared to Anganwadis attendance. The morbidities such as malnutrition (32.40%), anemia (42.40%), Vitamin A deficiency (39.20%), Vitamin B complex deficiency (28.80%), diarrhea (15.20%), and acute respiratory infections (11.60%) were significantly higher in children not attending Anganwadi as compared to those attending Anganwadis ($p < 0.05$). The mothers of children attending Anganwadis had higher (18.40%) good KAP score regarding ICDS services as compared to those not attending Anganwadis. **Conclusion:** Children attending Anganwadis have lesser morbidities than those not attending Anganwadis and their mothers had better knowledge about these services.

Key words: *Anganwadis, Children, Immunization, Morbidity, Nutritional status*

The World Health Organization has defined protein-energy malnutrition (PEM) as-"an imbalance between the supply of protein and energy and the child's demand for them to ensure optimal growth and function" [1]. It is a major public health concern in India and affects predominantly the preschool children (age <6 years) with its dire consequences ranging from physical to cognitive development and susceptibility to infection [2,3]. Integrated Child Development Scheme (ICDS) is the landmark in the history of nutrition in India to combat undernutrition among children. Government of India proclaimed a national policy on children in August 1974 declaring children as, "Supremely important asset" and launched ICDS program on October 2, 1975 [4]. It is the foremost symbol of country's commitment to its children and nursing mothers, as a response to the challenge of providing pre-school non-formal education, on the one hand, and breaking the vicious cycle of malnutrition, morbidity, reduced learning capacity, and mortality, on the other hand, through a network of Anganwadis across India [5].

The numbers of malnourished children are quite high in India. According to Rapid Survey on Children, 2013–2014 data showed that about 29.4% of pre-school children were underweight in India with the highest percentages from Bihar, Madhya Pradesh, and Uttar Pradesh. The prevalence of undernutrition, in Maharashtra state, among pre-school children reported was 25.2% for the year 2013–2014 [6-9]. Undernutrition is more predominant in the lower income groups and also contributed by illiterate women and infections during the childhood period. The ICDS scheme has an empirical role in combating undernutrition whose services include supplementary nutrition, health checkups, and growth monitoring. However, even after 35 years of its initiation, the problem of undernutrition still persists, and the decrease in the prevalence is relatively low [10].

Despite progress in the health sector, India has very high child morbidity and mortality rates. The ICDS scheme is very attractive, but beneficiaries do not realize its importance. Proper and sufficient nutrition supplementation provided to the beneficiaries may help the children toward leading a nutritionally sound and healthy life combating malnutrition. The present study is designed with an aim to address the child health issues related to nutrition, immunization, and morbid conditions among pre-school children attending and not attending Anganwadis. Another important concern is to study the knowledge, attitude, and practices (KAP) of mothers of the pre-school children about Anganwadi services regarding child health issues.

MATERIALS AND METHODS

This was a community-based, cross-sectional, epidemiological survey conducted in an urban slum area of Karad Municipal Corporation (KMC) district Satara of state Maharashtra, India. The study period was from January 2018 to July 2018. The study subjects were children of age group 0–6 years, residing in the study area of Satara district. A total of 500 children were studied, which had 250 of each group as those attending and not attending ICDS Anganwadi centers.

The sample size was calculated by accounting the prevalence of malnutrition in children of age group 0–6 years is 29% as per NFHS-3 data with keeping allowable error 20% of prevalence at 95% confidence level using the formula of $N= 4pq/L^2$. The calculated sample size was 245 in each arm but for easy to analysis; we enrolled 250 children in each group, so the total sample size was 500.

We conducted house to house survey with the house list provided by the administrative authority and enrolled and interviewed eligible children till the desired sample size achieved. The data were collected with the help of self-designed and pre-tested scheduled pro forma containing the demographic profile, immunization, and nutritional status of the children. We constituted a health team comprised trained intern and resident doctors from the department of pediatrics and community medicine along with supporting staff. The physical and clinical examinations and anthropometric data along with demographic and immunization status were obtained by doctors as per the standard guidelines.

House to house survey was conducted in the slums area as per housing list provided by KMC, and the relevant information was obtained from mothers and examination of children was performed at the household level as per study criteria and study schedule. Data were collected on KAP of mother regarding nutrition during pregnancy, immunization, and feeding practices of their children, utilization of available health and nutritional services such as feeding practices, immunization, and Vitamin-A prophylaxis. Nutritional status of children <6 years of age was recorded by clinical examination and anthropometric measurements. Health status of children was assessed by clinical examination performed in good daylight with minimum clothing, and clinical signs of malnutrition and systemic diseases are assessed.

Anthropometric measurements such as height and weight were recorded. To measure the height, a metal tape was used. The child stood upright without footwear on level ground with heels together. The head was held comfortably erect. It was ensured that the buttocks, shoulders, and occiput were in the same plane and perpendicular to the ground. In younger children, recumbent length was measured. The weight of the child with minimal clothing was recorded using Salter's weighing machine.

The BCG vaccination was verified by the presence of a scar on the left upper arm. Information was elicited from the parents and Anganwadi workers regarding Oral polio, DPT, and measles vaccine immunization by oral questionnaire and verification of immunization cards. Information regarding Vitamin-A prophylaxis and iron-folic acid coverage was also recorded.

The data analysis was done by entering the data into a computerized relational database management system (Microsoft Excel), and the necessary tables were generated by running quires with analytical relationships. The factors studied were split into relevant subgroups for tabulation. The Chi-square test and odds ratio were done using Epi info 2000 software with necessary corrections as applied. *P*-value (significance) of <0.05 was deemed statistically significant at a 95% confidence interval (CI).

RESULTS

The proportion of children in age groups of 0–12 and 13–36 months was higher, 14% and 40.8% from not attending Anganwadis. Most of the children (58.8%) from the age group of 37 to 72 months belonged to Anganwadi attendance [Table 1].

Table 2 shows the nutritional status of children according to the Indian Academy of Pediatrics (IAP) classification as this classification is used by ICDS in India and undernutrition was of 20.8% and 32.4% in children from attending and non-attending Anganwadis, respectively. There was a significant difference ($p<0.05$) in the nutritional status of children attending Anganwadis and not attending with the risk of developing undernutrition was of 1.8 times higher in children not attending Anganwadis (odds ratio at CI of 1.2–2.7). The undernutrition is significantly higher in female children as compared to male who were not attending Anganwadis ($p<0.05$) and there was 2.8 times higher risk of developing undernutrition in female children as compared to male (Odds at CI of 1.6–4.9).

In context to immunization, a significantly higher proportion of children attending Anganwadis (96%) was immunized for age as compared to those not attending Anganwadis (84.4%) ($p<0.05$). The chance of incomplete immunization was 4.3 times more in children not attending Anganwadis as compared to Anganwadi attendance (Odds ratio, 95% CI: 2.0–8.8). The percentage of incomplete immunization is significantly higher among female children than in males who were not attending Anganwadis ($p<0.05$). The risk of getting incomplete immunization was 3.7 times higher in female children as compared to male among not attending Anganwadies (Odds ratio, 95% CI: 1.6–8.3) [Table 3].

Table: 1 Age and sex distribution of children

Age group (months)	Anganwadi (%)			Non-Anganwadi (%)		
	Male	Female	Total	Male	Female	Total
0–12	14 (43.75)	18 (56.25)	32 (12.8)	19 (54.28)	16 (45.71)	35 (14)
13–36	25 (35.21)	46 (64.78)	71 (28.4)	54 (52.94)	48 (47.05)	102 (40.8)
37–72	76 (51.70)	71 (48.29)	147 (58.8)	50 (44.24)	63 (55.75)	113 (45.2)
Total	115 (46)	135 (54)	250 (100)	123 (49.2)	127 (50.8)	250 (100)

Table 2: Nutritional status of children as per the IAP classification

Nutritional status	Anganwadi (%)			Non-Anganwadi (%)		
	Male*	Female*	Total@	Male**	Female**	Total@
Normal	92 (46.46)	106 (53.53)	198 (79.20)	97 (57.39)	72 (32.54)	169 (67.6)
Grade-I	16 (45.71)	19 (54.28)	35 (14.00)	14 (35.00)	26 (65.00)	40 (16.0)
Grade-II	5 (45.45)	6 (54.54)	11 (4.40)	7 (29.16)	17 (70.83)	24 (9.6)
Grade-III	2 (33.33)	4 (66.66)	6 (2.40)	4 (30.76)	9 (69.23)	13 (5.2)
Grade-IV	0 (0.00)	0 (0.00)	0 (0.0)	1 (25.00)	3 (75.00)	4 (1.6)

***: p-0.87, Odds-1.0, CI-0.5–2.0, **: −0.0002, Odds−2.85, CI-1.6−4.9, at: p-0.004, Odds-1.8, CI-1.2−2.7, *P* value<0.05 considered as statistically significant at 95% CI, CI: Confidence interval, IAP: Indian Academy of Pediatrics**

Table 3: Immunization status of children

Immunization status	Anganwadi (%)			Non-Anganwadi (%)		
	Male*	Female*	Total@	Male**	Female**	Total@
Complete	112 (43.75)	128 (56.25)	240 (96.0)	114 (54.28)	98 (45.71)	212 (84.4)
Partial	3 (35.21)	7 (64.78)	10 (4.0)	9 (52.94)	25 (47.05)	34 (13.6)
No	0 (51.70)	0 (48.29)	0 (0.0)	0 (44.24)	4 (55.75)	4 (1.6)

***: p-0.34, Odds-2.0, CI-0.5–8.0, **: p-0.007, Odds-3.7, CI-1.6–8.3, at: p-0.0001, Odds-4.3, CI-2.0–8.8, CI: Confidence interval**

Table 4: Morbidity status of children

Morbidity	Anganwadi (%)			Non-Anganwadi (%)		
	Male	Female	Total	Male	Female	Total
PEM*	23 (44.23)	29 (55.76)	52 (20.80)	26 (32.09)	55 (67.90)	81 (32.40)
Anemia**	25 (44.64)	31 (55.35)	56 (22.40)	38 (35.84)	68 (64.15)	106 (42.40)
Vit A def.***	15 (41.66)	21 (58.33)	36 (14.40)	23 (23.46)	75 (76.53)	98 (39.20)
Vit B def.#	27 (58.69)	19 (41.30)	46 (18.40)	39 (54.16)	33 (45.83)	72 (28.80)
Diarrhea##	11 (61.11)	7 (38.88)	18 (7.20)	24 (63.15)	14 (36.84)	38 (15.20)
ARIss###	8 (66.66)	4 (33.33)	12 (4.80)	17 (58.62)	12 (41.37)	29 (11.60)
Skin inf.@	5 (83.33)	1 (16.66)	6 (2.40)	7 (58.33)	5 (41.66)	12 (4.80)

***: p-0.0004, Odds–1.8, CI–1.2–2.7, **: p-0.0001, Odds–2.5, CI–1.7–3.7, ***: p-0.001, Odds–3.8, CI–2.4–5.9, #: p-0.008, Odds–1.7, CI–1.1–2.7, ##: p-0.006, Odds–2.2, CI–1.2–4.0, ###: p-0.008, Odds–2.6, CI–1.2–5.2, at: p-0.2, Odds–2.0, CI–0.7–5.5, CI: Confidence interval, PEM: Protein energy malnutrition, ARIs: Acute respiratory infections**

The morbidities such as malnutrition (32.40%), anemia (42.40%), Vitamin A deficiency (39.20%), Vitamin B complex deficiency (28.80%), diarrhea (15.20%), and acute respiratory infections (11.60%) were significantly higher in children not attending Anganwadi as compared to those attending Anganwadis ($p<0.05$). The risk of developing of PEM, anemia, Vitamin A deficiency, Vitamin B complex deficiency, diarrhea, and ARIs was 1.8, 2.5, 3.8, 1.7, 2.2, and 2.6 times more in children not attending Anganwadis as compared to the children attending Anganwadis [Table 4].

A total of 9 standard questions of each were posed to the mother about the KAP toward the ICDS services provided through Anganwadi centers. The final summed score was categorized as poor, average, and good level on the basis of 3–9, 10–18, and 19–27, respectively [Table 5]. The mothers of children attending Anganwadi group have had higher average to good KAP regarding ICDS services as compared to mothers of children not attending Anganwadies.

DISCUSSION

In the present study, it was observed that the maximum 58.8% of children attending the Anganwadis were in the age group of 37–72 months. The similar findings have been also reported by Rajeev and Radhamani from Kerala [11], Deshmukh *et al.* from Maharashtra [12], and Kar *et al.* from Delhi [13], respectively. The present study revealed that nutritional status is better in children attending Anganwadis (79.2%) as compared to not

Table 5: Maternal KAP about ICDS services

KAP score	Anganwadi frequency (%)	Non-Anganwadi frequency (%)
Poor	32 (12.80)	85 (34.00)
Average	172 (68.80)	147 (58.80)
Good	46 (18.40)	18 (7.20)

Chi-square=38.21, *P*=0.0001, KAP: Knowledge, attitude, and practice, ICDS: Integrated Child Development Services

attending it (67.6%). Nutrition, health education and good access and utilization of health care can reduce undernutrition among children. The prevalence of severe malnutrition was least among the children attending Anganwadis (2.4%). Similar finding has been also observed by Sharma [14] from Hyderabad. A study conducted by Bloss *et al.* [15] from Kerala reported least (0.06%) severe malnutrition among children attending Anganwadies and the difference could be due to high maternal literacy status and positive attitude toward the health of the child population with gender discrimination. However, a study conducted by Gondikar *et al.* from Maharashtra [16] reported that 56.6% of children were underweight and while 1.8% of children were severely malnourished. This difference in undernutrition could be due to a better knowledge of ICDS staff in the study area as well as effective implementation of the program by the local self-government.

The study also revealed that undernutrition is significantly higher in female children ($p<0.05$) compared to male, not attending Anganwadies as compared to Anganwadi attendance. Similar findings have been also reported by Harishankar from UP [17], Gondikar *et al.* from Maharashtra [16], and Ray *et al.* [18] from West Bengal. The gender discrimination, neglection of female child, poverty, and illiteracy are predominant in Indian scenario and responsible for the high prevalence of undernutrition among female children. The controversial state was made by Rao *et al.* [19] from Madhya Pradesh, and the difference was mainly due to a study conducted in a tribal environment where girl child discrimination may not be practiced.

A study undertaken by Sharma [20] of NIN Hyderabad observed that immunization status was two to three folds better in the children who attended ICDS centers. In our study, immunization completed up to date was observed among 96% of children attending Anganwadis as compared to not attending Anganwadis (84.4%). A study conducted by Rajeev and Radhamani [11] also showed 94% of children were fully immunized with almost equal in both groups from Kerala. Similar finding has been also noted by Kar *et al.* [13] from Delhi area. The better awareness and health education campaign by government and non-governmental organizations in the slum area could be responsible for better coverage regarding immunization.

The morbidity status of children attending Anganwadis is better than children not attending it. The prevalence of PEM, anemia, Vitamin A and B deficiency, diarrheal, and ARI episodes is significantly higher in children not attending Anganwadies as compared to those attending it. According to Vaid and Vaid [21], it was found that children who attended Anganwadis centers had good health of appearance as compared to their counterparts. The prevalence of anemia reported in our study was similar to the study conducted by Rani [22]. The diarrheal and ARI episodes observed in our study and studies conducted by Kubde and Kokiwar [23] and Kumari *et al.* [24] had the same results of diarrheal and ARI episodes being more in that of children attending ICDS than their counterparts.

KAP of mother's toward supplementary feeding, immunization and ICDS services play a very important role in the health status of the child. The present study found positive health outcome among children attending Anganwadis as compared to not attending due to significant differences in KAP of mothers ($p<0.05$). Similar findings have been also reported by Chandrasekhar from Guntur Andra Pradesh [25]. Community-based child rearing practices through the public and private health-care sector significantly improve the KAP of women toward health and disease.

CONCLUSION

Prevalence of undernutrition, poor immunization status, and child morbidity is still highly prevalent among the children out of ICDS enrolment residing in slum area. The mothers of children not attending Anganwadis have had poor KAP score toward ICDS services. Anganwadis is the best place for mother to look after child growth and development with their active participation. Hence, the maximum emphasis should be directed toward community orientation and participation programs to strengthening the existing system and its optimal use.

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