



Correlation between Literacy and Sex Ratio in Gadhinglaj

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Abstract

The objective of the present investigation is to examine the correlation between the literacy and sex ratio in Gadhinglaj taluka and wards in Kolhapur district of Maharashtra state. The study was based on the Census 2011 data given by the Registrar General of India. The Spearman's Rank correlation approach was used to determine the relationship between literacy and sex ratio. The literacy rate was treated as an independent variable, whereas the sex ratio was treated as a dependent variable. It has observed that the moderate negative correlation and weak negative correlation between literacy rate and sex ratio in Gadhinglaj taluka and Gadhinglaj wards respectively.

Keywords: Spearman's Rank correlation, Sex ratio, Literacy rate.

1. Introduction

Literacy is a measure of human development and life satisfaction. On the one hand, it influences birth rates, but it also reflects economic progress, living standards, women's status, and technological advancement, among other factors. Literacy is defined as the percentage of literate persons (excluding the population aged 0 to 6 years), whereas crude literacy rate is the ratio of literate people in a specific location to the total population. Literacy is defined as the ability to read and write one's own name as well as create simple phrases; higher levels of literacy in a state indicate more socioeconomic development; and universal literacy is an essential component in achieving overall growth. The balance of male and female in any population is referred to as the sex ratio. It can be stated as a proportion of a specific sex in the population or as a ratio of male to female. Sex composition is another key demographic factor in human evolution. It is commonly expressed as a sex ratio, or the number of females per 1000 males. Male populations exceed female populations all throughout the world. Sex composition is seen as a key indicator

of gender imbalance in society. The many authors [3-8] studied correlation between literacy and sex Ratio of various districts and states.

2. Methodology

This paper is based on secondary data. The data came from the 2011 Census of India [1]. The correlation between literacy and sex ratio is analysed by using the Spearman's Rank correlation method. Spearman's rank correlation can be calculated using the following formula:

$$R = 1 - \frac{6D^2}{N(N^2 - 1)}$$

where, D is the difference between ranks of two variables, N is the total number of observations.

Study Area

Gadhinglaj is a city in India's Kolhapur district, located in the southwest region of the state of Maharashtra [2]. It is located on the banks of the Hiranyakeshi river, which originates in the mountains of the Amboli Ghats. It is situated on the border between Maharashtra and Karnataka. It is the administrative center of South Kolhapur and a sub-district of Kolhapur District. It is the largest

city in South Kolhapur and has enough land and people to be classified as a district. The city is 623 meters (2,044 feet) above sea level. Location of Gadhinglaj Taluka, Kolhapur district in Maharashtra shown in Figure 1.

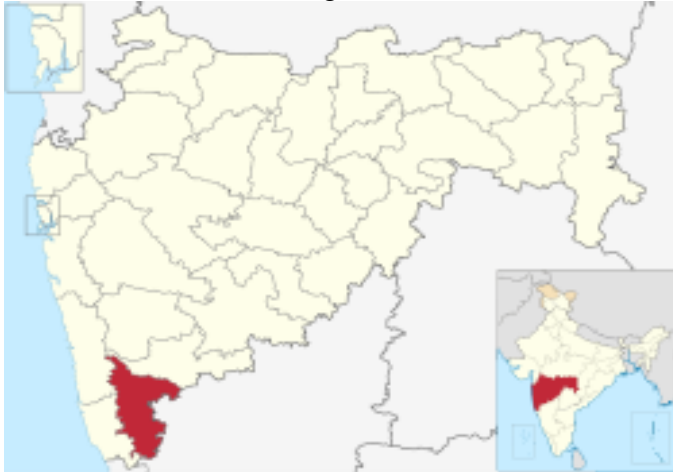


Figure 1 Location of Gadhinglaj Taluka, Kolhapur district in Maharashtra

A ward is a local government area that is primarily utilized for electoral reasons. Gadhinglaj is divided into 17 wards, with elections occurring every five years. Literacy Rate and Sex Ratio in Gadhinglaj Wards 2011 data's shown in Table 1.

Table 1 Literacy Rate and Sex Ratio in Gadhinglaj Wards 2011 (Source: Census of India Maharashtra 2011)

Ward	Literacy	Sex Ratio
Ward No - 1	71.1%	1,061
Ward No - 2	80.5%	967
Ward No - 3	80.7%	986
Ward No - 4	77.5%	971
Ward No - 5	77.8%	980
Ward No - 6	81.2%	1,039
Ward No - 7	79.7%	1,000
Ward No - 8	80.5%	1,052
Ward No - 9	81%	1,043
Ward No - 10	79.9%	1,039
Ward No - 11	78%	898
Ward No - 12	81.7%	933
Ward No - 13	84.7%	958
Ward No - 14	87.9%	1,024

Ward	Literacy	Sex Ratio
Ward No - 15	81.4%	1,016
Ward No - 16	86.8%	977
Ward No - 17	81.1%	1,010

Source Census of India Maharashtra 2011
Table 2 Literacy Rate and Sex Ratio in Gadhinglaj Taluka 2011 (Source: Census of India Maharashtra 2011)

Village Name	Literacy	Sex Ratio
Ainapur	80.94%	997
Aralgundi	74.80%	1,009
Arjunwadi	68.58%	1,074
Atyal	76.62%	1,057
Aurnal	83.19%	973
Basarge Kh	77.86%	950
Basarge Bk	75.71%	1,067
Batkanangale	72.67%	1,188
Beknal	76.96%	929
Belgundi	81.55%	980
Bhadgaon	72.55%	987
Bidrewadi	62.33%	1,154
Bugadi Katti	61.92%	1,020
Chandankud	71.02%	976
Channekuppi	75.29%	1,110
Chinchewadi	70.29%	1,085
Donewadi	75.45%	969
Dugunwadi	67.51%	1,339
Dundage	76.71%	937
Gadhinglaj	80.91%	1,016
Gijavane	81.29%	1,016
Hadlge	66.11%	1,111
Halkarni	76.47%	1,012
Hanimnal	77.56%	968
Hanmantwadi	74.54%	1,191
Harli Bk.	77.90%	1,101
Harli Kh.	73.29%	1,070
Hasurchampu	69.86%	995
Hasursasgiri	76.32%	1,067
Hasurwadi	71.01%	1,225
Hebbal Jaldyal	73.52%	1,213
Hebbal Kasaba Nool	73.61%	995
Helewadi	76.10%	946



Hidadugi	72.49%	1,225
Hirlage	79.94%	1,095
Hitni	75.94%	1,004
Hunginhal	75.29%	1,032
Idarguchhi	69.88%	969
Inchanal	83.30%	1,054
Jakhewadi	72.09%	1,116
Jambhulwadi	70.32%	1,297
Jarali	69.75%	983
Kadal	68.96%	1,288
Kadalge	74.63%	997
Kadgaon	78.96%	1,020
Kalamwadi	68.62%	1,067
Kalavi Katti	65.26%	1,166
Kandewadi	76.88%	1,043
Karambali	74.99%	1,045
Kasaba Nool	76.21%	1,024
Kaulge	77.98%	1,009
Khamale Hatti	72.23%	994
Khandal	73.01%	1,017
Kumari	67.53%	1,097
Kumbalhal	71.22%	950
Lingnoor K. Nool	80.59%	1,047
Lingnoor K.nesari	78.15%	1,023
Madyal	74.87%	953
Mahagaon	77.54%	1,089
Mangur Tarf Sawantwadi	66.12%	1,436
Manwad	76.12%	1,211
Masewadi	64.34%	1,323
Mugali	78.31%	1,032
Mungurwadi	72.59%	1,336
Mutnal	71.83%	992
Nandanwad	68.89%	1,035
Nangnur	72.44%	1,104
Narewadi	73.91%	1,304
Naukud	69.60%	1,295
Nesari	80.28%	1,036
Nilji	78.96%	924
Sambare	68.99%	993
Saroli	75.53%	1,143
Sawantwadi	80.42%	1,068
Shendri	77.12%	966

Shindewadi	77.21%	1,144
Shipur Tarf Ajara.	69.10%	1,107
Shipur Tarf Nesari	73.68%	1,187
Talewadi	83.73%	1,057
Tanavadi	74.74%	1,034
Tarewadi	72.42%	1,234
Tavarewadi	67.47%	1,058
Teginhal	68.86%	1,144
Terani	66.04%	989
Tupurwadi	69.51%	1,215
Umbarwadi	72.55%	1,115
Waghrali	72.15%	1,226
Wairagwadi	70.30%	1,132
Yamehatti	59.01%	1,002
Yenechawandi	75.34%	1,033

Source Census of India Maharashtra 2011
Literacy Rate and Sex Ratio in Gadhinglaj Taluka
2011 data's shown in Table 2. Source from Census
of India Maharashtra 2011.

3. Results and Discussions

**Table 3 Religion-Wise Population in
Gadhinglaj 2011**

Religion	Total	Male	Female
Hindu	23,326 (85.8%)	11,684	11,642
Muslim	3,244 (11.93%)	1,633	1,611
Christian	161 (0.59%)	87	74
Sikh	3 (0.01%)	1	2
Buddhist	46 (0.17%)	22	24
Jain	342 (1.26%)	163	179
Other Religion	9 (0.03%)	2	7
No Religion Specified	54 (0.2%)	26	28

**Table 4 Literacy Rate in Gadhinglaj and
Maharashtra 2011**

	Gadhinglaj	Maharashtra
Female	85.03%	75.87%
Male	93.74%	88.38%
Total	89.36%	82.34%

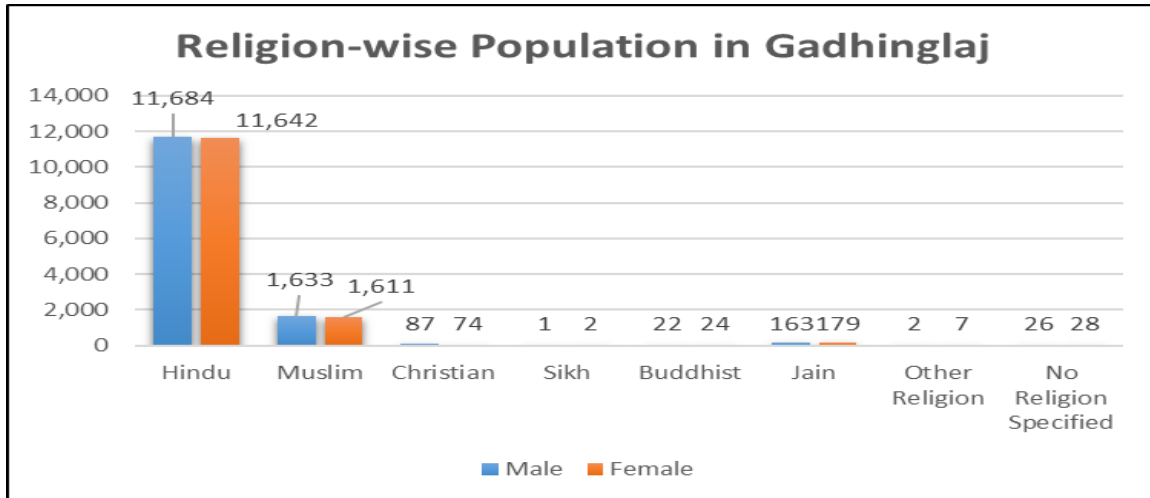


Figure 2 Religion-wise Population in Gadhinglaj

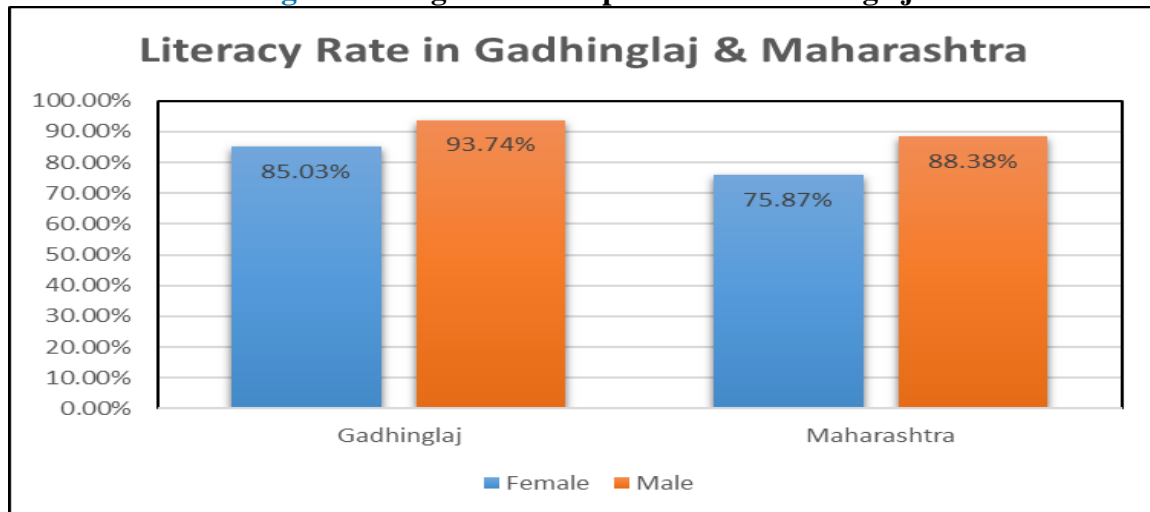


Figure 3 Literacy Rate in Gadhinglaj & Maharashtra

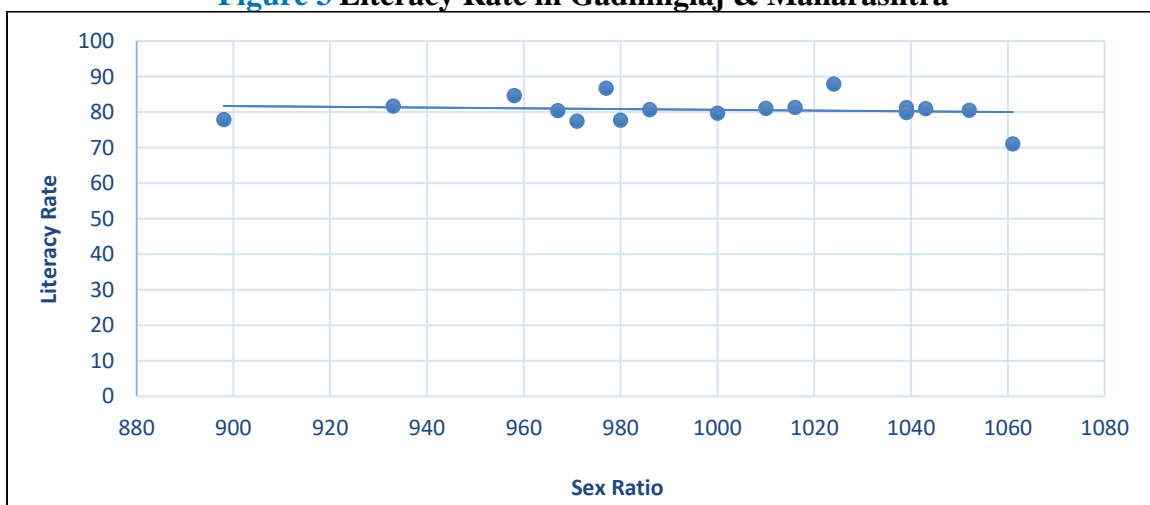


Figure 4 Correlation between Literacy Rate and Sex Ratio in Gadhinglaj Wards

Table 5 Relationship between Literacy & Sex ratio in Gadhinglaj Wards

Ward	Sex-ratio	Literacy	R_x	R_y	D	D^2
Ward No - 1	1061	71.08	17	1	16	256
Ward No - 2	967	80.49	4	7	-3	9
Ward No - 3	986	80.72	8	9	-1	1
Ward No - 4	971	77.53	5	2	3	9
Ward No - 5	980	77.76	7	3	4	16
Ward No - 6	1039	81.25	13	12	1	1
Ward No - 7	1000	79.73	9	5	4	16
Ward No - 8	1052	80.52	16	8	8	64
Ward No - 9	1043	81.02	15	10	5	25
Ward No - 10	1039	79.94	13	6	7	49
Ward No - 11	898	77.96	1	4	-3	9
Ward No - 12	933	81.71	2	14	-12	144
Ward No - 13	958	84.69	3	15	-12	144
Ward No - 14	1024	87.95	12	17	-5	25
Ward No - 15	1016	81.36	11	13	-2	4
Ward No - 16	977	86.81	6	16	-10	100
Ward No - 17	1010	81.11	10	11	-1	1

By using Table 5 and applying formula, we obtained $R = -0.06985$ this implies that there is a weak negative correlation between literacy and sex ratio. In other words, an increase in one variable, such as literacy rate, results in a decrease in the sex ratio. Religion-Wise Population in Gadhinglaj 2011 shown in Table 3& Literacy Rate in

Gadhinglaj and Maharashtra 2011 shown in Table 4. Religion-wise Population in Gadhinglaj & Literacy Rate in Gadhinglaj & Maharashtra shown in Figure 2 & Figure 3. Relationship between Literacy & Sex ratio in Gadhinglaj Wards shown in Table 5.

Table 6 Relationship between Literacy & Sex ratio in Gadhinglaj taluka

Village Name	Sex Ratio	Literacy	R_x	R_y	D	D^2
Ainapur	997	80.94	23	85	-62	3844
Aralgundi	1,009	74.8	27	50	-23	529
Arjunwadi	1,074	68.58	55	12	43	1849
Atyal	1,057	76.62	47	65	-18	324
Aurnal	973	83.19	12	88	-76	5776
Basarge Kh	950	77.86	5	73	-68	4624
Basarge Bk	1,067	75.71	50	58	-8	64
Batkanangale	1,188	72.67	74	40	34	1156
Beknal	929	76.96	2	68	-66	4356
Belgundi	980	81.55	14	87	-73	5329
Bhadgaon	987	72.55	16	37	-21	441



Bidrewadi	1,154	62.33	71	3	68	4624
Bugadi Katti	1,020	61.92	33	2	31	961
Chandankud	976	71.02	13	28	-15	225
Channekuppi	1,110	75.29	63	53	10	100
Chinchewadi	1,085	70.29	56	24	32	1024
Donewadi	969	75.45	10	56	-46	2116
Dugunwadi	1,339	67.51	89	10	79	6241
Dundage	937	76.71	3	66	-63	3969
Gadhinglaj	1,016	80.91	30	84	-54	2916
Gijavane	1,016	81.29	30	86	-56	3136
Hadlge	1,111	66.11	64	7	57	3249
Halkarni	1,012	76.47	29	64	-35	1225
Hanimnal	968	77.56	9	72	-63	3969
Hanmantwadi	1,191	74.54	75	47	28	784
Harli Bk.	1,101	77.9	60	74	-14	196
Harli Kh.	1,070	73.29	54	42	12	144
Hasurchampu	995	69.86	21	22	-1	1
Hasursasgiri	1,067	76.32	50	63	-13	169
Hasurwadi	1,225	71.01	79	27	52	2704
Hebbal Jaldyal	1,213	73.52	77	43	34	1156
Hebbal Kasaba Nool	995	73.61	21	44	-23	529
Helewadi	946	76.1	4	60	-56	3136
Hidadugi	1,225	72.49	79	36	43	1849
Hirlage	1,095	79.94	58	80	-22	484
Hitni	1,004	75.94	26	59	-33	1089
Hunginhal	1,032	75.29	37	53	-16	256
Idarguchhi	969	69.88	10	23	-13	169
Inchanal	1,054	83.3	46	89	-43	1849
Jakhewadi	1,116	72.09	66	31	35	1225
Jambhulwadi	1,297	70.32	85	26	59	3481
Jarali	983	69.75	15	21	-6	36
Kadal	1,288	68.96	83	16	67	4489
Kadalge	997	74.63	23	48	-25	625
Kadgaon	1,020	78.96	33	78	-45	2025
Kalamwadi	1,067	68.62	50	13	37	1369
Kalavi Katti	1,166	65.26	72	5	67	4489
Kandewadi	1,043	76.88	43	67	-24	576
Karambali	1,045	74.99	44	52	-8	64
Kasaba Nool	1,024	76.21	36	62	-26	676
Kaulge	1,009	77.98	27	75	-48	2304
Khamale Hatti	994	72.23	20	33	-13	169



Khandal	1,017	73.01	32	41	-9	81
Kumari	1,097	67.53	59	11	48	2304
Kumbalhal	950	71.22	5	29	-24	576
Lingnoor K. Nool	1,047	80.59	45	83	-38	1444
Lingnoor K.nesari	1,023	78.15	35	76	-41	1681
Madyal	953	74.87	7	51	-44	1936
Mahagaon	1,089	77.54	57	71	-14	196
Mangur Tarf Sawantwadi	1,436	66.12	90	8	82	6724
Manwad	1,211	76.12	76	61	15	225
Masewadi	1,323	64.34	87	4	83	6889
Mugali	1,032	78.31	37	77	-40	1600
Mungurwadi	1,336	72.59	88	39	49	2401
Mutnal	992	71.83	18	30	-12	144
Nandanwad	1,035	68.89	41	15	26	676
Nangnur	1,104	72.44	61	35	26	676
Narewadi	1,304	73.91	86	46	40	1600
Naukud	1,295	69.6	84	20	64	4096
Nesari	1,036	80.28	42	81	-39	1521
Nilji	924	78.96	1	78	-77	5929
Sambare	993	68.99	19	17	2	4
Saroli	1,143	75.53	68	57	11	121
Sawantwadi	1,068	80.42	53	82	-29	841
Shendri	966	77.12	8	69	-61	3721
Shindewadi	1,144	77.21	69	70	-1	1
Shipur Tarf Ajara.	1,107	69.1	62	18	44	1936
Shipur Tarf Nesari	1,187	73.68	73	45	28	784
Talewadi	1,057	83.73	47	90	-43	1849
Tanavadi	1,034	74.74	40	49	-9	81
Tarewadi	1,234	72.42	82	34	48	2304
Tavarewadi	1,058	67.47	49	9	40	1600
Teginhal	1,144	68.86	69	14	55	3025
Terani	989	66.04	17	6	11	121
Tupurwadi	1,215	69.51	78	19	59	3481
Umbarwadi	1,115	72.55	65	37	28	784
Waghrali	1,226	72.15	81	32	49	2401
Wairagwadi	1,132	70.3	67	25	42	1764
Yamehatti	1,002	59.01	25	1	24	576
Yenechawandi	1,033	75.34	39	55	-16	256

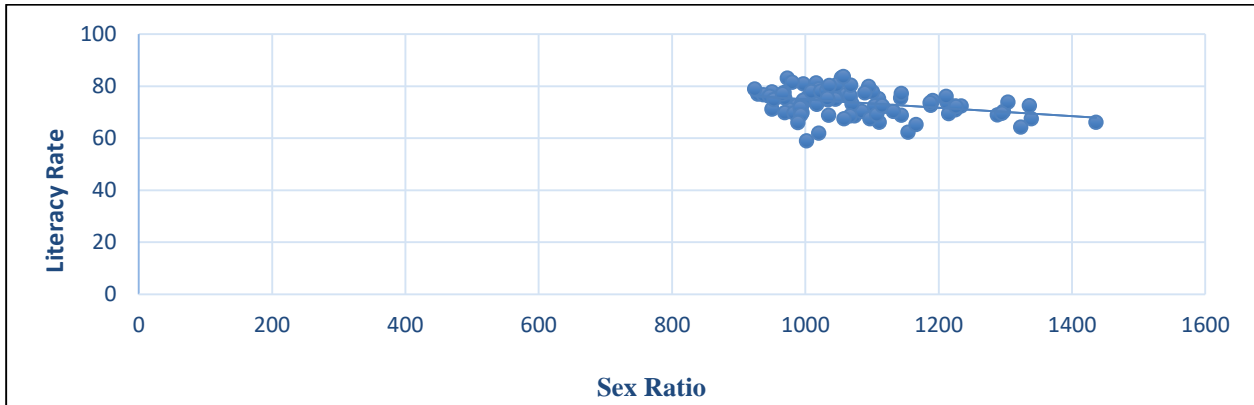


Figure 5 Correlation between Literacy Rate and Sex Ratio in Gadhinglaj taluk

By using Table No. 6 and applying formula, we obtained $R = -0.35357$ this implies that there is moderate negative correlation between literacy and sex ratio. In other words, an increase in one variable, such as literacy rate, results in a decrease in the sex ratio. Correlation between Literacy Rate and Sex Ratio in Gadhinglaj Wards shown in Figure 4. Correlation between Literacy Rate and Sex Ratio in Gadhinglaj Wards shown in Figure 5. Relationship between Literacy & Sex ratio in Gadhinglaj taluka shown in Table 6.

Conclusions

Literacy and the sex ratio are the most essential indices of progress in any given location. Spearman's rank correlation (R) is -0.35357 , this study shows that there is moderate negative correlation between literacy and sex ratio in Gadhinglaj taluka. Spearman's rank correlation (R) is -0.06985 , this study shows that there is weak negative correlation between literacy and sex ratio in Gadhinglaj wards. Sex ratio and literacy rate have moved opposite directions in Gadhinglaj taluka and wards. The highest sex ratio (1061) and lowest sex ratio (898) in ward no. 1 and ward no. 11 respectively. The highest literacy rate (87.95%) and lowest literacy rate (71.08%) in ward no. 14 and ward no. 1 respectively. The highest sex ratio (1436) and lowest sex ratio (924) in Mangur Tarf Sawantwadi and Nilji respectively. The highest literacy rate (83.73%) and lowest literacy rate (59.01%) in Talewadi and Yamehatti respectively.

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