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A Study of Dietary Diversity and Implementation of Mid-Day Meal (PM- Pohsan) Scheme During Covid-19 in Chamoli, District Uttarakhand

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Abstract:
The study examines the implementation of the Mid Day Meal (PM POSHAN) scheme during COVID-19 in Chamoli district, Uttarakhand, using primary data from 100 parents of government school children and a mixed methods approach including regression analysis. While all received dry rations during school closures, job losses led to reduced household dietary diversity. The economic impact of the pandemic outweighed the benefits of ration distribution. Still, respondents highlighted the scheme's crucial role in supporting marginalized families. The study calls for better implementation, enhanced nutrition, and stronger government measures to safeguard child nutrition and education during crises.

Keywords: Mid Day Meal (PM POSHAN) , Child Nutrition, Dietary diversity, Regression analysis.

1.1 Introduction

Schools play a major role in children's holistic development. In developing countries like India, lack of nutrition is one of the primary causes of ill-health in children. In most states of India, the problem of under-nutrition exists among children. The Government of India introduced the National programme of Nutritional Support to Primary Education (NP-NPSE) as a centrally funded scheme in 1995, the plan was to distribute cooked free food to the students during lunch. The scheme is popularly known as the Mid-Day Meal (MDM). Earlier it was for primary but in 2008-09, the scheme was extended to upper primary. The program has a crucial role in improving child health and nutrition by fulfilling the daily dietary requirement of children, it contributed to an improvement in student enrolment. It also solves the problem of food insecurity and poor nutrition.

According to the Global Nutrition Report (2018), India accounts for one-third of the global burden of undernutrition. In 2017, child stunting was 39.3%, wasting 15.7%, underweight prevalence 32.7%, and anemia affected 59.7% of children. Achieving Sustainable Development Goals (SDG) 2030 on malnutrition elimination remains a challenge. In response to the global COVID-19 pandemic significantly impacted the Mid-Day Meal (MDM) scheme in India, disrupting its implementation and affecting children's nutrition **(S. Arora & Kanchan Sharma, 2022).** In August 2020, India had about 19 lakh COVID-19 cases which severely affected education and MDM implementation. School closures increased the risks that vulnerable children would suffer malnutrition.

In Uttarakhand, the total number of government schools is 17752, consisting of 1231 primary and 829 upper primary schools in Chamoli. Due to COVID- 19, pandemic schools were closed, education sector and the Midday meal program were badly affected. To overcome the hindrance caused by the pandemic the government of India issued orders to distribute dry rations to its beneficiary. Students are being given dry rations such as rice, wheat, pulses and so that their nutrition does not suffer during a pandemic. To mitigate the impact, the government distributed dry rations (rice, wheat, pulses) along with monetary support for cooking costs.

Table 1.1 : Food Norms under Mid-Day Meal Scheme (Class-wise Distribution)

Students	Food (in grams)	Particulars
Primary 1-5	100	Pulses(20 gms), vegetable(50 gms), oil (5 gms), etc
Upper Primary ()	150	Pulses (30 gms), vegetables (75 gms), oil(7.5), etc

Source: *Adapted from Minisry of Human Resource Development, Department of School Education and Literacy, Circular on FSA, July, 2020*

This study focuses on the implementation of the MDM scheme in Chamoli district, Uttarakhand, during the pandemic, examining its effectiveness and challenges.For many vulnerable families, the MDM scheme remains a critical source of nutrition, making its effective implementation essential, especially during crises like COVID-19.

2. Literature review

The MDM Scheme, mandated by the Indian Supreme Court in 2001, provides free, hot, cooked meals to over 120 million primary school children across India **(Bhagwat et al., 2014).** Its primary objectives include improving nutritional status, reducing classroom hunger, and fostering social equity **(Kantawala et al., 2013).**

Swami et al. (2020) found MDM vital for child nutrition, especially during pandemic-related school closures. The COVID-19 pandemic posed significant challenges to the MDM Scheme, including disruptions in supply chains, closure of schools, and the need for alternative distribution models **(Singh et al., 2014) (Dercon et al., 2012).**

As **Goutam (2020)** highlighted that COVID-19 significantly disrupted India's food supply chains, increasing transaction costs, instability, and food security concerns, affecting up to 92% of food intake through private-dominated channels**. Jena (2020)** focuses on the wider impact of the pandemic on education, especially how the shift to remote learning has affected educational outcomes. The closure of schools and Anganwadi centers severely impacted children's nutrition. Reports from **the Economic Times (2020)** and **Upadhyay (2020)** indicated that disruptions in supplementary nutrition programs under ICDS and MDM led to widespread food insecurity, especially among marginalized communities. **Census 2011 and NFHS-4 (2015-16)** data revealed alarming malnutrition rates, with 38.4% stunted and 32.7% underweight children under five years old in India. The MDM scheme, covering over 11.34 lakh schools and benefiting 11.59 crore children, serves as a vital intervention in addressing hunger and nutritional deficiencies.**Kumar et al. (2020)** analyzed the multidimensional impact of COVID-19,

including food insecurity, economic distress, and mental health challenges The government increased the MDM budget to ensure food supply during lockdowns **(A. Chatterjee, 2020; Neeti Goutam, 2020).** However, nutritional analysis revealed micronutrient deficiencies in the meals provided **(A. Chatterjee, 2020)**. The pandemic also affected dietary diversity among farmers, with those cultivating multiple crops showing greater resilience to market disruptions **(Connors et al., 2021)**. The impact of COVID-19 on MDM has been extensively researched across different states, but no research has specifically focused upon its implementation in Uttarakhand .The current research is based on this gap and intends to evaluate the success and challenges of the project in this area.

3. Methodology

The data source used in the study includes both primary and secondary data.The source of the data used in the study is primary, which was collected from primary and upper primary schools in the Chamoli district and secondary data has been utilized from government reports, educational surveys, search articles to provide a comprehensive understanding of the nutritional intake and related aspects of students in the region.

3.2 Research Design

The data is collected through a well-structured questionnaire and the sample is selected based on the purposive sampling method, targeting parents or guardians of children aged 3-12 years attending government-aided schools under MDMS. Randomly selected 100 respondents were interviewed directly by the researcher through structured interviews.

3.3 Sample Size

The study is based on primary data collected from 100 parents and guardians of students enrolled in government schools in Chamoli district, Uttarakhand. The sample includes 50 respondents from primary schools and 50 from upper primary schools.

3.4 Tools of collection

The following tools were used for the study:

1. Questionnaire: questionnaire will be prepared for guardians/parents.
2. Survey: For this study, we will contact student guardians or parents personally through direct interview mode so that their view on the mid-day meal can be known.

3.5 Technique

- The statistical approach was used to analyze the present research. Both quantitative and qualitative tools were used.
- Regression Technique was applied to analyze data empirically.

The analytical tool used in this study to analyze and interpret the data of 100 students' parents or guardians is done with the help of MS-Excel and SPSS. S-Excel is used to analyze and interpret the data for descriptive statistics whereas SPSS is a software used to analyze data of Statistical technique-Regression.

3.6 Econometric Methodology

3.6.1 Regression analysis- Regression analysis measures the nature and extent of the relationship between two or more variables, thus enabling us to make predication, it is the measure of the average relationship between two or more variables. The general form of a simple regression model is:

$Y=\beta0+\beta1X+\epsilon$

where:

- Y = Dependent variable
- β0 = Intercept
- ϵ = Random error
- β1 = Slope coefficient
- X = Independent variable

3.6.2 Multiple regression- Multiple regression extends linear regression to allow for 2 or independent variables. There is still only one dependent variable. We can think of the independent variables as 'predictors' of the dependent variable.

The multiple regression with categorical variables is used to estimate the results with the help of the software SPSS at the significance level of 0.05

The general form is:

$Y=\beta0+\beta1X1+\beta2X2+\epsilon$

where:

- Y = Dependent variable
- β0 = Intercept
- X1,X2= Independent variables
- β1,β2 = Slope coefficients
- X1,X2= Independent variables
- ϵ = Error term

3.6.3 Variable

The variables considered in this research are divided into the following two categories:

Dependent variable: The variable considered in this was measured in the research. The dependent variable in the research is the Child's dietary diversity score.

Independent Variable: The variables can be changed or manipulated to see the change independent variable. The independent variable in the research is job status, a pandemic. Dummy coding is used for job status and pandemic. Loss of job status and pandemic. Loss of job is assigned 1 otherwise zero. Pandemic is assigned 1 otherwise 0.

4. Data Analysis and Findings

In response to the problem posed in this study, the data was collected, and then through the interview schedule are being depicted below. The main emphasis was on the impact of Covid-19 on the Mid-day Meal Scheme during this analysis.

5.1 Statistical Result

From the statistical analysis performed on the collected data using the SPSS, The following results were obtained:

Y = 8.93 - 0.922 x1 – 2.17 x2 + e

where

Y= Child dietary Score (dependent variable)

X1 = Jobloss Status (Independent variable)

X2 = Pandemic/Covid-19 (Independent Variable)

Table 2 : Result of Child dietary diversity before, during, and after Pandemic

Child Dietary Score = a * JobLossStatus + b* Pandemic+e.....(1)				
Variable	Value of Coefficient	Standard Error	T value	Significance
Intercept	8.93	0.15	57.011	***
Job Loss	-0.9228	0.3995	-2.31	*
Pandemic	-2.1739	0.2287	-9.507	***

Table 5.3.1 Result of Child dietary diversity before, during, and after Pandemic

Multiple R Squared	0.38
F-statistic	60.77(***)
* indicates 95% confidence level	
*** indicates a 99.99 confidence level	

The intercept of the regression equation in 8.93 and the coefficients of the variables are listed below:
Job loss -0.9228
Pandemic -2.1739

Interpretation of Model (Result)

1. **Intercept (8.93) :** This value indicates the expected child dietary score when neither loss nor pandemic – related disruptions are present. It serves as a baseline reference for understanding how external factors affect dietary diversity.
2. **Job Loss (- 0.9228) :** The negative coefficient suggests that losing a job has an adverse impact on children's dietary diversity. Specifically, when job less occurs , the child diertary score drops by 0.9228 points. This implies that children from households facing employment difficulties tend to have a lower variety in their diet .
3. **Pandemic (-2.1739)** : The negative impact of the pandemic on child dietary diversity is more significant than job loss due to its size. (-2.1739) With a coefficient of 2.1739, it is concluded that the pandemic reduced food standards were more severely affected.
4. **R^2 (0.38):** The difference in child dietary choices, as per R2 (0.38), is attributed to job loss and the pandemic, while other factors like food availability, government support, and household income are responsible for 62% of the variation.
5. **Significance Levels:**

- **Job loss is statistically significant at 95 % confidence ($p < 0.05$),** meaning there
  Strong is strong evidence that job loss negatively affects child dietary diversity.
- **Pandemic is highly significant at 99.99% confidence** ($p< 0.0001$), meaning there is overwhelming evidence that the pandemic had a substantial negative effect on child dietary diversity.

Table 2 : Result of Household dietary diversity before, during, and after Pandemic

Household Dietary Score = a * JobLossStatus + b* Pandemic+e……(2)				
Variable	Value of Coefficient	Standard Error	T value	Significance
Intercept	8.87	0.15	57.011	***
Job Loss	-1.01	0.405	-2.496	*
Pandemic	-2.24	0.2318	-9.507	***

Multiple R Squared	0.39
F-statistic	64.1(***)
* indicates 95% confidence level	
*** indicates a 99.99 confidence level	

Y = 8.87 – 1.01x1 – 2.2 x2 + e

where

Y= Household's dietary Score (dependent variable)

X1 = Jobloss Status (Independent variable)

X2 = Pandemic/Covid-19 (Independent Variable)

The intercept of the regression equation in 8.87 and the coefficients of the variables are listed below:

Job loss -1.01

Pandemic -2.24

Intrepretation of Model (Result)

1. **Intercept (8.87) :** This suggests that in the absence of job loss and pandemic effects, the average household dietary score would 8.87.
2. **Job Loss (-1.01) :** Households experiencing job loss had a dietary score reduction of 1.01 units, meaning job loss had slightly stronger effect on household dietary compared to child dietary diversity.
3. **Pamdemic (-2.24,):** The pandemic significantly reduced household dietary diversity by 2.24 units, similar to its impact on children.
4. **R^2 (0.39):** This means 39 % of the variation in household dietary diversity is explained by job loss and the pandemic, while 61 % is due to other factor (e.g, food prices, savings , government aid).

Significance Levels:

- Job loss statistically significant at 95 % confidence ($p < 0.05$), meaning job loss has a clear negative impact on household dietary diversity.
- Pandemic is highly significant at 99.99% confidence ($p < 0.0001$), reinforcing the finding that the aondemic had a major effect on household dietary diversity..

Conclusion:

The pandemic and job loss both negatively affected household diversity dietary and child dietary diversity. However, child dietary diversity was less affected by job loss then household diversity. The key reason for this difference is government intervention during the pendemic. The government provide

dry ration (rices, wheat,pulses) and monetary support for cooking costs to student in primary and upper primary School as a substitute for School meals.
This shielded children from the full impact of economics shocks, ensuring that their diet remained relatively stable compared to rest of the household.

Policy Recommendations

To address the negative impact of job loss and the COVID-19 pandemic on household and child dietary diversity, the following measures are suggested:

- **Targeted Food Support:** Provide free or subsidized food to families affected by job loss to maintain basic nutrition.
- **Emergency Food Aid:** Implement rapid-response food relief during crises to protect vulnerable households.
- **Strengthen Social Safety Nets:** Expand job security, wage support, and unemployment benefits to cushion economic shocks.
- **Child Nutrition Programs:** Ensure continuity of mid-day meals, community kitchens, and nutrition supplements for children, even during school closures.

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