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## Impact of COVID-19 pandemic on academic performance and work–life balance of women academicians<sup>☆,☆☆</sup>

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### ABSTRACT

This paper explores the academic experiences of women academicians in India during the COVID-19 pandemic. Data was collected through online questionnaires from 87 women faculty members teaching in colleges and universities. Findings indicate that increased household work of women due to the pandemic and resulting lockdown has amplified their effort in executing their teaching and examination related duties, but they have ensured that their remote teaching performance has largely remained unaffected. However, the pandemic seems to have had adverse effects on research of women faculty that is likely to impinge on their future prospects of career advancement. Managing the increased demands of teaching and household work and maintaining work-life balance has been stressful for them.

### Introduction

The spread of COVID-19 pandemic across the world has exposed the higher education sector to unprecedented challenges. There was a sudden shift of classroom-based pedagogies to distance learning. The mode of teaching faced a sudden transition from in-person learning to online classes and remote activities/work (Aldossari & Chaudhry, 2021). While students encountered problems in coping with the new system, the faculty and academicians have no less been subject to severe difficulties with the reshaping of every facet of the academia.

The closures of higher education institutions during the COVID-19 pandemic disproportionately affected the women academicians (Staniscuaski, 2021; Myers et al., 2020). While they had to upgrade their digital skills, prepare online modules, make themselves prepared for remote work methods, online teaching and changes in grading systems, they also had to tackle increased household responsibilities (Alon et al., 2020; Malisch et al., 2020; Zamarro, et al., 2020) due to lockdown, suspension of house helpers, more focus on hygiene and precautionary measures against the virus. The academic performance of women with children or other caring responsibilities have been more disrupted (Corbera et al., 2020; Guy & Arthur, 2020; Yildirim & Eslen-Ziya, 2020). The elders at home required extra care and time during the pandemic in their fight against the risk of infection (Deshpande, 2020). Additionally,

there were strains on research agendas due to closure of laboratories, limitations on fieldwork and curtailment of in-person contact. Studies show that the number of academic papers submitted and published by women were lower during the pandemic, while those of men had increased (Andersen et al., 2020; Woodward et al., 2020).

This paper purports to explore the altered work dynamics of women in academia in India during the COVID-19 pandemic, its impact on their academic productivity and the challenges faced by the women faculty members in balancing remote work and domestic activities. It employs a survey based primary data analysis to find out the change in the time spent on academics comprising of teaching, examination related duties and research work, and the women's self-assessment regarding their respective performances in each domain. It discusses the factors that affected their academic performance and imposed stress on them due to work-life balance.

The paper contributes to the emerging body of literature in two ways: a review of the Indian literature suggests that it is the first study undertaken on the impact of COVID-19 on female academicians in India; and secondly, though the effect of pandemic on research has been studied earlier, no other study examines the impact on teaching performance. Since an academician's basic duties comprise of both teaching and research, the interplay of the pandemic with teaching performance is an interesting and relevant one. The results unmask how COVID-19 has encroached on research of female faculty and their future prospects of career advancement, how women have been resilient to pressures of

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transitioning to online teaching assignments and how gendered societal roles have been stressful for them.

### Underlying theory and literature review

Gender inequality is persistent in higher education institutions where career progressions of women are circumscribed by ‘glass ceilings’ or invisible barriers, and women disproportionately occupy the lowest ranks (Huang et al., 2020; Read & Kehm, 2016; Sharma & Sehrawat, 2014). Moreover, the gendered distribution of domestic work perpetuates the inequality by imposing additional workload and exerting stress on the women.

The theoretical underpinning behind the disproportionate effects on academic life of women is rooted in two domains: the persistent gender inequality in housework and glass ceiling in academic hierarchy. Researchers identify different mechanisms that drive the gendered division of labour in the household. Bargaining perspectives hypothesize economic resources as the negotiating tool for a couples’ housework allocations (Becker, 1981). However, evidences show that women with same earnings as men perform more household work (Schneider, 2011), thereby reinforcing the tenet of gendered division of housework. Secondly, the time availability perspective asserts that time in employment reduces time available for housework (Presser, 1994), so that full-time workers spend less time in housework than those with limited or no employment (Coltrane, 2001). But even full time employed women share greater household work (Sayer, 2016), indicating that apart from resources and time, gender shapes household work.

The other plausible explanations for gendered housework are provided by the gender socialization and social interactionist approaches. The gender socialization perspective suggests that macro-level gender expectations are internalized such that men and women are socialized toward different identities and preferences, leading to women doing more housework than men (Cunningham, 2005). The interactionist perspective posits that gender is negotiated and reinforced through social interaction and expectations; hence gendered behaviour at home is an outcome of social norms that associate domesticity with femininity (Berk 1985; Ridgeway 2011).

On the other hand, evidences point towards the existence of glass ceiling within academic institutions, where hierarchies of power privilege men over women. The phenomenon of glass ceiling refers to the barriers, manifested by discriminatory, conscious and unconscious practices, and attitudes that deter eligible women access to top management positions (Zeng, 2011). Theoretically, glass ceiling is related to two prime factors—procedural justice and distributive justice (Wesarat & Mathew, 2017). Procedural justice consists of unsupportive culture (Ansari, 2016), absence of equal policies (Sahoo & Lenka, 2016) and unfairness of performance appraisal procedures (Kiaye & Singh, 2013). Distributive justice comprises of unfair pay (Xiu & Gunderson, 2014), lack of educational and training opportunities for women (Cornelius & Skinner, 2005) and unequal promotion opportunities (Knörr, 2011).

Inequalities in work and household division of labour renders ‘work-life balance’ a pertinent issue for working women (Roos, et al., 2020). Work-life balance is the extent to which individuals are engaged and satisfied equally with work and family roles (Clark, 2000). Researchers have found the lack of this balance to be associated with frustration and loss of mental peace at home and in the workplace. Duxbury (2004) has defined work life balance as an interference between family and work so that having too much to do within a specified time leads to feeling of stress, fatigue and time crunch.

The differential impact of the COVID-19 pandemic on men and women in academics have received considerable attention among researchers. Studies show that the pandemic and lockdown have deepened the gender inequality due to increased demands of academia, household responsibilities and caregiving. Family to work interference has been rampant during COVID-19 when family demands and responsibil-

ities rendered it more difficult for women to fulfil work demands and responsibilities.

A number of country-based case studies have probed the effect of COVID-19 pandemic on the work dynamics of women academicians. Staniscuaski et al. (2020) examined the influence of gender, parenthood and race on academic productivity during the pandemic period among Brazilian academicians. Safdar & Yasmin (2020) and Ali and Ullah (2021) explore the disproportionate effects of COVID-19 on women academics in Pakistan. Parlak (2020) studied how women in academics have dealt with domestic and academic responsibilities in Turkey. The associations of gender and parental status with academic productivity of faculty in Science, Technology, Engineering, Mathematics, and Medicine in USA has been examined by Krukowski (2020). Marques et al (2021) found increased domestic duties and emotional burden of the pandemic for women academics in Portugal. The deepening of gendered organization of work in higher education institutions in Poland has been discussed by Górska et al (2021). However, almost no study has been undertaken to examine the teaching and research performance of women academicians in India.

### Higher education scenario in India

India has the third largest higher education sector after USA and China. There are three categories of higher education institutions: College, University, and Stand-Alone Institutions. Universities are empowered to award degrees, while colleges cannot award degree in its own capacity but are affiliated with any university. Stand-Alone institutions are not affiliated to universities, are not empowered to confer degrees and hence run diploma level programmes. According to the All-India Survey on Higher Education (AISHE, 2020), there are 42343 Colleges, 1043 Universities and 11779 Stand Alone Institutions, out of which 307 Universities have colleges affiliated with them. Only affiliated and constituent institutions of public Universities are considered as colleges. They predominantly offer undergraduate programmes, with only a small percentage offering post graduate program. The higher education institutions in India are largely publicly funded, with the proportion of privately managed institutions increasing rapidly (Tilak, 2014). 37.9% of the Universities and 78.6% of the colleges are privately managed; the rest are either directly under government control or are aided by the government.

The apex regulatory body of the general higher education sector is University Grants Commission (UGC)<sup>1</sup> that coordinates, determines and maintains the standards of teaching, examination and research in university education. The career advancement or promotion rules are laid by the UGC, which is uniform across all government run or aided colleges and universities. There are three stages of Assistant Professors, followed by Associate Professor, Professor and Senior Professor respectively. However, the colleges do not have the posts of Professor and Senior Professor. The criteria for promotion are based largely on teaching performance for promotion from Assistant Professor Stage I to II, while the importance of research increases with seniority in posts. Nonetheless, the UGC and the government has many schemes to encourage young teaching faculty by providing financial support for publication, presentation in conferences, undertaking research projects, etc. It is well recognized that research enables a teacher to gain insights into new developments in the subject and reinforce their professional skill, thereby making them more reflective and effective as facilitators of knowledge.

Gender discrepancy is quite evident in every aspect of higher education in India. There is considerable gender gap in teaching jobs, with majority of the teachers in higher education institutions being males (All-India Survey on Higher Education, 2020). Out of the 2.14 lakh teachers at the university level, 62.9% are male and 37.1% are female, while at

<sup>1</sup> There are other bodies like All India Council for Technical Education, Medical Council of India, etc for technical universities and medical institutes.

the college level, the total number of teachers is 11.3 lakh with 56.4% teachers being male.

Although 43% of STEM graduates in India are women, their share in employment in scientific research and development sector is merely 14% (Sarkar, 2021). The reasons for women leaving science and identification of retention strategies have been dealt with by Karup et al. (2010). The higher education sector exhibits glass ceiling with respect to employment of women to the highest jobs. This can be attributed to delay in promotions to the higher posts due to loss of seniority on account of marriage and pregnancy. Reluctance on the part of the Selection Committee to select a woman to the position of Vice-Chancellor is also observed (Morley & Crossouard, 2015). The barriers to ascent of women academicians to leadership roles in Indian higher education has been explored by Gandhi and Sen (2020). A study by Chanana (2003) focused on issues of women academics like career disruptions, job changes, opportunities for leadership. According to the report of the Task Force there are widespread practices of discrimination and harassment among women working in higher education institutions (University Grants Commission, 2013). While several women make it to mid-ranking posts such as Deans, Heads of Departments and Controller of Examination, fewer than 7% of Vice Chancellors in India are women (Kumar, 2021). These organizational trends constitute the essential context for analyzing the impact of COVID-19 on perpetuation of gender inequality in academia.

It is also relatively harder for women to become researchers in India. There were 2.8 male first authors per female first author in 2017 (Thelwall et al., 2019). Gupta (2007) and Bal (2004) highlight the gender bias in doctoral education and publications. An important hardship of women relates to their relegation to the primary duty of household work despite their academic responsibilities. Women are obliged to perform domestic duties that including children's care, their education, and household chores (Aryee et al., 2005; Ravindran & Baral, 2014).

The only study to ascertain the relative position of women in Indian academics due to the pandemic is by Dogra and Kaushal (2021) who explore the changes in the lifestyle of women teachers in primary, secondary, and higher education in India, resulting in psychological and emotional stress. However, change in their work dimension and their performance in the context of familial responsibilities remains to be examined. This research gap motivated the paper for an analysis of the extent to which the pandemic impacted the work and family dynamics of the women in academia.

## Methodology

### Sample and data collection

The sample selection was based on criteria and snowball sampling techniques. The inclusion criteria consisted of being female faculty member having consistent publication records. Since publication of papers constitute a pertinent yardstick for measuring research performance, that is, research can be quantified by the number of papers published, the pre-COVID publication history of the respondent is important to ascertain whether COVID-19 had any effect on their research performance<sup>2</sup>.

Potential participants were reached using the researcher's professional networks and the participants' recommendations. This was because initial sending of mails to faculty unknown to the researcher re-

sulted in very poor response rate. Hence direct or indirect acquaintances were needed to identify participants.

Online questionnaires were e-mailed to female faculty of government aided colleges and Universities in permanent substantive posts in Kolkata district in the state of West Bengal. Kolkata has 3 public Universities, with University of Calcutta having 79 government aided degree colleges affiliated with it, Jadavpur University having only one, while Rabindra Bharati University having no affiliated college. The selection of Kolkata can be justified on the grounds that the entry and promotion criteria are uniform for permanent faculty in government aided institutions across the country, so that the stimulus to perform well in professional life is fairly similar to other regions. Secondly, being an urban centre with fairly fast and stable internet facilities and infrastructural support, remote working has been convenient enough in Kolkata as compared to rural or semi-urban areas of West Bengal or other states. Thirdly, West Bengal, and particularly the city of Kolkata lies somewhere in the middle of the continuum of India's socio-economic and cultural diversities and hence seems to be fairly representative sample. According to a recent report by the Ministry of Statistics and Programme Implementation, Government of India (2022), West Bengal ranks 19<sup>th</sup> out of 36 states in terms of Gender Inequality Index. The educated, middle-class society of Kolkata is moderately patriarchal – although rooted in traditional cultural beliefs, it has moved towards egalitarianism (Dutta, 1999). Among the other districts of the state of West Bengal, Kolkata ranks first in terms of Gender Development Index (West Bengal Human Development Report, 2004). The targeted sample was limited due to snowball sampling and the criteria of pre-COVID publications. Out of the 115 emails sent, 91 responses were received out of which 4 were incomplete. The final completed sample comprised of 87 women academicians.

The questionnaire consisted of 25 questions that sought to collect information on three aspects of the academicians: (i) demographic and work profile (age, marital status, children, employment details); (ii) academic effort during COVID-19 pandemic (average number of hours spent on teaching, research, household work, childcare, and commuting to work before and during pandemic); and academic performance (regarding online teaching, examination related work and research); and (iii) perceptions regarding factors that affected academic performance (lockdown related personal factors and remote work-related factors). Teaching and examination performance were gauged on the ability to take regular online classes as allotted and compliance with examination related deadlines during the pandemic. They are measured on a 5-point Likert scale (Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly disagree). Online teaching load and examination related work load during the pandemic were evaluated by the increase, decrease or same average hours spent on these as compared to the pre-pandemic times. Research performance was assessed by the number of papers submitted for publications to journals, presented in e-conferences and project proposal submissions.

### Statistical procedures

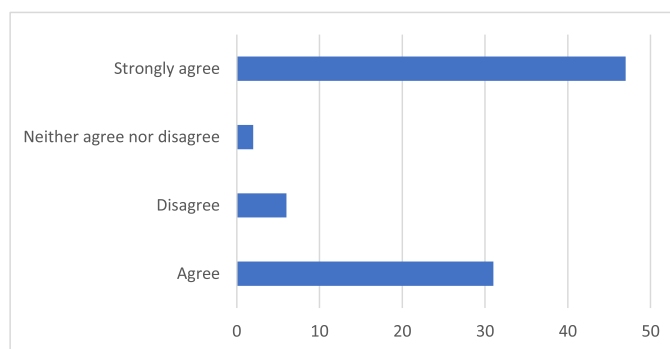
We use statistical methods to find out the interdependencies and impacts of demographic and pandemic related factors on academic performances of women faculty members. For one-dimensional inductive statistics, frequency tables showing the frequency by categories and bar charts have been used. For two-dimensional inductive statistics between categorical variables, we have applied Pearson's chi-squared ( $\chi^2$ ) test, commonly used for testing the independence or difference between two categorical variables. The  $\chi^2$  test assesses the expected frequencies if the null hypothesis (no difference between groups) is true. The treatment of frequencies by  $\chi^2$  is an approximation (Fisher, 1970). In case the expected values are less than 5, we have used the Fisher's exact test since it is more appropriate than the  $\chi^2$  test (Aaron et al., 2017). The Fisher's exact test uses the exact hypergeometric distribution instead of approximate chi-square distribution to compute the p-value. The signif-

<sup>2</sup> In India, the first promotion of Assistant Professors from Stage 1 to 2, particularly in colleges, depends somewhat less on research and more on teaching activities. Of course, at higher stages of Assistant Professors and subsequent stages, research becomes increasingly important. Though there are many junior level faculty who are involved in regular publications, it is not uncommon to find people who did not publish or had very few papers in the last 5 years. Their inclusion would not make it possible to gauge the effect of COVID-19.

**Table 1**  
Demographic and work profile of respondents.

Demographic profile		Work profile	
	Number (%)		Number (%)
<b>Age</b>		<b>Current institutional position</b>	
25–34 years	10 (11.49)	Professor	12 (13.79)
35–44 years	37 (42.53)	Associate Professor	23 (26.44)
45–54 years	26 (29.89)	Assistant Professor	47 (54.02)
55 years and above	14 (16.09)	Other	5 (5.75)
Total	87 (100)		
<b>Marital status</b>		<b>Affiliation</b>	
Married	70 (80.46)	University	34 (39.08)
Unmarried	14 (16.09)	College	53 (60.92)
Divorced	2 (2.30)		
Widowed	1 (1.15)		
Total	87 (100)		
<b>Number of children</b>		<b>Period of employment in substantial post</b>	
0	26 (29.55)	1–5 years	20 (22.98)
1	51 (57.95)	6–10 years	10 (11.49)
2	9 (10.23)	11–15 years	16 (18.39)
3	1 (1.14)	More than 15 years	41 (47.13)
Total	87 (100)		
<b>Age of the youngest child</b>		<b>Academic discipline</b>	
Below 5 yrs	8 (9.20)	Humanities	20 (22.99)
5–9 yrs	14 (16.09)	Social Science	41 (47.13)
10–14 yrs	14 (16.09)	Science	26 (29.89)
15–19 yrs	9 (10.34)		
More than 20 yrs	15 (17.24)		
Not applicable	27 (31.03)		

**Table 2**  
Count of agreement of the respondents that they were able to take all allotted online classes during the pandemic.



ificance level has been set at  $P < 0.05$ . On the other hand, Chi-square tests of independence may not be adequate sometimes since it does not indicate the strength of association between variables under consideration. Hence, we use Cramer’s V to find the effect size between the categorical variables. Cramer’s V  $\in [0, 1]$ , with V approaching 1 for large effects and 0 for small effects. The Cramer’s V is interpreted as follows: V  $\in [0.1, 0.3]$  implies weak association, V  $\in [0.4, 0.5]$  means medium association and V  $> 0.5$  implies strong association. Finally, the Kruskal–Wallis test is performed to examine the association between discrete and categorical variables. For graphical presentation of the results and statistical analysis, MS Office Excel and Stata 14.0 software respectively have been used.

**Results**

The demographic and work profile of the respondents have been presented in Table 1. Most of the respondents were in the middle age –

42.53% were aged between 35 and 44 years while 29.89% belonged to 45 to 54 years age cohort. About 80.46% were married and more than half of them (57.95%) had one child. About 54% of the respondents were early career academicians and held the position of Assistant Professors; 60.92% were employed in colleges and 47.13 belonged to Social Science.

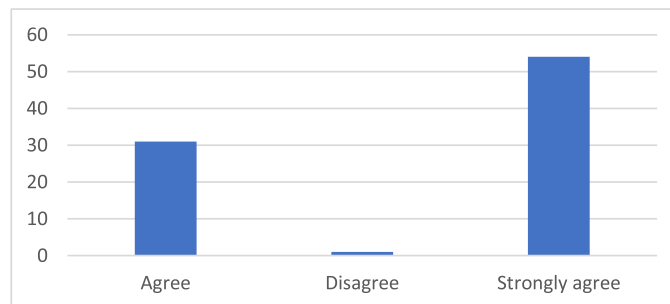
*Teaching effort and performance*

Teaching effort and performance during the COVID-19 pandemic is proxied by two categorical variables. Performance is evaluated by whether the respondents were able to take all allotted online classes and their effort on online teaching methods is assessed by whether there is any change in the average number of hours spent on teaching related activities on a working day before and during pandemic. Among the respondents, 52.04% strongly agreed and 38.76% agreed that they were able to take all allotted online classes (Table 2). No

**Table 3**  
Chi-square statistics for teaching performance.

Factor	Statistic	Value	p-value
<i>Effect on ability to take all allotted online classes</i>			
Marital status	Pearson's Chi-squared	7.1638	0.620
	Fisher's exact test	0.394	
	Cramér's V	0.1657	
No. of children	Kruskal-Wallis rank test	2.800	0.4235
Change in average hours spent on household work	Pearson's Chi-squared	104.7032	0.000
	Fisher's exact test	0.022	
	Cramér's V	0.6298	
Change in average hours spent on childcare	Pearson's Chi-squared	8.8753	0.449
	Fisher's exact test	0.690	
	Cramér's V	0.1844	
<i>Effect on average number of hours spent on teaching related activities on a working day before and during COVID-19 pandemic</i>			
Change in average hours spent on childcare	Pearson's Chi-squared	10.2116	0.037
	Fisher's exact test	0.054	
	Cramér's V	0.3196	
Change in average hours spent on household work	Pearson's Chi-squared	97.7107	0.000
	Fisher's exact test	0.004	
	Cramér's V	0.6119	
Hours saved in commuting to workplace during COVID-19 pandemic	Pearson's Chi-squared	5.8416	0.211
	Fisher's exact test	0.192	
	Cramér's V	0.1887	

**Table 4**  
Count of agreement of the respondents that they were able to meet all examination related deadlines during the pandemic.



significant relationship is observed between regularity of taking online classes and marital status ( $\chi^2 = 7.1638$ ,  $p = 0.620 > 0.05$ ) (Table 3). The Fisher's exact value = 0.394 > 0.05 confirms the absence of any relationship. The number of children is also found to have no association (Kruskal-Wallis H = 2.800,  $p = 0.4235 > 0.05$ ). The change in the average number of hours spent on childcare activities due to the pandemic has no significant association with ability to take all online classes ( $\chi^2 = 8.8753$ ,  $p = 0.449 > 0.05$ ). However, the change in average hours spent on household work does significantly affect teaching performance ( $\chi^2 = 104.7032$ ,  $p = 0.000 < 0.05$ ) and the association is strong (Cramer's V = 0.6298).

For 79.31% of the respondents, hours spent on household activities have increased, for 17.24% it remained the same and for 3.45% it decreased during the pandemic. About 40.23% of the respondents experienced an increase in time required for childcare, while 42.53% were childless or the children were old enough to take care of themselves. The average hours spent on online teaching has significant association with pandemic induced change in hours spent on household work ( $\chi^2 = 97.7107$ ,  $p = 0.000 < 0.05$ ) and childcare ( $\chi^2 = 10.2116$ ,  $p = 0.037 < 0.05$ ). 17.86% of the respondents saved above 4 hours for commuting to and from the workplace, 44.05% saved 2 to 4 hours while 38.10% saved less than 2 hours. No evidence was found that the hours

saved in commuting to and from the workplace had any significant effect on hours of online teaching ( $\chi^2 = 5.8416$ ,  $p = 0.211 > 0.05$ ).

*Performance regarding examination-related work*

The performance with regard to examination related duties during COVID-19 pandemic is assessed by whether the respondents were able to meet all examination related deadlines. 63.22% of the respondents strongly agreed and 35.63% agreed that they were able to meet all examination related deadlines during the pandemic (Table 4). Marital status and examination related performance is found to be uncorrelated ( $\chi^2 = 3.6039$ ,  $p = 0.730 > 0.05$ ) (Table 5). Examination related performance has significant and strong relationship with household work hours ( $\chi^2 = 116.9194$ ,  $p = 0.000 < 0.05$ ) and significant but weak association with hours spent on childcare ( $\chi^2 = 14.5109$ ,  $p = 0.024 < 0.05$ ).

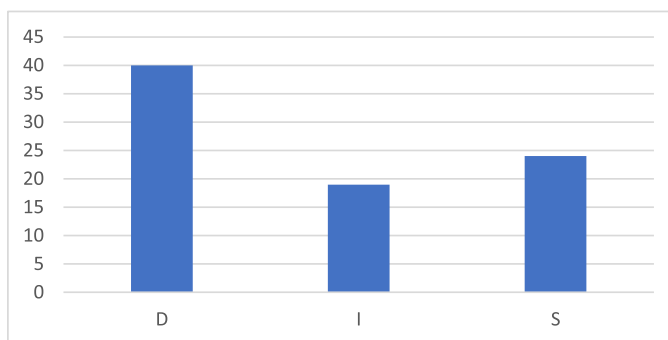
*Research effort and performance*

For 48.28% of the respondents, presentation and submission of research papers had declined during the pandemic period, for 29.89% it has remained the same and for 21.84% it has increased (Table 6).

**Table 5**  
Chi-square statistics for performance on examination related duties.

Factor	Statistic	Value	p-value
<b>Effect on ability to meet all examination related deadlines during the pandemic</b>			
Marital status	Pearson's Chi-squared	3.6039	0.730
	Fisher's exact test	0.446	
	Cramér's V	0.1439	
No. of children	Kruskal-Wallis rank test	0.958	0.6193
Change in average hours spent on household work	Pearson's Chi-squared	116.9194	0.000
	Fisher's exact test	0.004	
	Cramér's V	0.6655	
Change in average hours spent on childcare	Pearson's Chi-squared	14.5109	0.024
	Fisher's exact test	0.311	
	Cramér's V	0.2888	

**Table 6**  
Change in research publications during the pandemic compared to pre-pandemic times.



**Table 7**  
Chi-square statistics for research performance.

Factor	Statistic	Value	p-value
<b>Effect on number of research papers submitted or presented during the pandemic compared to pre-pandemic times</b>			
Marital status	Pearson's Chi-squared	4.6378	0.591
	Fisher's exact test	0.578	
	Cramér's V	0.1633	
No. of children	Kruskal-Wallis rank test	1.281	0.5271
Change in average hours spent on household work	Pearson's Chi-squared	115.9713	0.000
	Fisher's exact test	0.000	
	Cramér's V	0.6628	
Change in average hours spent on childcare	Pearson's Chi-squared	5.6587	0.462
	Fisher's exact test	0.484	
	Cramér's V	0.1835	
<b>Effect on number of research proposals submitted during the pandemic</b>			
Marital Status	Pearson's Chi-squared	2.5559	0.465
	Fisher's exact test	0.525	
	Cramér's V	0.1714	
No. of children	Kruskal-Wallis rank test	0.223	0.6365
Change in average hours spent on household work	Pearson's Chi-squared	3.6585	0.161
	Fisher's exact test	0.196	
	Cramér's V	0.2051	
Change in average hours spent on childcare	Pearson's Chi-squared	7.7013	0.053
	Fisher's exact test	0.077	
	Cramér's V	0.2975	
<b>Effect on average number of hours spent on research on a working day during pandemic compared to pre-pandemic times</b>			
Change in average hours spent on childcare	Pearson's Chi-squared	115.9713	0.000
	Fisher's exact test	0.000	
	Cramér's V	0.6628	
Change in average hours spent on household work	Pearson's Chi-squared	27.6534	0.000
	Fisher's exact test	0.000	
	Cramér's V	0.3987	
Hours saved in commuting to workplace during COVID-19 pandemic	Pearson's Chi-squared	2.4446	0.655
	Fisher's exact test	0.671	
	Cramér's V	0.1206	

**Table 8**  
Descriptive statistics for different perceptions.

Perceptions	Responses	Number (Frequency)
COVID-19 pandemic induced online classes adversely affected the teaching performance	Strongly agree	4 (4.60)
	Agree	13 (14.94)
	Neither agree nor disagree	22 (25.29)
	Disagree	42 (48.28)
	Strongly disagree	6 (6.90)
COVID-19 pandemic adversely affected the research output	Strongly agree	10 (11.49)
	Agree	28 (32.18)
	Neither agree nor disagree	18 (20.69)
	Disagree	25 (28.74)
	Strongly disagree	6 (6.90)
Meeting teaching and examination related deadlines were more stressful in COVID period than in pre-COVID period	Strongly agree	20 (22.99)
	Agree	30 (34.48)
	Neither agree nor disagree	10 (11.49)
	Disagree	23 (26.44)
	Strongly disagree	4 (4.60)
Lockdown related personal factor that affected the overall academic performance (both teaching and research) the most during COVID-19	Caring for the elderly	18 (20.69)
	Child care and/or their schooling	13 (14.94)
	Household work	38 (43.68)
	Pandemic had no effect on performance	18 (20.69)
Remote work-related factor that affected the overall academic performance (both teaching and research) the most during the pandemic	Coping with new methods of online teaching	17 (19.54)
	Excess workload in balancing work and home due to remote work pattern	43 (49.43)
	No access to laboratories/libraries	14 (16.09)
	Pandemic had no effect on performance	13 (14.94)

Marital status and research paper publication ( $\chi^2 = 4.6378$ ,  $p = 0.591 > 0.05$ ) are unassociated (Table 7). Paper presentations and submissions have significant association with hours spent in household work ( $\chi^2 = 115.9713$ ,  $p = 0.000 < 0.05$ ) but are uncorrelated with childcare hours ( $\chi^2 = 5.6587$ ,  $p = 0.462 > 0.05$ ). Submission of research projects has no association with marital status, number of children and hours spent on household work, but significant relation exist with hours spent on childcare ( $\chi^2 = 7.7013$ ,  $p = 0.053$ ).

Hours spent on research work is significantly correlated with that spent on household work ( $\chi^2 = 27.6534$ ,  $p = 0.000 < 0.05$ ) and childcare ( $\chi^2 = 115.9713$ ,  $p = 0.000 < 0.05$ ). However, hours saved for commuting has no significant impact on hours spent on research ( $\chi^2 = 2.4446$ ,  $p = 0.655 > 0.05$ ).

#### Perception regarding difficulties during COVID-19 and the associated stress

Most of the respondents (48.28%) disagreed that distance mode of teaching-learning during COVID-19 imposed any adverse effect on their teaching performance (Table 8). However, more than 40% agreed that research had been adversely affected. Meeting teaching and examination related deadlines were more stressful in COVID period than in pre-COVID period for around 57% respondents. About 44% attributed household work as the lockdown related personal factor and about 50% considered excess workload in balancing academics and home due to

distant work pattern as the main remote work-related factor that exacerbated their difficulties and deteriorated their academic performance.

#### Discussion

The sudden lockdown and closure of educational institutions due to COVID-19 pandemic, followed by remote teaching modes posed technological challenges on faculty members. This study shows that about 90% of the respondent revealed efficiency and self-satisfaction in their regularity and performance with respect to remote teaching. Despite the gap in digital skill among teachers and students, India has been progressing towards digital education, through increased adoption of digitization by colleges and universities. This has been driven by the government's initiative of augmenting digital infrastructure, expanding internet connectivity and launch of several schemes related to online education.

Previous studies have shown that the difficulty of female academicians during the pandemic was exacerbated due to the disproportionate burden of household activities (Alon et al., 2020) and perpetuation of gender inequality in families with children under the age of sixteen (Kan, 2014; Kolpashnikova, 2018). Our study finds no evidence of the effect of marital status, number and age of children on the teaching performance of women. However, as a result of working from home the boundaries between work and home have become indistinct requiring more time to be spent on cooking, cleaning and other household chores



(Daniel et al., 2018; Gao & Sai, 2020). This has impinged on the ability to perform all teaching assignments meticulously.

Though commuting time was saved during lockdown, it was perhaps used up by the increased hours spent on household work and childcare. The time spent for online teaching related activities increased as well and enabled the faculty to maintain their class assignments, but at the same time intensified their stress in meeting their teaching responsibilities.

Nearly all performed their examination duties and met the respective deadlines with respect to setting of question paper, correction of answer scripts and uploading of marks. Marital status and number of children had no effect on their performance. Even the time spent for childcare did not affect their performance, though their household workload did. The increase in the household work forced by the lockdown necessitated women to raise their working hours to meet these emerging demands of paid employment and household work (Yildirim & Eslen-Ziya, 2020).

Though their teaching and examination related performance were not severely affected, research performance, in general, deteriorated. The women academicians seem to have neglected their personal research due to the augmented burden of online teaching and domestic activities (Minello, 2020). With women already publishing fewer papers than men (Huang et al., 2020; Hunt, 2020), COVID-19-induced lockdown has exacerbated the gender gap in the academic career of faculty with regard to publications. For about half of the respondents, the research time declined despite saving considerable time in commuting during lockdown. It seems that since teaching-learning-examination constitutes the basic duties of a faculty member, women exerted considerable effort and stress on themselves so as to continue with academic progress of students. Our finding is commensurate with Rapanta et al. (2020) that concludes that pandemic situation impose more stress and workload on the teachers. Also, women in higher educational institutions have been experiencing higher levels of stress than men (Johnson et al., 2021). Research took a backseat for them and is likely to adversely affect their promotions that considers research as an important component.

## Conclusion and policy implications

The paper studies the impact of COVID-19 pandemic on the academic performance of women academicians in India. The results indicate that gendered housework perpetuated by additional precautionary measures for corona virus and absence of domestic help to ensure social distancing, is a major deterrent in maintaining teaching and research stipulations of the women academicians. Teaching, being their prime duty, has mostly been prioritized and hence their regularity and performance in teaching has remained largely unaffected. However, managing the increased dual demands of teaching and household work has been stressful for them. Research work has been adversely affected and is likely to affect their future career. COVID-19 might evoke mechanisms whereby gendered household work burden is manifested into gendered career advancement of academicians.

The unequal performance in teaching and research of Indian women academicians calls for a gendered evaluation during their performance appraisal. The unhindered teaching performance of women academicians at the cost of enhanced effort and stress warrants appreciation by the employers since they have catered to their primary obligation towards students by ensuring seamless teaching-learning. However, it was difficult for them to devote much time and effort on research due to skewed household responsibilities; this aspect needs to be considered by the selection committee during their promotion.

Secondly, there exists lacunae in the implementation of work-life balance policies (Kumari & Devi, 2013), aggravating the stress level of women in striving to balance between home making and teaching profession (Muben & Karim, 2018). In the present higher education paradigm, planning teaching-learning sessions to a diverse group of students with diverse needs warrant substantial review, understand-

ing, time and effort. This calls for the higher educational institutions to address the work-life challenges in academia. Enabling more flexible timing, adequate compensation for every extra hour of work and other family-friendly supportive programs are found to have positive impact on work life balance and academic productivity (Kar et al., 2019; Wilson et al., 2014). These can be implemented in the Indian institutes as well in an effective manner.

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