

## Female work participation and child health: an investigation in rural Tamil Nadu, India\*



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### **Abstract**

This paper seeks to examine the linkage between mothers' work and child health. The data are from a survey of 75 working and 75 non-working women in a village in Tamil Nadu, India. The results show that the working women spend on an average 1.7 hours less than the non-working women on child care. The duration of breastfeeding also is shorter among the working women. The morbidity rates were higher for the children of working women than for the children of non-working women. Logistic regression analysis showed that the children of working women are at a significantly greater risk of morbidity even when socio-economic factors are controlled. The results, however, do not show a significant variation in morbidity by sex.

Traditionally a woman's place has been at home and a generation ago, her employment outside the home was looked down upon by the society. This situation has now changed and women have started seeking employment outside their homes through gross economic necessity followed by the desire to raise economic status, to have an independent income, to make use of education, to pursue a career etc. In rural areas, however, poor women may go to work mainly out of sheer economic necessity.

In the demographic literature, the discussion of the relationship between women's work and child mortality has almost always focused on paid employment outside the home. At low skills and in less developed economies, working women's additional income may be quite small. The mother's employment is seen as affecting the family through changes in care received by children. If the woman is working, she is likely to spend less time on feeding children, cleaning them, and playing with them. In the past, older siblings or grandparents were usually available to take care of young infants while the mother was employed; but because of social change and modernization, the extended family has become less common. All these factors may contribute to poor child health.

On the basis of a review of literature, Ware (1984) observed that women's economic activities will have an adverse effect on child care only where the activity is incompatible with child rearing or where the mother lacks access to another person able to care for the child. There is a possibility of child neglect and malnutrition due to an early abandonment of breastfeeding.

Very few studies in India have specifically investigated the effect of mothers' work on child health. However, a few analyses of child mortality have examined mothers' work

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as one of the explanatory factors. Zachariah et al. (1994) found that in Kerala if a woman was working, the mortality risk for her child during infancy and childhood was higher than if she was not working, because the working woman had a shorter duration of breastfeeding and less time with the child. In a study of a slum population in Delhi, Basu and Basu (1991) also found higher risk of child mortality for working mothers at least in the poorest section of the population. On the other hand, an analysis of 1981 Indian census data showed a negative influence of female labour force participation on child mortality at the aggregate (state) level (Tulasidhar 1993).

A recent study examined the role of female employment in child care and health in greater detail (Desai and Jain 1994). It was found that in villages in Karnataka, children whose mothers are wage workers are less likely to be immunized and more likely to suffer from poor nutrition than children whose mothers are family workers or housewives. It was also found that the mother's time in specific activities such as feeding or bathing children does not differ much by work status, but the mother's leisure time is affected by her work. The study did not, however, examine child mortality.

There is a need to compare the time input on child care and the health of children of working and non-working women. The present study examines whether the work status of a mother has implications for child care and child health.

## Method

Conceptually, the work status of women can affect child health because a working woman has less time to devote to child care. Therefore, it is necessary to examine how working and non-working women spend time on specific aspects of child care. Further, it is possible that the working women as a class are in a different socio-economic stratum. In particular, in rural India, the women from poor landless families are more likely to work than women from affluent landholding families. The latter may be able to provide better child care than the former because of better financial and possibly educational endowments. Therefore, to see whether work status *per se* has an influence on child health, it is necessary to control for household socio-economic factors.

In order to answer the research questions raised here, data on child care, various aspects of child health and household socio-economic background of working and non-working women are required. Given the resource constraints, it was decided to obtain such data by concentrating on a single village. For this purpose, a village in the Dindigul-Anna district of Tamil Nadu was chosen.

A preliminary listing of households in the village was carried out, and women who were normally engaged in economic activity during the previous year or the previous agriculture season were identified as working women. Almost all of them were engaged in agriculture and related activities. From these, 75 currently married women below the age of 45 were selected systematically for detailed study. Since most of the working women were wage workers, no further division into wage workers and family farm workers was made. Further, of the non-working women, 75 were selected in a similar manner.

A schedule was designed to obtain information on household characteristics, fertility history, time input on work and child care activities, and health for children below the age of 15 years. Given the smallness of the sample, it was felt that examination of child mortality differentials would not be possible. Hence, child health is assessed in terms of morbidity, that is, the incidence of an illness during a specified period preceding the survey. In most large surveys, the reference period for recording morbidity is one week or one month. But in a small sample, such a period would be too short as there would be very few incidences of disease within it. Hence, it was decided to adopt a longer period: one year for any illness, and three years for specific illnesses. Information on immunization, breastfeeding, provision of

special diets, and treatment of a sick child was also obtained. The survey was carried out during December 1994.

### **Setting**

The study village is of a medium size with a population of 3121 in 1991; it is 15 kilometres from the nearest town. There are no medium or small industries in or near the village and thus it has become possible to concentrate on a purely agrarian setting. The climate of the village is dry with very low rainfall; there are both irrigated and dry lands. Cultivation depends on rain and private wells; no river or canal irrigation is available. Only one crop such as maize is grown in dry lands, whereas in irrigated lands two or more crops such as groundnuts, onions, cotton, and chillies are grown.

A majority of the people in this village belong to the Kongu Vellala and Naicker castes which are the dominant agricultural communities in the region. These two communities own most of the land in the village and most others either work as labourers on their land or provide other services. Rice is the staple food and meat is consumed occasionally, once a week or month or during festival times. However, eggs are provided to the children more often. Almost all the households in the village have electricity, used mostly for lighting. Drinking water is available from taps, mostly at common points on street corners; a few wealthy households have private connections. But very few households have toilets. This village is on a bus route with frequent services to nearby towns.

The village has two nursery schools, two primary schools, one high school for boys and one higher secondary school for girls. One primary health centre (with two physicians) and two private dispensaries are located in the village and provide simple curative services. The primary health centre also provides immunization on a specified day every week in addition to family planning and maternal health care. Various government-sponsored nutrition programs, such as the Tamil Nadu Integrated Nutrition Programme (TNIP) and the Chief Minister's Noon Meal scheme, have been functioning in the village.

### **Profile of the sample**

Of the 75 working women in the sample, five did not have a child at the time of survey, and were excluded from further analysis. Thus, the proceeding analysis is based on 145 women, 70 working and 75 non-working. A comparative view of the demographic and socio-economic characteristics of the two groups of women is presented in Table 1. It can be seen that the non-working women are younger than the working women on average. The mean age at marriage of non-working women is slightly higher than that of working women. The mean number of children ever born is higher among working women. The level of education is quite low among the working women. In contrast, a majority of the non-working respondents have completed at least five years of education. A greater proportion of the non-working women are from landholding families. As a result, while the husbands of most of the working women are engaged in agriculture as casual labourers, in the case of the husbands of the non-working women, a substantial proportion are cultivators or engaged in trade, transport and white-collar activities. Average annual household income of the non-working respondents is considerable: a larger percentage of non-working than working women's families have incomes exceeding Rs. 20,000. Broadly, the non-working women are in a higher socio-economic stratum of the rural society than the working women.

**Table 1**  
**Demographic and socio-economic characteristics of the two groups of women**

	Non-working women	Working women
Age group	Percentage Distribution	
19-24	25.3	7.1
25-29	36.0	32.9
30-34	20.0	28.6
35-39	12.0	15.7
40-44	6.7	15.7
Total	100.0	100.0
Mean age (yrs)	29.2	32.0
Mean age at marriage (yrs)	20.7	20.1
Mean children ever born	1.9	2.2
Per cent literate	77.3	38.6
Mean annual household income (Rs.)	20,538	16,973
Per cent in landholding households	25.3	12.9
Mean land owned and/or cultivated (acres)	1.0	0.4
Per cent residing in <i>pucca</i> houses	69.3	38.6
Number of women	75	70

### Nature of work by women

The main economic activity for the women is agricultural labour. There is little scope for household industry (weaving, basket making) in this area and hence the rural women depend on agricultural and occasionally construction activities for employment. This work is often seasonal and is casual, that is a woman desirous of employment must seek wage labour on a daily basis. The work is outside the home though mostly in the same village or in a neighbouring village. The working hours are generally from about 9 in the morning to 6 in the evening with a lunch break at midday. The wages are Rs. 15 to 20 per day (about US 50c) paid in cash.

In agricultural operations, woman do jobs like sowing seeds, harvesting, weeding, and transplanting, while men do the ploughing and digging. During the off-season women stay at home and sometimes they do jobs like collecting firewood or some other manual work at the landowner's house. The working women, of course, also take care of their own household activities: cooking, cleaning, child care, bringing water. Most of the working women leave the children at home to be cared for by grandparents or elder siblings or other relatives. However, when a child is ill, some women forgo work to attend to the child. Some of the non-working women reported that they are not able to go to work as they have to take care of their children. Others said that it was due to the unwillingness of their husbands that they were not going to work. Further, traditionally, the upper castes do not send women to work outside the home and outside the village.

### Results

The time spent on specific aspects of child care, in mean hours per day, is shown in Table 2. It can be seen that the working women spend only a little less time than the non-working women in feeding and bathing their children, but the non-working women, who have more time at their disposal, spend more time in playing with children which the working women cannot do.

Interestingly, as the number of children increases, such time spent by non-working women declines (details not shown in the table), because with more children the elder ones can entertain the younger, obviating the need for the mother to do so. The survey showed that working women spend on an average 2.4 hours less than the non-working women on child care.

**Table 2**  
**Time spent on child care by working and non-working women**

Activities	Non-working women	Working women
Mean time spent in hours per day on:		
Bathing children	0.3	0.2
Giving food	0.5	0.4
Playing with children	2.5	0.7
All activities of child care	3.9	1.5

Most of the women were aware of the preventive measures of immunization and the coverage is nearly universal among children of both working and non-working women, especially for BCG and DPT immunizations. The coverage of measles immunization is also fairly high in both the groups, perhaps because the government immunization program is wide-ranging. Data on breastfeeding the last child were obtained; since some women were continuing breastfeeding at the time of the survey, some of the observations are truncated, so the life table approach was used to estimate the length of breastfeeding. Breastfeeding is discontinued earlier and the average duration of breastfeeding is shorter among working women (11.5 months) than among non-working women (14 months). It is generally felt that milk and eggs are nutritious and contribute to healthy child growth, but fewer children of working than non-working women get such nutritious food. The differences persist even when income is controlled for.

Information was obtained on whether a child suffered from any illness during the one-year period before the survey, and the incidence of specific illnesses such as fever, diarrhoea, jaundice and chickenpox during the three-year period before the survey. Fever (indicating some form of infection) was the most commonly reported illness and a majority of the children were affected during the three-year period (Table 3). Very few of the children of the non-working women suffered from diarrhoea, jaundice or chickenpox; the incidence was noticeably higher among the children of working women. Thus the children of working women appear to face a greater morbidity risk.

In the case of an illness, the child is generally taken to a clinic for treatment. Among the non-working women, the preference was for a private doctor whereas the majority of working women consult a government doctor. This is probably because the non-working women with their higher income can afford to consult a private doctor. Some working women forgo work for a day or so to attend a sick child, but 73 per cent continue to work even when a child is sick. In some cases, a family member, usually the mother-in-law, looks after the sick child. But in about half the cases, the child is kept home without any person to look after it.

### Regression analysis

In the previous section, differences between working and non-working women's time spent on children, special food given, immunization coverage and morbidity were examined. In most cases, the gross differences, that is without any control for background variables, were presented. However, in an earlier section it was noted that the working and non-working women differ considerably with respect to income, education, landholding etc., factors which

could also plausibly influence child care and health. Therefore, a multiple regression approach has been adopted to see the extent to which the work status of the mother influences child care and child health.

**Table 3**  
**Child health/care for children of working and non-working women**

	Non-working women	Working women
Mean length of breastfeeding (in months)	14.0	11.5
Per cent children getting additional nutritious food	50.0	14.0
Per cent reporting incidence of any illness (during the preceding year)	49.2	91.1
Illness during last three years:		
Fever	81.3	91.1
Diarrhoea	3.8	20.0
Jaundice	3.8	14.6
Chickenpox	2.3	15.4

In the following analysis, a child care-health variable is taken as the dependent variable, and work status and relevant background variables as explanatory variables. The general model adopted is:

$$y = f(\text{WS}, X1, X2, \dots) + e$$

where:

$y$  = a child care or health variable,

WS = mother's work status,

$X1, X2, \dots$  are relevant background variables, and

$e$  = the error term.

The functional relationship is assumed to be of a linear type so that the model reduces to a multiple regression model. The primary interest is in the coefficient of the work status variable. The model is assumed to satisfy the usual conditions.

The background variables which may possibly influence child care-health are included. These are: (1) education of mother, (2) annual household income, (3) size of land holding, and (4) livestock ownership. In addition, the number of young children (below the age of 5 years) is also included as an explanatory variable, since the mother's time input is likely to be influenced by it.

Finally, when the dependent variable relates to child health, sex of the child is also included, since in the literature there has been considerable discussion on gender discrimination.

Two sets of analyses are carried out; one is for the time spent by women on child care. Here the individual woman is the unit of analysis. Three dependent variables are examined: total time spent per day on child care; time spent in playing with children; time spent in feeding the children.

The second analysis is for the individual child. Here the special food given to the child, coverage of measles immunizations and morbidity rates (any illness, fever, diarrhoea) are used as the dependent variables. Polio, DPT and BCG immunizations have not been included since the coverage of these has been found to be nearly universal. Further, the incidence of jaundice and chickenpox was very small so, for a sample of this size, it was

decided not to include these as morbidity variables. Since all of these dependent variables are dichotomous in nature, instead of linear regression, logit regression has been used. The list of variables used in the two analyses is given in the Table 4 along with means and standard deviations.

**Table 4**  
**Variables used in regression analysis**

**A Unit of observation: Mother (n = 145) (Working mothers (W) 70; Non-working mothers (NW) 75)**

Variable Name	Description	Mean			S.D.		
		All	W	NW	All	W	NW
CB 5	Total no. of living children below age 5 (actual number)	0.6	0.5	0.8	0.7	0.7	0.7
EDM	Education of mother (in completed years of schooling)	4.0	2.2	5.9	4.1	3.4	4.0
LND	Landholding by the household Dichotomous: No landholding = 0 Landholding = 1	0.19	0.13	0.25	0.40	0.34	0.44
LST	Livestock ownership by the household (Dich.): No livestock = 0 Livestock = 1	0.12	0.07	0.16	0.32	0.26	0.37
INC	Annual household income (in thousands of rupees)	18.8	17.0	20.5	14.3	15.4	13.1
TCR	Time spent on child care (in hours per day)	2.8	1.5	3.9	1.8	0.6	1.7
TPL	Time spent on playing with children (in hours per day)	1.6	0.7	2.5	1.2	0.5	1.0
TFD	Time spent on feeding the children (in minutes per day)	26.1	21.0	30.9	10.4	9.9	8.5

**Table 4 continued**

**B Unit of observation: Child (n=270)(Children of working women (W) 136; Children of non-working women (NW) 134)**

Variable Name	Description	Mean			S.D.		
		All	NW	W	All	NW	W
EDM	Education of mother (in completed years of schooling)	3.9	5.7	2.1	4.1	3.9	3.3
INC	Annual household income (in thousands of rupees)	19.5	21.9	17.2	14.5	13.7	14.9
SEX	Sex of the child (Dichotomous): Male = 0						

SPF	Female = 1	0.51	0.46	0.55	0.50	0.50	0.50
	Special food (egg, milk) (Dich.): Not given = 0						
MSL	Given = 1	0.32	0.50	0.14	0.47	0.50	0.35
	Measles immunization (Dich.): Not given = 0						
ILL	Given = 1	0.64	0.72	0.57	0.48	0.45	0.50
	Any illness during the previous year (Dich.): No = 0						
FER	Yes = 1	0.70	0.49	0.91	0.46	0.50	0.28
	Fever during the previous three years (Dich.): No = 0						
DIA	Yes = 1	0.86	0.81	0.91	0.34	0.39	0.28
	Diarrhoea during the previous three years (Dich.): No = 0						
	Yes = 1	0.12	0.04	0.20	0.32	0.19	0.40

#### *Time spent on child care*

As mentioned earlier, three indicators of child care are used. The regression results (Table 5) show that of the six variables considered only two, work status (WS) and number of children under five (CB5), have significant effects on the total time spent on child care. As expected, as the number of young children increases, the mother has to spend more time on them on child care. Working women spend on average two hours less than non-working women on child care. None of the education, income, landholding, or livestock variables showed any significant effect, though a large proportion of the variation in the dependent variable is explained (60%). The regression was rerun after deleting the non-significant variables. It can be seen that the  $R^2$  did not drop much and the coefficients of the significant variable did not change notably. A similar analysis was carried out for the time spent by the mother on playing with her children. Once again, only two variables, WS and CB5, have a significant effect; working women spent an hour and a half less on playing with their children. The  $R^2$  value is quite large, 67.7 per cent. Dropping the insignificant socio-economic variables makes little difference in  $R^2$  or in the regression coefficients.



**Table 5**  
**Regression analysis for mother's time on children: summary results**

Explanatory Variables	Dependent Variables				
	TCR		TPL		TFD
Regr. No.:	1	2	3	4	5
CB5- child under 5	0.846 (0.000)	0.923 (0.000)	0.560 (0.000)	0.568 (0.000)	7.068 (0.000)
EDM	0.037 (0.220)	a	0.014 (0.445)	a	a
LND	-0.254 (0.405)	a	-0.057 (0.753)	a	a
LST	-0.383 (0.122)	a	-0.010 (0.965)	a	a
INC	-0.013 (0.122)	a	-0.001 (0.891)	a	a
WS- work status	-2.035 (0.000)	-2.035 (0.000)	-1.500 (0.000)	-1.536 (0.000)	-7.349 (0.000)
Cons	3.388	3.156	1.969	2.004	25.117
R <sup>2</sup>	0.600	0.576	0.677	0.675	0.450

(n = 145). Note: a not included in the equation. Figures in parentheses are 'p'- values.

Finally, time spent on giving food to children (recorded here in minutes) is also influenced positively by the number of young children and negatively by work status.

#### ***Child health and morbidity***

The results of the logit regression analysis for a series of child health variables regressed on socio-economic variables and work status are given in Table 6. Note that this analysis is at the child level. Throughout the analysis, sex of the child, education of the mother, and household income are used as explanatory variables in addition to work status of mother. Two of the variables used in the earlier analysis, landholding (LND) and ownership of livestock (LST) are not used in the child level analysis, as these were felt to be less relevant especially since income is used as a variable. Besides, these two variables did not show any effect even in the analysis of mothers' time. It should be noted that since the dependent variables are dichotomous, logit regression has been carried out. The magnitude of the logit regression coefficient does not have the same interpretation as in the case of conventional multiple linear regression, though the direction and significance of the coefficient has a meaning similar to that in linear regression.

From Table 6 it can be seen that WS has a negative and significant effect on logit of SPF. In other words, working women have less propensity to give special food like milk and eggs to children. Note that this is the case even when controlling for education and income. Incidentally, both education and income have significant positive effects on SPF as expected. The effect of sex is not significant.

**Table 6**  
**Logit Regression analysis for child nutrition, immunization and morbidity**

Explanatory Variables	Dependent Variables				
	Special food	Measles immunization	Any illness during previous year	Fever	Diarrhoea
Regr. No.:	1	2	3	4	5
SEX	-0.384 (0.247)	-0.387 (0.140)	-0.182 (0.567)	-0.751 (0.051)	0.157 (0.691)
EDM	0.103 (0.033)	0.044 (0.300)	0.118 (0.019)	0.153 (0.018)	-0.046 (0.506)
INC	0.065 (0.000)	-0.011 (0.281)	-0.046 (0.000)	-0.045 (0.002)	-0.009 (0.626)
WS	-1.427 (0.000)	-0.493 (0.094)	2.746 (0.000)	1.321 (0.002)	1.637 (0.003)
Cons.	-1.770	1.111	0.382	2.055	-2.879
Log likelihood	-118.67	-170.97	-125.75	-98.26	-88.36
Chi-Square	100.56	9.50	76.66	19.24	19.82

(n = 270). Note: Figures in parentheses are 'p'- values.

The regression for measles immunization shows that work status has no significant effect on the chances of being immunized; neither was the child's sex found to have a significant influence. Note that the chi-square value is quite low in this logit regression. Finally, work status positively and significantly influences the risk of any illness, and specifically of fever and diarrhoea; the effect is more prominent in the case of illness in general, than in the cases of fever and diarrhoea; the chi-square values are quite small in the later regressions. In other words, the children of working women are more prone to illness even when socio-economic variables are controlled. As expected, rise in income lowers the risks, since the coefficients of the income variable are significant and negative. Sex of the child does not seem to have much influence except that the risk of fever is moderately lower for girls. Education of mother rather surprisingly has a positive effect on morbidity; possibly this is because education has a bearing on the perception of morbidity. It should be noted that the morbidity information is obtained from reports of mothers and more educated mothers may have a tendency to report minor episodes of illness which the less educated mothers may ignore. The limitations in using self- perceived (or perceived by mother as in the present case) morbidity measurement are well known (Murray and Chen 1994) and need no elaboration.

In examination of the differences between the child care and health indicators of working and non-working women, there was an apprehension that such differences need not necessarily be attributable to the mother's work factor. An examination of the two groups had revealed that they differ substantially with respect to socio-economic background. But the regression analysis points towards a notable influence of mother's work on child care and health. Even after controlling for key socio-economic variables, children of working mothers tend to receive less attention of the mother, and less special nutritious food, and are at a greater morbidity risk. Immunization, however, does not seem to have been affected by mother's work.

Finally, a point about gender discrimination. The results in this study do not show that girls receive significantly less special food or have significantly higher incidence of disease than boys. In fact, in the case of fever, the girls face significantly lower risk. This may

appear incongruent with the general impression that in India, girls are discriminated against in allocation of food and health care, and are at greater risk of morbidity than boys. However, it must be noted that the present study was in rural Tamil Nadu in south India. It is well recognized (see Karve 1968; Dyson and Moore 1983) that women have more autonomy and higher status in south India than in the north. In the southern states of India, including Tamil Nadu, female child mortality has actually been lower than male mortality (India, Registrar-general 1988). It has been observed earlier that the nature of sex bias in health care differs across different cultures, and differentials by sex are smaller in Tamil Nadu than in northern states (Basu 1990).

### **Implications of results**

The regression analysis clearly shows that the children of working women are at a disadvantage compared to the children of non-working women. This is true especially in the case of morbidity and provision of special foods. But this need not necessarily imply that a woman's preference for work goes against the interest of her children. A working woman raises the household income which makes it possible to provide better food and health care to children as well as to others. This could partly, fully, or more than offset any adverse effect of work. However, trial computations of predicted values of probabilities of illness (obtained from the logit regressions) showed that even a rise of 10,000 rupees in household income does not compensate for the work effect. For example, the probability that a male child of an illiterate non-working woman with a household income of Rs. 10,000 will fall ill with diarrhoea is 0.05, whereas for the son of an illiterate working woman with a household income of Rs. 20,000 the probability is as high as 0.19. Not many women in rural areas can hope to earn as much as 10,000 rupees. Thus, it appears that a poor woman's decision to engage in economic activity, especially outside the home, is likely to adversely affect her child's health.

This is not to make a case against female employment. The additional income earned contributes to the household and should clearly promote a better standard of living overall. Employment provides a woman a degree of autonomy which positively contributes to the quality of life. Economic production by women contributes to the overall production of the society and economic development. What the results do suggest is that appropriate steps need to be taken to minimize any negative effect of mothers' work on child health. These could include provision of childcare facilities to rural working women. Strengthening of the nursery schools in villages and providing facilities for the care of very young children will be helpful. The entire burden of childbearing falls on the woman. But this need not be the case with child rearing. All members of the family could share the tasks of child care, freeing the mother to fully participate in economic production.

Certain limitations of the study should also be noted here. First, the sample size and coverage are small. We must see whether a large study yields similar results. Second, the two groups, working and non-working women, could represent two classes in the society and coefficients from pooled regressions may not reflect true effects in individual classes. However, separate regressions for working and non-working women did not show any differential effect on the dependent variables. The study is restricted to a rural area. Urban working mothers may possibly be able to make appropriate arrangements for good child care during their absence from home. It should also be seen how well institutional arrangements like creche services work. In spite of these limitations, the findings of the study clearly make a strong case for greater attention to be given to the children of working rural women. The women, burdened with the responsibilities of earning livelihood and caring for the family, find it difficult to devote adequate time to the children who face a heavy morbidity risk. As

female participation in the labour force increases, the problem will become larger. This calls for adjustments at the familial level and policy measures at the societal level.

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