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Children's health and malnutrition in Bihar: A sociological examination

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Abstract

Prevalence of malnutrition among under-five children is very high in many developing countries in the world. As a step towards reducing the level of malnutrition, there is need to identify the important determinants of malnutrition in the specific context. This study examines the important socioeconomic determinants of malnutrition among under-five children in India, using the household production model. Descriptive results from National Family Household Survey- III, 2005-'06 data show that around 70% (38,000 out of 51,560) children from all parts in India are malnourished (z-score below -1 SD) and 48.0%, 42.5% and 20.89% of the sample children under five are stunted, underweight and wasted respectively. The OLS and an ordered probabilistic model are used to estimate the determinants of child malnutrition econometrically. The covariates of child malnutrition are selected on the basis of the econometric model setup, descriptive statistics of socio-demographic characteristic of households and past literatures. When the outcome variable is categorical, it is often based on an odd ratio and marginal effect, making the interpretation much complex and varying depending on the category of malnutrition. However, the results are consistent with our expectations and show that the child malnutrition varied significantly with family wealth, mother's education, mother's age at first baby birth, birth history, family size etc. To reduce the present high rate of malnutrition, the study suggests the targeting of women with education programmes and provision of healthy environment.

Keywords: Malnutrition, determinants of malnutrition, stunting, underweight, wasting, India

Introduction

The story of India is the mixture of growth, gains and gaps. With an economy that is strengthening from higher rate of growth, benefiting from the demographic dividend of a young and growing workforce, this largest democracy of the world is also home to the largest number of children (20% of 0-4years) in the world, significantly larger than the number in China (World Population Prospect: 2008). India's economic progress remained resilient enough to register a growth rate of 6.7 per cent in 2008-2009 and 7.4 per cent in 2009-2010 (Govt. of India, 2010). The number of live births in the country is estimated to be 27 million (UNICEF, 2010) which again constitutes 20% of the total number of live births in the world. Although the number of births is expected to gradually go down in the coming years, but the relative load of India in the world in terms of child population is not going to reduce significantly. The health of the mother and children are still quite disappointing and not really gains from high economic growth. Health and education expenditure is extremely low and inadequate in most of the major states in India. With nearly half a billion children in India, a lot more remains to be done to ensure the survival, growth and development of India's greatest asset: its children. Stubbornly high malnutrition rates, poor sanitation and persistent disparities between rural and urban, between socio-economic groups are just some of the obstacles we face in ensuring inclusive growth.

The analysis of the situation of children in India would be incomplete without paying attention to the disparities and the inequalities that persist among different socioeconomic subgroups of the population, notably rich and poor, rural and urban, boys and girls, education levels, societal (castes and religion) groups. According to the latest estimates 21.92 per cent (NSSO report 2011-2012) of the population in India lives below the poverty line, signifying the inequity in distribution of wealth and household income. National data establishes that approximately 100 million children are in the poorest wealth quintile (NFSH-III, 2006).

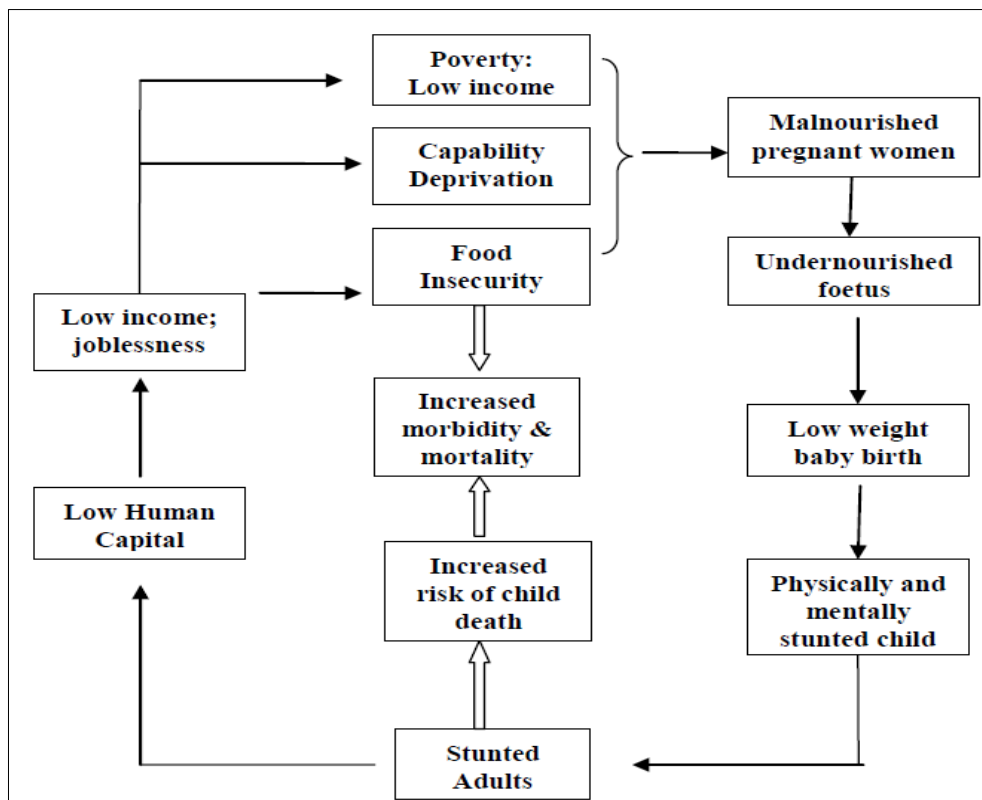
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One half of all the poor children belong to the Scheduled Castes and Scheduled Tribes groups and they continue to be at a significant disadvantage in terms of MDGs 1, 2, 3, 4, 5 and 7. Vulnerabilities associated with rapid urbanization and the effects of violence are also need to be addressed to reduce inequalities in outcomes for children. Despite the difficult fiscal situation, the Government of India has continued to increase allocation in social sector programmes including health and education, in line with its commitment to —Inclusive Growth.

Pathway of Socioeconomic Health Inequality

The corner stone of empirical research on the measurement of inequality in health or ill-health was on track since the mid-nineteenth century in the advanced countries like France, Germany, and the United Kingdom. Although many studies went before it, the Black report played a crucial role in getting the issue of socioeconomic differences in health in a number of advanced countries. Thus, it is regarded as the beginning of the current and continuing research into the measurement of health or ill-health inequalities. Why do

researchers study variation in health outcomes? One argument in favour of the in-depth analysis in variation in health outcome is that it may help to formulate health policy for the mass especially for the disadvantageous group of the society. Variation in health outcome is studied in relation to socioeconomic status for various reasons. The socioeconomic linkages to health outcome are complex social construct rather than to specific (socioeconomic) factors that are thought to be cause. Researchers and policy makers seem to favour measures of societal notions of an inequitable distribution of health outcomes with respect to the differentials of socioeconomic status and other summary measures According to a World Health Organization (WHO) study, across 51 countries, people consider the equitable distribution of health almost as important as the average level of health when evaluating the performance of a health care system. In line of the analysis of socioeconomic pathway, the present study aims to study the child malnutrition as the ill-health outcome and its variation in relation to the distribution of different socioeconomic status.



Source: H. Vorster; 2020

Fig 1: The vicious cycle of poverty and malnutrition.

Measurement of child malnutrition

The present analysis uses compromised z-scores of child as child ill-health or malnutrition measure. Survey data often contain measures of weight and height, in particular for children. Weight and height do not indicate malnutrition directly. Besides age and sex, they are affected by many intervening factors other than nutrient intake, in particular genetic variation. However, even in the presence of such natural variation, it is possible to use physical measurements to assess the adequacy of diet and growth, in particular in infants and children. This is done by comparing indicators with the distribution of the same indicator for a —healthy| reference group and identifying—extremel or—abnormall

departures from this distribution. There are three different systems by which a child or a group of children can be compared to the reference population: Z-scores (standard deviation scores), percentiles, and percent of median. For population based assessment—including surveys and nutritional surveillance—the Z-score is widely recognized as the best system for analysis and presentation of anthropometric data because of its advantages compared to the other methods. Three of the most commonly used anthropometric indicators for infants and children— weight-for-height, height-for-age, and weight-for-age—can be constructed by comparing indicators based on weight, height, age, and gender with reference data for —healthy|

children. Variation in this subjective measure may not accurately capture variation in true health or ill-health, but it can be better to capture those health limitations that matter at the individual child and may well be systematically related to socio-economic class. Height for age has greater sensitivity than weight for height in identifying those who will die in the subsequent 2 years within the population studied. Again, height for age generates fewer errors of classification at every level of sensitivity and specificity than weight for height. In this context, therefore, height for age is the better indicator (WHO 1995). Thus, for the present analysis, the compromised z-scores height for age as an anthropometric measure have been chosen for child malnutrition by using household survey data from 3rd round National Family Health Survey.

Cardinal Health Measure

The ill-health is generally measured on an ordinal scale. In the inequality measures such as the concentration index, one can dichotomize the ill-health measure. Dichotomizing multiple categories into healthy and non-healthy always leads to a loss of efficiency, and the choice of a cut-off point may well affect the measured inequality. Alternatively one could convert the cut-off level as the ordinal scale. Wagstaff and Van first upgraded an ordinal scale health variable by assuming a latent ill-health variable that had a log-normal distribution from which the ordered responses were drawn. In international comparative research on health, it is assumed a separate log-normal distribution to underlie the observed ordered health for each of the countries, implying that while responses to the self-assessed health questions differed between countries, the underlying mean level of health and the distribution of health are assumed to be identical across countries. Instead of using mid-point values Van used cut-point values in combination with grouped data or interval regression. In this study the cardinal measure of z-score height for age is used as a measure of child malnutrition. Thus, in my study, the dependent variable z-score height for age is used as continuous or ordered response wherever necessary. The continuous dependent variable is actually the negative of the z-score (multiplied by 100), such that a positive coefficient indicates a negative correlation with malnutrition. The specification of the regression is based on the work done. Furthermore, the dependent variable z-score height for age is classified for some part of present analysis as the ordered response category by using general malnutrition classification between mild (z-score ≤ -1), moderate (z-score ≤ -2), and severe malnutrition (z-score ≤ -3) (WHO, 1995). This is done with a view to understand further the probability of all three categories of malnutrition and to explore the corresponding factors for respective category of child malnutrition.

Explanatory Variables Selection

After reviewing an exhaustive literature on malnutrition and its determinants, the following explanatory variables are considered for the present work†3. Variables at the level of the child: Child birth related characteristics like child age in months, sex of the child, child birth characters i.e, birth order, birth intervals, birth size are included in the analysis to explain the inherent causes of malnutrition. Where family planning is not so wide-spread, the variables related to child

birth history have the immense relevance. Maternal Health Related Variables: Characteristics of the mother included in the analysis are mainly dummy variable like the mother's younger age (<21 years) at time of first birth of the child. Adolescent mothers typically have higher risks of poor pregnancy outcomes (for the medical literature on this issue. While duration of breast feeding in months and underweightness of mother may reflect biological factors, it also reflects socioeconomic considerations including the need for financial contribution to household. Underweight mother dummy may also reflect biological factors and socioeconomic considerations. According to the bargaining literature on household decisions, educational status (continuous in year of schooling completed) of mother could influence those resources that the mother may receive for herself as well as for her child, possibly leading to adverse nutritional consequences and does have a significant impact while male does not Education in completed years of the mother is included in this analysis as an indicator of information access related to mother and child health care. Household and Community level Variables:

In India, family composition, size, initial birth history etc. are assumed to be important factors determining the nutritional status of the child. Family size reflects the number of units among which household resources need to be allocated according to the weights of each unit. Family size may have an ambiguous role in nutritional status depending on the relative strength of size economies in consumption as against the diminishing returns to scale in nutritional status.

Factors that may cause unavoidable variation

Most empirical researchers seem to follow the reasoning of biological (or genetic) variation as an example of an unavoidable cause of variation. Age- and sex-related variations in health and ill-health are examples of such unavoidable health, as both could not be caused by SES. Even so, researchers generally choose to standardize for differences in the age and sex distribution while comparing health or ill-health inequalities between groups. In this present work, the outcome variable z-scores are standardized by definition with respect to mean age and sex of the reference child cohort of the specific child.

Child Malnutrition and Poverty Linkages

It has long been recognized that the well-being of a population is not solely captured by the levels and growth of consumption and income. Social indicators such as life expectancy, infant and child mortality and educational outcome serve as complementary in economic development. Long term health-human capital is severely affected if the individual does suffer from malnourishment which may cause an intergenerational vicious cycle, a worse health capital stock may be passed from adults to their children. There is enough evidence that health is positively associated with other dimensions of economic prosperity and the causality moves in both directions: people with higher incomes invest more in their human capital and hence health, while healthier workers tend to be more productive and achieve higher earnings. Such considerations are not new that basically originates from the efficiency theory of wages which presents one aspect of the transmission mechanism and goes back at least.

Review of Literature

Smith and Haddad (1999) ^[1]. Numerous studies have already been conducted pertaining to the determinants of malnourishment and its consequences in the developing countries. Using cross-country data, have argued that malnutrition is caused due to insufficient, excessive or imbalance consumption of dietary energy and nutrients. In a robust study, using household survey data from 12 countries, have found a strong effect of income at the household and at national level in reduction of malnutrition.

Danzon & Donohue (2000) ^[2]. The nutritional status of young children is an important indicator of health and development-it is not only a reflection of past health status but an important indicator of future health trajectories. Studies have identified poverty as the chief determinant of malnutrition in developing countries that perpetuates into intergenerational transfer of poor nutritional status among children and prevents social improvement and equity. Children under age three are particularly vulnerable to under-nutrition, and because the growth rate in this period is greater than any other age period, it increases the risk of growth retardation.

Wagstaff (2003) ^[3] Mother's education has a significant negative relationship with incidence of height-for-age; suggesting that improved mother's education will reduce the level of child malnutrition. This result is consistent with the findings, which highlighted the importance of human capital investment in improving children nutritional status. Educated mothers are better aware about the nutrition requirements of their children and they usually provide improved health care as a result of their awareness.

Trapp and Menken, (2005) ^[4] Three commonly used measures of nutritional status are there such as, height for age, weight for age and height for weight which are termed as z-score (standard deviation score) and defined as the difference between the value for an individual (X) and the median value (μ) of the reference population for the same sex and age (or weight), divided by the standard deviation (σ) of the reference population; $Z = (X - \mu) / \sigma$. This provides the basis of estimating prevalence of malnutrition in the populations or subpopulations.

Babatunde (2011) ^[5] Malnutrition is caused due to insufficient, excessive or imbalance consumption of dietary energy and nutrients. It manifests in different forms, such as under nutrition, over nutrition and micronutrients malnutrition. Children that are malnourished tend to have increased risk of morbidity and mortality and often suffer delayed mental development, poor school performances and reduced intellectual achievement.

National Health Policy

The first National Health Policy (1983) has been set up in response to the commitment by the Alma Ata declaration to achieve "Health for All by 2000". It is accepted that health is central to development and has a focus on access to health services. While much is achieved in health services infrastructure development, the health service system continued to be plagued by widening inequities in access to health care and the quality of care. The poorly regulated health system has undergone dramatic changes since 1983, with an emerging profit corporate health care system, which has further marginalized the development of the public system.

National Nutrition Policy and Plan of Action

Nutrition constitutes the foundation for human development, by reducing susceptibility to infections, reducing the related morbidity, disability and mortality burden, enhancing cumulative lifelong learning capacities and adult productivity. In 1950, two major nutritional problems are faced in India. One is the threat of famine and the resultant acute starvation due to low agricultural production and the lack of an appropriate food distribution system. The other is chronic energy deficiency due to: low dietary intake because of poverty and low purchasing power; high prevalence of infection because of poor access to safe-drinking water, sanitation and health care; poor utilization of available facilities due to low literacy and lack of awareness. The article 47 of our Constitution states that -the State shall regard raising the level of nutrition and standard of living of its people and improvement in public health among its primary duties. Successive Five-Year Plans has laid down the policies and strategies for achieving these goals.

National Plan of Action for Children

The National Plan of Action for Children (2005) commits itself to ensure all measures and an enabling environment for survival, growth, development and protection of all children, so that each child can realize his or her inherent potential and grow up to be a healthy and productive citizen. This calls for collective commitment and action by all sectors and levels of governments and partnership with families, communities, voluntary sector, civil society and children themselves. The nutrition specific goals are

1. To eliminate child malnutrition as a national priority;
2. To reduce under five malnutrition and low birth weight by half;
3. To ensure adequate neo-natal and infant nutrition;
4. To reduce moderate and severe malnutrition among preschool children by half;
5. To reduce chronic under nutrition and stunted growth in children;
6. To effectively implement the infant milk substitutes,

Feeding Bottles and Infant Foods (Regulation of Production, Supply and Distribution) Act, 1992 as amended in 2003. The Ministry of Woman and Child Development, Govt. of India, has come into existence as a separate Ministry with effect from 30th January, 2006.

The main decisions were taken in the first meeting of the Prime Minister's National Council for India's Nutrition, held on 24th November, 2010: on

1. ICDS strengthening and restructuring
2. Multi-sectoral programme to address the maternal and child malnutrition in selected 200 backward districts
3. Launching a nation-wide information, education and communication campaign against malnutrition
4. Bringing strong nutrition focus in sectoral programmes - Health, Drinking Water Supply and Sanitation, School Education, Agriculture and Food & Public Distribution.

Healthcare System in India: Some Emerging Policy Issues

The health and health care is now being viewed within the fundamental rights perspective which requires availability, accessibility, affordability, and quality with regard to both health care and underlying preconditions of health. Universal coverage and equity for primary health care are

closely related and accepted as the repeated goals. "Equity in health implies that ideally everyone should have a fair opportunity to attain their full health potential and, more pragmatically, that no one should be disadvantaged from achieving this potential. Equity is therefore concerned with creating equal opportunities for health and with bringing health differentials down to the lowest level possible" (Whitehead, 1990, p 9) [15]. This is possible only when health care programs can assure universal coverage. The experience of all countries having near-universal health care systems is that with increased coverage of health care services inequities decline rapidly.

Children's health and malnutrition in Bihar

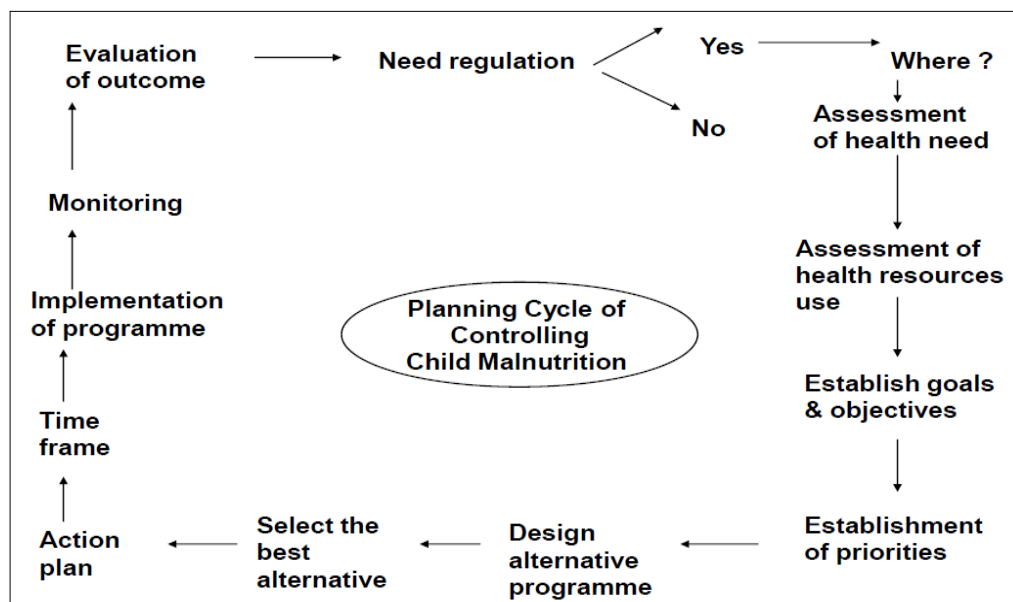
Bihar is the third most populous state in India and it is home to 47 million children, almost half (46 per cent) of the State's 104 million people and the highest proportion of children of any state in India. Bihar's children make up 11 per cent of India's population. Almost 88.7 per cent of people in Bihar live in villages and 33.74 per cent live below poverty line. Children in Bihar face many deprivations owing to wide-spread poverty, deep-rooted socio-cultural and gender inequalities, caste divisions, poor infrastructure, lack of basic services and recurring natural disasters. The State ranks lowest in India in terms of per capita income with inclusive development a key challenge.

A newborn dies every eight minutes and an infant dies every five minutes in Bihar.

Every year some 2.8 million children are born in Bihar but almost 75,000 of these newborns die within the first month. Despite this child mortality has reduced in Bihar due to the significant improvements in immunization coverage (11 per cent in 1998 to 69 per cent in 2018) and institutional

delivery (19.9 per cent in 2005-2006 - National Family Health Survey (NFHS) 3 to 63.8 per cent in 2015-2016 - NFHS 4). Malnutrition remains a key challenge, every second child (48.3 per cent) under the age of five are stunted (low height for age) and one fifth (20.8 per cent) are wasted (NFHS-4). Only 34.9 per cent of children are breastfed within the first hour of birth and 7.3 per cent of children aged 6-23 months are introduced to complementary foods (NFHS -4). One in two girls aged 15-19 is undernourished and one-third of women of reproductive age are undernourished. Close to three million girls are married before the legal age of 18 years and 370,000 girls are pregnant during adolescence (NFHS-4). To address this, focusing on girls' empowerment, the State has adopted a comprehensive Women's Empowerment Policy and led a state-wide campaign to eliminate child marriage and dowry. Around one million children aged 6-14 years are child workers and are highly vulnerable to early marriage, trafficking, abuse and exploitation.

Despite the challenges, there has been progress in development in Bihar in recent years. Most girls and boys are enrolled in primary school, although regular attendance, quality education and transition to secondary schools remain a concern. Improved governance has led to better health care services, greater emphasis on education, better management of social sector programmes and a reduction in crime and corruption. In 2015, the State Government committed to improving development indicators through a mission mode by 2020. The state adopted seven policy resolutions titled '*Viksit Bihar ke liye Saat Nishchay*' for inclusive development and good governance agenda. The resolutions included ensuring a toilet for every household and safe piped drinking water for all rural households by 2020.



Source: Modified from planning cycle of control infectious diseases

Fig 2: Planning Cycle of Controlling Child Malnutrition

Objective of the study

The child health outcomes are invariably worse among the poorer or less-wealthy section of the population. The redistribution of limited resources is thus the main concern for the policy planners and researchers. The obvious policy for distribution of public resources should be pro-poor

because poorer sections are more vulnerable with the increasing trend in out-of-pocket health expenditure. The optimal allocation or redistribution process cannot be determined without examining the link between prevalence of inequality in child malnutrition and the socio-economic heterogeneity in the population. Thus, the main objective of

this study is to work out a systematic analysis and explanation of SES-based inequality in child malnutrition, with the aim of finding a vulnerable socioeconomic target cluster or group in terms of child malnutrition for placing an alternative process of optimal utilization of limited resources.

Research Methodology

The study is a blend of both primary and secondary data. Secondary data were collected from the records, Individual level data on child z-scores height for age of Indian children, and related SES like family wealth scores for India are taken from National Family Health Survey (NFHS), The actual use of resources by the child as proportion of total child for different wealth quintiles are computed from the sample data from National Family Health Survey-III. The binary resource use variable is defined as the under -5 children visited in any form of health service at least one time in last three months.

Conclusion

In study of evaluation of child malnutrition outcome, the identification and targeting the socio-economic factors and socio-economic sub-groups are done in previous chapters of this analysis for which the high persistence of under-five childhood malnutrition and its inequality is responsible for. Regulation of four basic and most important identified socioeconomic factors *viz*, wealth, mother's education and training, mother's nutrition and child bearing age of mother can improve the major problem of SES-related child malnutrition situation. The complementary sub-group difference plays a major role in explaining the wealth based inequality in child malnutrition in India; thereby, studying the socio-economic group based inequality and its decomposition allow us to review economic policies and their implementation from a public health perspective in a multi-dimensional heterogeneous structure of our population. The thesis even boldly suggest the pathway of distribution of limited public resources towards the dream of universal coverage of health care, starting from the most vulnerable Interactive Socioeconomic Cluster (ISC) with highest conditional probability of risky child health category. Hence, there is a threat to the country to maintain a sizable stock of healthy population for the survival.

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