A Descriptive Study of the Assessment of Socio-Economic and Educational Inequality of Women in Arsenic-Affected Areas of Ballia District (UP)

Anita gupta[1] Archana chakravarty[2]

[1] Research scholar, Department of Home Science, MMV, Banaras Hindu University, Varanasi

[2] Ex.Professor & Head, Department of Home Science, MMV, Banaras Hindu University, Varanasi

Abstract

At present, the effect of arsenic-related problems is being seen widely. In some parts of the world, levels of arsenic have been found several times higher than their standard levels. Ballia district of Uttar Pradesh is also one of them where arsenic has been found in drinking water at dangerous levels. The present study describes the impact of the socio-economic and educational status of women in some specific arsenic-affected areas of the Ballia district. A cross-sectional study was done on a total of 400 women who were selected with a random sampling method in this study and the data was collected and analyzed through the questionnaire-cum-interview scheduled techniques with appropriate statistical tests. Most of the respondents were belonging to medium SES followed by low SES while the percentage of high SES respondents was found very low. A negative correlation was found between different age groups of females in different educational statuses. Apart from this, there was a highly significant association exists between respondents' occupational status and their various caste groups. This study could be useful in reducing Arsenicosis in women concerning their discrimination of socio-economical and educational status.

Keywords: Arsenic, SES, Educational status, Drinking water, Arsenicosis

Corresponding Author*

Anita Gupta

Department of Home Science (MMV)

BHU, Varanasi- 221005

1. Introduction

Arsenic is a natural component of the earth's crust which is widely found at high levels in the groundwater of many countries. The greatest threat to public health from arsenic is contaminated water used for drinking, food preparation, and irrigation of food crops. The long-term risk of arsenic from drinking water and food is related to the cause of many cancer and problems of skin diseases. Diabetes, lung, and kidney-related problems, cardiovascular diseases, and many others problems are also associated with arsenic (World health organization, 2018).

In India, it is found with highly toxic in its inorganic form in West Bengal, Assam, Bihar, Chhattisgarh, Haryana, Jharkhand, Karnataka, Punjab, and Uttar Pradesh like states. Chronic Arsenic Toxicity (Arsenicosis), as a result of drinking arsenic-contaminated groundwater, is a major environmental health hazard throughout the world, including India. It is also associated with different types of cancers as like skin, lung, and urinary bladder cancer (Mazumder & Dasgupta, 2011).

As per BIS Standards (IS 10500: 2012) the maximum permissible level of Arsenic in drinking water is 0.01 mg/l (ppm) or 10 µg/l(ppb)while Arsenic concentrations were found in Ballia district from the dangerous range of 0 to 468 µg/l (ppb) in groundwater which was collected from the depths of 30–33 m of India Mark II hand pumps (Chauhan et al. 2009). Some reports also stated the presence of arsenic in the drinking water of the population of Ballia district and determined its correlation with blood arsenic levels (Katiyar and Singh, 2014). Contamination of arsenic in the Belahari block was found very high in the Ballia district (Asthana & Dwivedi, 2021). Arsenic-related health problems are being widely spread in the affected areas. People have to be concerned about this problem.

The socioeconomic status (SES) of an individual is one of the important determinants of health status(Singh et al., 2017). According to UNESCO, good quality education is the foundation of an individual's health and well-being. To lead healthy and productive lives, people need to be educated to prevent sickness and diseases. The 2015 Incheon Declaration confirms that education develops the skills, values, and attitudes that enable citizens to lead healthy and fulfilled lives, make informed decisions, and respond to local and global challenges. The adequate socio-economical and educational status of women is very helpful for increasing work capacity, their right to healthy living, as well as for the health of their offspring. Women play an important role in contributing to the well-being of society. So they have to be strong on the different forms of socioeconomic and educational levels. The present paper provides valuable information about women's socio-economical and educational status that lived in arsenic-affected areas which could contribute to the reduction of arsenic health effects.

2. Materials and methods

In the present study, samples had selected by systematic random sampling techniques from Ballia district's arsenic-affected selected areas of the Belahari block. This study was a cross-sectional study in which data had been collected from 20-40 age groups of 400 women who lived there for at least five years in the rural area of Ballia district. The data was collected from the respondents through the self-designed questionnaire cum interview schedule. The socioeconomic status of the sample was calculated by the updated standard scale of B. G. PrasadSocio-Economic classification, 2017.

The general characteristics of the respondents i.e. age; caste, marital status, family type, occupational, educational, and other information were also assessed through questionnaire-cum-interview schedules from the respondents. The collected data were tabulated and classified in number, frequency, and

percentage. To determine the significances between different variables mean, chi-squares test, t-test, F-test, and other appropriate statistical techniques are used in data interpretation. The Pearson correlation coefficient was also used for finding the different correlations between the parameters. Statistical analysis was done by using the Statistical Package of Social Sciences (SPSS) Version 16.0.

3. Results and Discussions

The present study indicates that the total numbers of the sample were 400 reproductive age group women. The respondent's ages were categorized into three groups and most of the respondents (37.8 %) were in the age group of 30 to 38 years while 32.2 % of the respondents were in the age group of fewer than 30 years. Along with this 30 % of the women belonged to the over 38 year's old age group. All 97.8 % of respondents belonged to the Hindu religion except only 2.3 % Muslim religion (Table no.1).

Table no. 1: Distribution of Respondents According to their Age, Religion, and Caste

Age Status	No.	%
<30	129	32.2
30-38	151	37.8
>38	120	30.0
Total	**400**	**100.0**
Religion		
Hindu	391	97.8
Muslim	09	2.2

In the context of caste groups, most of the respondents (61.2 %) were belong to the OBC category while 19.5 % were General followed by 14.8 % in the SC category and only 4.5 % of the respondents belonging to the ST category (Figure no. 1).
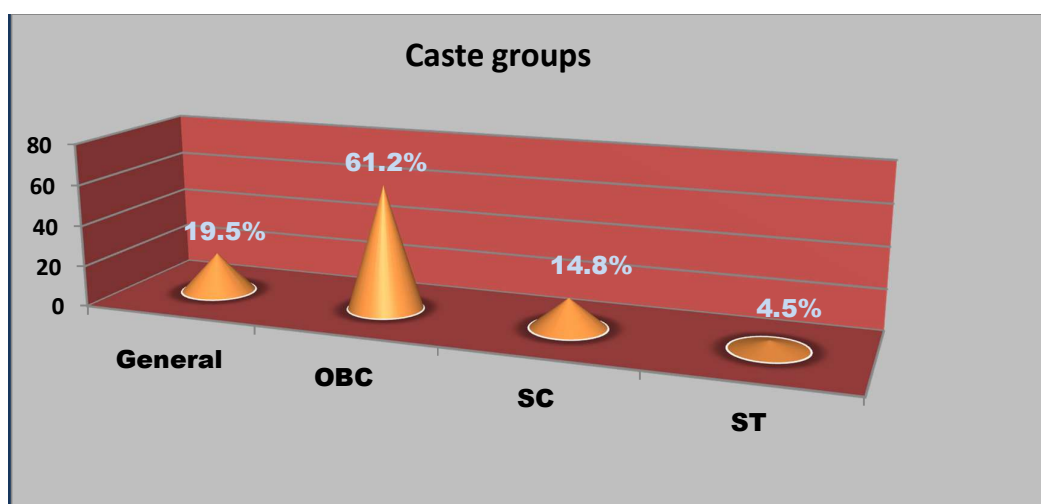

Figure no. 1: Distribution of Respondent's Caste Group

As shown in figure no. 2, the majority of the respondents (94.5 %) were married while 4.3 % of the respondents were widows, and 1.2 % of divorcee respondents lived separately.
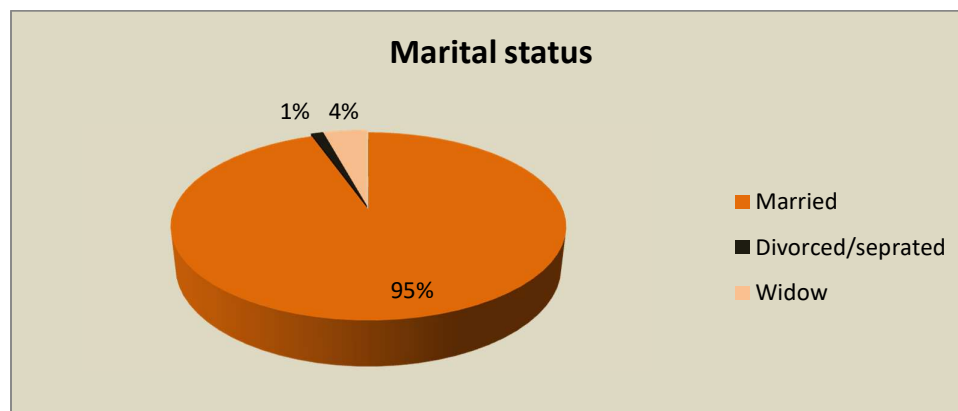

Figure no. 2: Distribution of Respondent's Marital Status

Table no. 2 shows an overview of the educational qualification of the respondents. A maximum of 29.2 % of women were illiterate, 21 % were educated matric level followed by 20.5 % intermediate level. 13.5 %, 9.0 %, and 4.8 % were educated up to junior high school, primary, and undergraduate levels respectively. Only one percent of the respondents studied other professional courses and post-graduation.

Table no. 2: **Distribution of respondents based on their educational qualifications**

Educational Qualification	No.	%
Illiterate	117	29.2
Primary	36	9.0
Middle	54	13.5
High school	84	21.0
Intermediate	82	20.5
Undergraduate	19	4.8
Postgraduate	04	1.0
Other professional qualification	04	1.0

Table No. 3 presents the summary statistics for the respondent's educational status based on their different age and caste group. Maximum illiterate respondents (47.5%) and low educational level

respondents (26.6%) were in the above 38 years, age group. The majority of the medium educational level respondent (56.6%) and high educational level respondents (12.4%) both were found in the below 30 years, age group. There was a highly significant difference (<0.001) found between different age groups and educational status along with a low negative correlation. The table shows that as we moved from the less than 30 years age group to the more than 38 years age group, the literacy percentage was decreasing, and going from the more than 38 years age group to the less than 30 years age group, literacy percentage was increasing.

It was also clear from the table that low-level, medium-level, and high-level educated respondents were found in the general caste group with 44.4%, 52.6%, and 10.2 % respectively. Maximum SC and ST caste group respondents (54.5%) were found illiterate than other caste groups. This table indicates that the difference between different caste groups and educational status was highly significant (P<0.001) along with a low negative correlation. Moving from general to OBC and then SC/ST caste groups, the literacy percentage was decreasing. The caste and education level of respondents was affecting each other.

Table no. 3: Distribution of Respondent's Educational Status According to their Age and Caste Group

Age Group (in years)	Educational Status									
	Illiterate		Low		Medium		High		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
<30	16	12.4	24	18.6	73	56.6	16	12.4	129	100.0
30-38	44	29.1	34	22.5	67	44.4	06	4.0	151	100.0
>38	57	47.5	32	26.6	26	21.7	05	4.2	120	100.0
Total	117	29.2	90	22.5	166	41.5	27	6.8	400	100.0
Correlation coefficient(r)= -0.393, P<0.001, χ^2= 55.75,df= 6, P<0.001										
Caste Group										
General	10	12.8	19	44.4	41	52.6	08	10.2	78	100.0
OBC	65	26.5	57	23.3	108	44.1	15	6.1	245	100.0
SC/ST	42	54.5	14	18.2	17	22.1	04	5.2	77	100.0
χ^2= 37.02, df= 6, P<0.001, r= -0.274, P<0.001										

Table no. 4 represents the caste-wise distribution of respondents based on their occupational status. The out of the total respondents (400) maximum respondents were non-working (80.5%) while the remaining 19.5% respondents were engaged in some work such as cultivation and labor. It was found that a higher number of working respondents belong to SC/ST caste group (54.5%) followed by the OBC caste group (12.2%) and general caste group (7.7%) respectively. The majority of non-working respondents were found in the general category (92.3%) followed by the OBC category (87.8%) and SC/ST category (45.5%) respectively. Statistical test signifies that there was a highly significant difference (<0.001) between respondent's different caste group and their occupational status.

Table no. 4: Caste-wise Distribution of Respondents Based on their Occupational Status

Caste Group	Occupational Status					
	Working		Non-Working		Total	
	No.	%	No.	%	No.	%
General	06	7.7	72	92.3	78	100.0
OBC	30	12.2	215	87.8	245	100.0
SC/ST	42	54.5	35	45.5	77	100.0
Total	78	19.5	322	80.5	400	100.0
χ^2= 75.39, df= 2, P<0.001						

It was observed that the majority of lower-income group respondents (85.7%) belonged to SC/ST caste group followed by the OBC caste group (40.0%) and general caste group (20.5%) (Table no. 5). Maximum middle-class group (69.2%) and upper-class group (10.3%) respondents belonged to general category followed by 56.7% and 3.3% of OBC category respectively whereas the smaller percentage of a middle-income group (13.0%) and upper-income group (1.3%) were from SC/ST category. The difference in the socio-economic status of the respondents concerning their caste was found to be highly statistically significant (<0.001).

Table no. 5: Distribution of Respondent's SES According to their Caste

Caste	Socio Economic Status							
	Lower		Middle		Upper		Total	
	No.	%	No.	%	No.	%	No.	%
General	16	20.5	54	69.2	08	10.3	78	100.0
OBC	98	40.0	139	56.7	08	3.3	245	100.0
SC/ST	66	85.7	10	13.0	01	1.3	77	100.0
Total	180	45.0	203	50.8	17	4.2	400	100.0
χ^2= 77.49, df= 4, P<0.001								

Table No. 6: Association of Respondent's SES with their Family Type and Family Size

Family type	Socio economic status									
	Lower		Middle		Upper		Total		MPCI	
	No.	%	No.	%	No.	%	No.	%	Mean	SD
Joint	116	46.0	126	50.0	10	4.0	252	100.0	2553.70	1833.41
Nuclear	64	43.2	77	52.0	07	4.8	148	100.0	2863.00	2024.58
Total	180	45.0	203	50.8	17	4.2	400	100.0	2668.20	1909.72
t= 1.57, df= 398, P>0.05										
Family size										
1-5	71	42.3	86	51.2	11	6.5	168	100.0	2952.50	2147.97

6-10	83	44.1	99	52.7	06	3.2	188	100.0	2586.80	1786.20
>10	26	59.1	18	40.9	00	0.0	44	100.0	1930.00	1070.15
F= 5.44, P<0.001, Sig. Pairs= (3 Vs. 1,2)										

From the above table (Table no. 6) it was found that the maximum number of respondents of the joint family was in the middle economical group (50.0%) followed by the lower economical group (46.0%) and only 4.0% of the respondents belonged to the upper socio-economical group. Of the nuclear family's respondents, 52.0% belonged to the middle economical group, 43.2% belonged to the lower group and 4.8% respondents belonged to the upper socio-economical group. There was no significant difference (>0.05) in respondents' family type and their socio-economical status.

The table also clear that respondents had 1 to 5 family members, the maximum number of respondents (51.2%) were in the middle group, 42.3% were in the lower group and 6.5% respondents were in the upper group. Having 6 to 10 family member's maximum number of respondents was in also the middle group with 52.7%, followed by 44.1% of the lower group and 3.2% of the upper group. Of respondents who belonged to more than 10 family members, the maximum number of respondents (59.1%) was found in the lower socio-economical group followed by 40.9% of the middle group and there were no respondents found in the upper group (Table no. 6). There were most significant differences (<0.001) among respondent's socio-economic status and their family size with the significant pairs of 3 vs 1, 2 (>10 vs 1-5, 6-10).

4. Suggestion and Recommendation

This study reported that out of a total of 400 respondents, the maximum number of respondents was illiterate. Because of their illiteracy, they could not able to understand the harmful effects of arsenic and related problems. It was observed that respondents' educational status was negatively correlated with their different age groups and caste groups. The educational level was decreasing with aging and also in the lower caste of the respondents, so it is necessary to educate them. Maximum women were housewives and most of the SC/ST respondents were in cultivation and labor work. Socio-economic status was highly significantly associated with respondents' caste group and their family size. SC/ST caste group respondents' SES was lower while upper SES was found in the General caste group. Socio-economic and educational discrimination need to be solved. Respondents should know arsenic toxicity and foods so that they could take measures to protect themselves and their families. Therefore there has to need a vast study further to resolve the problems which are associated with socio-economic and educational discrimination and arsenic-related health issues.

References

1. World Health Organization, Arsenic, Factsheet, 15 February 2018, Available online at https://www.who.int/news-room/fact-sheets/detail/arsenic
2. Arsenic mitigation department of water resources, RD& GR ministry of JA SHAKTI, available online at https://pmksy-mowr.nic.in/arsenic/
3. Chauhan, V. S., Nickson, R., Chauhan, D., Iyengar, L., & Sankararamakrishnan, N. (2009). Groundwater geochemistry of Ballia district, Uttar Pradesh, India and mechanism of arsenic

release. *Chemosphere*, *75*(1), 83-91.

4. Asthana N. and Dwivedi, A. K. (2021). Arsenic Contamination at District Ballia (U.P.). *Journal of Emerging Technologies and Innovative Research (JETIR)*, *8*(5), 347–353.

5. Katiyar, S. and Singh, D. (2014). Prevalence of arsenic exposure in the population of Ballia district from drinking water and its correlation with blood arsenic level. *Journal of Environmental Biology, 35,* 589- 594.

6. Available online at on https://en.unesco.org/themes/education-health-and-well-being#:~:text=A%20good%20quality%20education%20is,be%20well%20nourished%20and%20healthy.

7. Singh, T., Sharma, S., & Nagesh, S. (2017). SES status updated 2017. *International Journal of Research in Medical Sciences*, *5*(7), 3264–3267.

8. Mazumder, D.G., & Dasgupta U.B. (2011). Chronic arsenic toxicity: Studies in West Bengal, India. *Kaohsiung journal of medical sciences, 27*,360-370.