ISSN: 0976-3031

Available Online at http://www.recentscientific.com

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 8, Issue, 10, pp. 21265-21270, October, 2017

International Journal of Recent Scientific Research

DOI: 10.24327/IJRSR

Research Article

ASSOCIATION OF SOME SOCIO-ECONOMIC AND SOCIO-DEMOGRAPHIC VARIABLES WITH MALNUTRITION AMONG CHILDREN OF SOUTH KASHMIR Himalayas, J&K- INDIA

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DOI: http://dx.doi.org/10.24327/ijrsr.2017.0810.1040

ARTICLE INFO

Article History:

Received 17th July, 2017
Received in revised form 21th August, 2017
Accepted 28th August, 2017
Published online 28th October, 2017

Key Words:

Malnutrition, Child health, Anthropometry, Wasting, Birth Order, Maternal Education, GHI

ABSTRACT

Background: Under nutrition is a global public health problem that causes premature morbidity and ill-health conditions and has along-lasting physiological effects in children. The present study assesses the prevalence of wasting [low Weight for Height (W/H)] among children and to determine the association of wasting with different socio-economic and socio-demographic variables. **Methods:** The present cross-sectional study was conducted among 308 children (boys: 162; girls: 146), aged 0-6 and 7-14 years, in South Kashmir, J&K; using stratified random sampling technique. The Weight for Height measured using the standard anthropometric procedure. Low Weight-for-Height was assessed by comparing with a standard age-sex-specific reference population of WHO, 2010. Children whose W/H value was found to be the z-scores <–3SD, and <–2 SD were considered to be severely and moderately wasted, respectively. The socio-economic and socio-demographic variables were recorded using structured schedule methods. The data were statistically analyzed based on descriptive statistics and logistic regression using SPSS (version, 17.0). **Results:** The age-specific mean W/H was 23.87 percent. The prevalence of wasting was very high (boys: 22.57%; girls: 25.18 %) ($p>0.05$). The logistic regression analysis observed that age, gender, birth order, area (rural), maternal education, household income and mothers' age were significantly associated with the prevalence of wasting ($p<0.05$) **Conclusion:** Using Weight-for-Height, a high prevalence of wasting was observed among the children. Birth order, maternal education and maternal occupation were important determinants of wasting. There is an urgent requirement of nutritional intervention programmes to ameliorate the nutritional status of the children.

INTRODUCTION

Malnutrition is a complex multidimensional problem based on both etiological and ecological factors (Aggarwal, 1986). It is a pathological state resulting from a relatively or absolute deficiency or excesses of one or more essential nutrients (Jellifle, 1966) leading to direct or indirect effects which remain an indispensable aspect of most environmentally concerned studies (Pant, 1998). Malnutrition does not develop overnight and is a prevalent issue in all developed and developing countries. Its current dimensions are largely determined by past under development and discrimination which in turn fuel future downward spirals.(WHO, 2012; Black *et al*., 2003). WHO cites malnutrition as the gravest single threat to the world's public health and estimates that about two third of the world population is struggling with conditions that make sickness and under nourishments the normal state of life (Bakshi, 1996).

Nutritional status of the population is essential to monitor ongoing nutrition transition and initiate appropriate interventions. Children constitute the most vulnerable segment of any community. Their nutritional status is a sensitive indicator of community health and nutrition (Sachdev 1995). Under nutrition among them is one of the greatest public health problems in developing countries. Malnutrition in children under five years of age, as measured by stunting, affects 161 million (25%), wasting accounts 51 million and the underweight prevalence was 99 million, among which two-third lives in Asia and one third in Africa (UNICEF-WHO-WORLD BANK, 2014). The infant mortality rate (IMR) shows increasing trend too in developing nations as each year, more than 10 million children die because of malnutrition (Black *et al*., 2003). In India, routine reporting of nutritional status by the health and social welfare functionaries is suboptimal. India ranked 15th, amongst leading countries with hunger situation. It also places India amongst the three countries where the GHI between 1996 and 2011 went up from 22.9 to 23.7(GHI, 2011).

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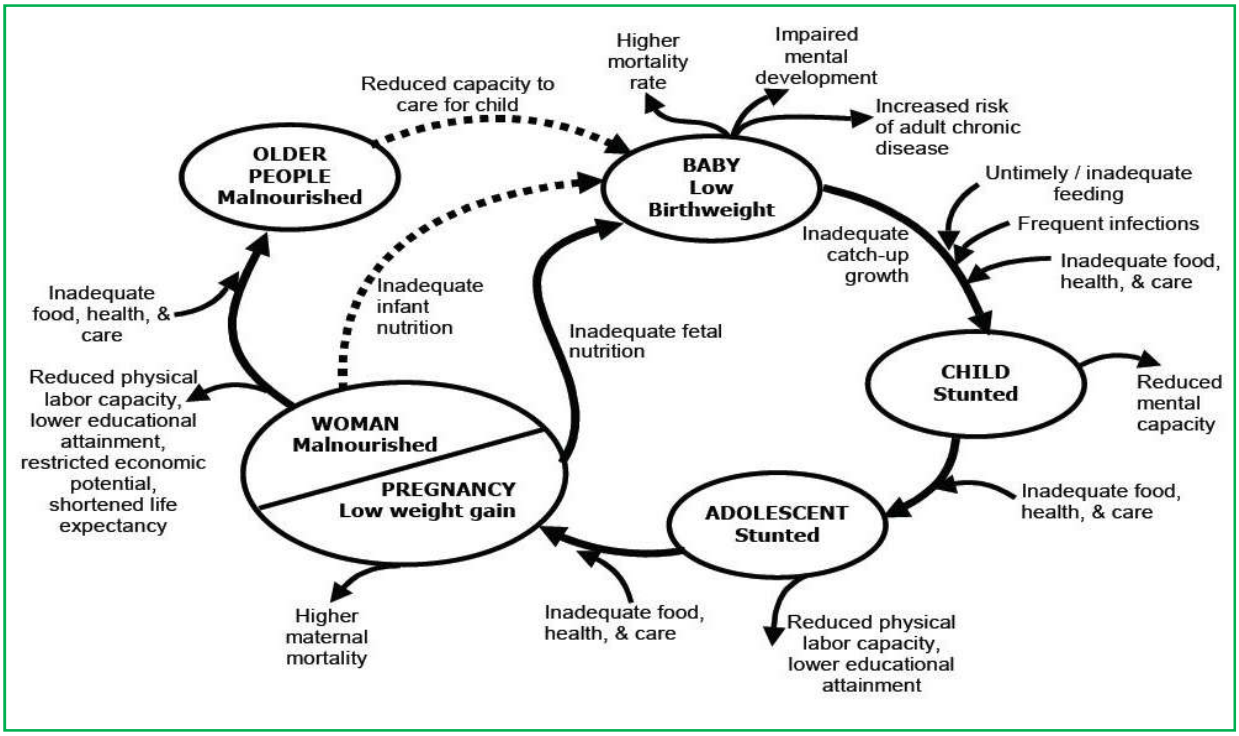
About 48 percent children under age five are malnourished in India (UNICEF-WHO, 2014) among them female children are more vulnerable due to socio-economic status. Although different governments including J&K are working in this direction but this stigma still prevails and needs a long term approach.

Gujjar and Bakerwal Communityof J&K found the health of Gujjar and Bakerwal women's very deteriorating the reasons being high family pressure as all the work is being done by women folk besides rearing of animals; illiteracy, early marriages with high fecundity and lack of awareness about the schemes and facilities through meager provided by the govt.



Source: after authors

REVIEW OF LITERATURE

Many factors can contribute to high rates of malnutrition, ranging from political instability and slow economic growth, to highly specific ones such as the frequency of infectious diseases and the socio economic and demographic status. These factors can vary across countries, Nations; regions and sub-regions because of huge diversity in terms of geographical as well as human induced factors. World-wide nutritional survey based on food consumption and their associations with malnutrition were published like the Nutrition and Diet Atlas of India (Gopalan, 1971). Khuroo (1988), Zargar (1997), Rather (2004), Khanday (2005) and Mayer (2007) identified diverse agricultural activities and socioeconomic status responsible for highest prevalence of malnutrition in Kashmir valley. While Das gupta, (1982); Dewan (2008)attributed it to poor socio-economic status as the root causes of malnutrition with 25.2% women as compared to male's 20.2%.in Punjab and W. Bengal while Villar (2008) analysed the relationship between income and Body mass Index found the relationship between household income and women. Koundal (2012) and Shukla (2011) revealed the encouraging association between literacy and malnutrition in J&K while Krishnan (2012) in Tamil Naidu and Akhtar (2009) in J&K find out the regional disparity in health care patterns and planning process of the state mainly responsible for malnutrition. Khan (2012) found feeding practices sub-standard before the recommended standards leading to parallel increase in the malnutrition with 14.1%, 17.2% and 16.8% of the children in Jammu, Kashmir and Ladakh. Gull (2014) Assessing the women health aspects of agencies and lack of health services were the reasons. So steps should be taken to uplift the group on leaps and bounds.

Study Area

South Kashmir Himalayas –a part of Kashmir Himalayas lies between 33°21'53"N to 34°16'44.79"N and longitudinally it extends from 74º30'45"E to 75°13'44.42"E. It encompasses the major physiographic divisions of Jammu and Kashmir State. (Raza *et al*, 1978 and Qazi, 2005). The region has mountainous topography inhabited by Gujjar and Kashmiri communities at the height of 2338 to 2856 metres (amsl) within 20-40 degree slope and Kashmiris between 1800-2338 mts above mean seal level. Mostly the population of the region is engaged with agriculture and its allied activities (Rana, 2002; Hussain M., 2000).

Database and Methodology

The study was purely a cross sectional, 308 children both male and female below 14 years from 1023 sample households were selected in 30 sample villages across five altitudinal zones using stratified random sampling technique. The anthropometric data was collected using the procedure stipulated by the WHO (2010) for taking anthropometric measurements.

Weight: Weight was measured by electronic digital weight scale with minimum/lightly/clothing and no shoes. Calibration was done before weighing every child by setting it to zero. In case of children age below two years, the scale was allowed weighing of very young children through an automatic mother-

child adjustment that was eliminated the mother's weight while she standing on the scale with her baby. The procedure for measuring weight was repeated three times and the mean was taken as final weight for each children

Height: Height was also measured without shoes. Children were asked to stand against the wall with shoulder and buttocks touching the wall. The mark at the head level was chalked on the wall then distance from the wall to bottom was measured using measuring tape, which gave the approximate height of the respondents. Height was recorded in centimeters.

The recommended reporting system of Weight for Height (W/H) is in terms of Z- scores and percentiles mentioned for both male and female children. But here the Z-score technique (1)-(a statistical measure of the distance from the median expressed as a proportion of the standard deviation.) was used; because this method was approved by Indian association of paediatrics (IAP) in 2008. The most common cut-off point is − 2 Z-score, i.e., two standard deviations below the median values of the international reference. This is the cut-off risk level used to differentiate malnourished children from those adequately nourished. Children whose W/A scores fall below this point were therefore considered as wasted.

$$Z\text{-}Score = \frac{\text{Observed value (weight/height/BMI)} - \text{median of the reference population}}{\text{Standard Deviation (SD) of the reference Population}} \quad (1)$$

Table 1 Malnutrition classification by WHO based on Z-score

Malnutrition Type	Classification
Adequate	-2<Z score + 2
Moderate	-3<=Z score<-2
Severe	Z score < -3

Source: WHO, 2007

Logistic regression analysis was used identifying the relationship between a dependent variable (Y) (malnutrition) and one or more independent variables(X),by keeping all other variables as constant.

$$\text{Malnutriton} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_3 X_3 + \beta_4 X_4 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \mu$$

Where X_1=Sex, X_2=Education, X_3=Occupation, X_4=Income, X_5=House type, X_6=Family Size, X_7=Family Type, X_8=Sanitation, X_9=Hygiene, X_{10}=Community

$\alpha$and $\beta_{1....}$ are referred to as the model parameters, and μis a probabilistic error term that accounts for the variability in y that cannot be explained by the linear relationship with X. For simple linear regression, the sample correlation coefficient is the square root of the coefficient of determination, with the sign of the correlation coefficient being the same as the sign of $\boldsymbol{\beta}_1$, the coefficient of X_1 in the estimated regression equation.

RESULTS AND DISCUSSION

Weight-for-height (W/H) (WASTING)

The term "wasting" refers to a situation where a child has failed to achieve sufficient weight for height (W/H). Weight-for height is normally used as an indicator of current nutritional status. Wasting may be the consequence of starvation or severe disease. It can also be due to chronic conditions or a combination of both.

Weight of the 308 children was recorded by digital weight measuring machine and Height in terms of length/ height was recorded using sign board of marked height in cms. The procedure for measuring weight was repeated three times and the average was taken as final weight for each children. The children were grouped into two age groups i.e. 0-6 and 7-14 accounting 140 and 168 children respectively. With the help of Z-score technique the children were categorised into three classes of Adequate, moderate and severe as per WHO classification mentioned above (Table 1) for both male and female children of both the ethnic groups/categories. Analysis of data reveals that overall about 22.84 percent fall in the severe (Z- score<-3) category in 0-6 age group among which 21.16 percent were males and 22.54 percent were females as compared to 24.78 percent in overall with little variation between males and females of 23.69 percent and 25.88 percent respectively in 7-14 age group respectively. However regional/zonal variation is also highlighted. On the basis of severity Kashmiri community depicts 21.16 percent and 21.06 percent in 0-6 and 7-14 age groups. Zone D is having highest severity accounting 21.5 percent followed by B with 22.59 percent while the lowest severity and healthy children were found in Zone A with 20.71 percent among Kashmiris male while Zone D reveals highest severity Zone D 23percent in females, and Zone A with 19.50 percent shows the lowest among Kashmiri females.

Table 2 Zone wise grades of Malnutrition among different communities/age groups using Weight for Height

Altitudinal Zone (mts)	Age Group	Kashmiri						Gujjars					
		Male children			Female children			Male children			Female children		
		Adequate	Moderate	Severe	Adequate	Moderate	Severe	Adequate	Moderate	Severe	Adequate	Moderate	Severe
		-2<Z score+2	-3<= Z - score <-2	Z- score<-3	-2<Z - score+2	-3<= Z score <-2	Z- score<-3	-2<Z score+2	-3<= Z score <-2	Z score<-3	-2<Z score+2	-3<= Z score <-2	Z score<-3
A	0-6	51.31	27.94	20.71	55.97	24.3	19.5	0	0	0	0	0	0
(1800-1950)	7-14	55.47	26.76	17.71	54.05	23.23	22.5	0	0	0	0	0	0
B	0-6	49.42	27.69	22.59	53.57	25.08	21.26	49.73	27.44	22.93	47.67	27.62	24.65
(1950-2100)	7-14	54.94	26.81	18.29	57.05	23.32	19.67	46.5	28.55	25.27	47.85	25.5	26.5
C	0-6	44.95	33.04	21.85	53.58	27.6	18.88	52.51	26.33	21.33	44.51	29.93	25.45
(2100-2250)	7-14	51.71	26.22	22.04	56.19	22.23	21.77	50.8	20.72	28.42	45.65	21.2	33.33
D	0-6	50.24	24.5	25..5	54.01	20.65	23	49.59	23.27	22.35	53.26	22.2	24.29
22.88	7-14	49.56	30.56	23	51	25.56	23.44	47.89	24.78	27.33	45.86	26.98	27.16
E	0-6	0	0	0	0	0	0	48.79	28.88	24.88	49.17	23.48	27.35
(2400-above)	7-14	0	0	0	0	0	0	49	23.53	27.15	47.13	20.15	32.75
Total Average	0-6	48.98	28.2925	22.66	53.78	24.40	19.66	50.15	29.34	23.63	48.6525	25.8075	25.43
Total Average	7-14	51.43	27.59	20.28	54.57	23.58	21.845	48.54	24.39	27.10	46.62	23.45	29.93

Source: Based on field survey, 2013-14

Among the Gujjars in 0-6 age group of Zone C with 28.42 percent children fall in the category of severity among males and Zone C with 33.33 percent among females are mostly affected. Similar results are depicted for 7-14 age groups with interzonal variation which is clear from the table.2

The reason for high severity among the children of both age groups 0-6 and 7-14 is poorly rapid growth during early years of childhood and poor Socio-economic status acts as a dominant reason for their severity besides leading to poor balanced diet, least awareness towards nutrition programmes and negligence of parental care in bringing up the child and early weaning of child. High fecundity among Gujjar females seems leading cause of high malnutrition which later on transcends to the children thus became intergenerational.

Prevalence of Malnutrition in Children With Respect To Socio-Economic Variables (SES) In South Kashmir Himalayas

Socio-economic status (SES) remained a major concern to those who study child development and derives its conviction from the fact that rich families with high SES manage to pay for their children an assortment of goods and services that potentially redound to the benefit of children as compared to parents with low SES, thus leading to intergenerational problems especially interms of nutrition (Brooks and Duncan 1997).

The overall prevalence of malnutrition (severity) was about 23.87 percent, in which female's child constitutes 25.18 percent, followed by male 22.57 percent. It is analyzed from the study that the malnutrition paralyzed both groups independently but the rate was slightly higher among females. The income status of a household was one of the major determinants of nutritional status (UNICEF, 1990). Parental income showed that the higher the level of income, the better the care to the child and lower the level of malnutrition. The study revealed that the highest prevalence of malnutrition (32.05 %) was found in low income group i.e. below ` 7000 per month and as the income level increases; malnutrition decreases (table 3). Education helps in growth and development (Engle and Menon, 1996). Mothers education had a dominant role in preventing malnutrition among children as revealed by table 3 that highest level of malnutrition was found in children with illiterate mothers (36.63%) followed by primary (30.2%) and as the levels in education increased the malnutrition decreased as found in mother with graduation and above who depicted only 10.3 percent. Similarly parental occupational structure has a positive impact on the nutritional status of children. Highest prevalence of malnutrition was found in children whose parents were engaged in primary sector (33.4%) as compared to parents who are engaged in territary sector (15.19%). Family type and Size although were the outcome of above three indicators. Most of the malnourished (27.84) were found in joint families as compared to nuclear families (19.9%). Besides, graveness was also found in families where the size was above ten (29.9 %) and better nutritional status was found in small sized families (13.77 %). 15.53 percent malnutrition was found in children whose mothers had birth order of one and as the birth order increases (2-3 or above 5); the prevalence of malnutrition also increased (31.13%). Unfavourable health environment caused by inadequate water supply and bad sanitation and hygiene had increased the probability of infectious diseases and indirectly caused malnutrition with highest (34.49 %) malnutrition was found in children cohabited with poor hygiene and bad sanitation especially of Zone D and Zone E . Among the communities Gujjar children were found more vulnerable (27.12%) as compared to Kashmiri (20.62%). The reasons for high malnutrition were the meager parental income/occupation, high birth order /fecundity, unprotected water source and open defecation/non-availability of latrine, socio-economic backwardness, hard labour work, poor connectivity, frequent illness and ignorance regarding new policies and programmes which exist etc. besides and geophysical constraints etc.

Table 3 Prevalence of Malnutrition in Children with respect to Socio-Economic Variables in South Kashmir Himalayas

Socio-Economic Variable	Total Respondents	Prevalence of Malnutrition
Sex		
Male	162	37 (22.57)
Female	146	37(25.18)
Total	308	74(23.87)
Mothers Education		
Illiterate	98	36(36.63)
Primary	69	21(30.2)
Middle	73	17(23.78)
Secondary	48	9(18.42)
Graduate	20	2(10.3)
Total	308	74(23.87)
Parental Occupation		
Primary	142	47(33.4)
Secondary	103	24(23.02)
Territary	63	10(15.19)
Total	308	74(23.87)
Parental Income		
Below 7000	112	36(32.05)
7000-14000	83	21(25.3)
14000-21000	71	16(21.9)
Above 21000	42	7(16.23)
Total	308	74(23.87)
Birth Order		
1	38	6(15.53)
02—3	112	28(24.94)
4—5	159	49(31.13)
Total	308	74(23.87)
House Type		
Nuclear	139	28(19.9)
Joint	169	47(27.84)
Total	308	74(23.87)
Hygiene		
Good	43	5(11.3)
Satisfactory	114	29(25.83)
Poor	151	52(34.49)
Total	308	74(23.87)
Family Size		
Below 5	139	19(13.77)
42133	86	24(27.93)
Above 10	83	25(29.9)
Total	308	74(23.87)
House Type		
Pucca	137	24(17.35)
Semi Pucca	95	23(24.1)
Kuccha	76	23(30.17)
Total	308	74(23.87)
Community		
Kashmiri	145	30(20.62)
Gujjar	163	44(27.12)
Total	308	74(23.87)

Source: Based on Primary Survey, 2013-14

Relationship between Socio-Economic Variables and Malnutrition among Children in South Kashmir Himalayas (Logistic Regression Model)

Logistic regression technique has been used to identify the various factors that have affected the levels of malnutrition of the study area. From this analysis it has been found that among various socio-economic parameters like sex, mother's education, parental income, parental occupation, birth order, house type, family type and size, hygiene, community etc. Community status of the people and those who have very low social and community status have been found among the malnourished people with the odd ratio = 2.43. Mother's education, parental occupation, income, birth order, and family size depict the negative relationship i.e. if there was an increase in any one of the indicator, their malnutrition rate declined. This analysis showed that parental occupation and education has an effective role in reducing the malnutrition by achieving the food security. One percent increase in mothers education level leads to 16.81 percent decline in malnutrition while as one percent increase in quality occupation leads to decline in 13.74 percent in malnutrition. Table 5.27 also depicted that other than house type (odd ratio = 0.242060, Std.Err. = 0.137500) all other odd ratios had the standard error less than half of their values. Finally it was concluded that all the values have insignificant differences and are statistically significant.

The final multiple logistic regression model indicates that P>|z| of mothers education (p=0.0008), income (p=0.001) occupation (p=.0006), Birth order (0.007), house type (p=0.360), family size (p=0.160), Hygiene (p=.016), were significant independent predictive risk factors for the prevalence of malnutrition.

Table 4 Relationship between Socio-economic variables and Malnutrition among Children in South Kashmir Himalayas (Logistic Regression model)

Socio- economic Variable	odds ratio	Std. Err.	Z	P>|z|
Sex	1.229000	0.282400	1.0500	0.073
Mothers Education	-1.681740	0.226400	-2.6300	0.008
Parental Occupation	-1.374860	0.014000	1.4500	0.006
Parental Income	- 1.243800	0.062640	2.2500	0.001
Birth Order	-1.351910	0.028308	-2.6640	0.007
House Type	0.242060	0.137500	1.89020	0.036
Hygiene	1.511380	0.039300	-2.0150	0.016
Family Type	1.553000	0.280000	0.4200	0.110
Family Size	-0.163200	0.0526822	0.8300	0.160
Community	2.433000	0.124000	3.3160	0.032
_cons	0.22193	0.18845	-1.77	0.076
log likelihood=-317.32904, no. of obs=308, LR hi2(13)= 239.23, Prob>chi^2= 0.000, Pseudo R^2 =0.2738				

Source: Compiled from primary survey, 2013-14

CONCLUSION

Malnutrition was noted in children in higher rate. However, weight for height between communities showed significant difference. The overall prevalence of wasting (weight for height) among children (0-14) was 23.95 percent, with Kashmiri male (21.05%) and Gujjar male (25.08%) and in case of females the Kashmiri female (22.01%) as compared to Gujjar female (27.69%) were most affected.

The association between socio-economic parameters like sex, education, income, occupation, house type, family type and size, community etc. and malnutrition revealed a significant association at different levels. Community status of the people revealed that Gujjars had been found among the malnourished people with the odd ratio=2.38 (1=Kashmiri, 2=Gujjar). Education, occupation, and income depicted the negative relationship with malnutrition. If there was increase in any one of the indicator by one unit then there was decline in malnutrition rate by 12.95 percent, 14.7 percent, and 5.9 percent respectively by keeping other variables at constant. The following suggestions are recommended for improving nutritional status among children i.e. proper monitoring of health status of children at ICDS centres with integrated approach among departments like AWW, ANM, Improve literacy rate and health visitors and most importantly awareness regarding Balanced Diet/Nutrition Programmes especially in Zone D and E

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How to cite this article:

Rouf A. Dar.2017, Association of Some Socio-Economic And Socio-Demographic Variables With Malnutrition Among Children of South Kashmir, J&K- India. *Int J Recent Sci Res.* 8(10), pp. 21265-21270.
DOI: http://dx.doi.org/10.24327/ijrsr.2017.0810.1040

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