



A study on the impact of work from home during COVID-19

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Abstract: The effects of COVID-19 have been witnessed by every individual, and it has impacted everyone in a different way. Due to the pandemic, work from home (WFH) has become a policy priority for most organizations. We expect that the people will seem to be satisfied with their job while working from home, because of certain factors like productivity, motivation, reduces in expense, work family-life balance. And to understand the effect of social, behavioral, and physical factors on the well-being of office workstation users during COVID-19 work from home (WFH), we conducted an online survey to capture the experience of people, and the survey reveals the positive effects of work from home during COVID-19. Survey also reveals that due to certain factors people are neither satisfactory nor unsatisfactory while working from home during COVID-19. Precisely, we analyzed the relation between stress, expense and job satisfaction. For this purpose, first data visualization has been performed to see the impact on work family balance, conflict resolution, expenses, and time for hobbies. This is followed by one way ANOVA test and plum-ordinary regression to perform predictive analytics.

Keywords: work from home, Covid-19, ANOVA test, job satisfaction, stress and expenses

1. Introduction

The trend of working from home (WFH) has been accelerated by COVID-19, especially in information technology (IT) organizations. The world is now trying to adopt the WFH, and most of the organizations in Pakistan are also follow the same pattern. WFH has the potential to spend time with families, fulfill their hobbies and even start a side business as well.

However, it has been found that work from home may lead to work and family life imbalance, more stress and other physical and mental health issues. In a global survey, the participants agree to the fact that work from home is anticipated to rise in the future [1]. The digital technology has also played a major role in work from home [26]. A great deal of research has been done in this regard to analyze the impact of work from home on productivity, stress, job satisfaction and various other factors [21]. These studies can be useful for policy makers and provide an option to employers to consider the factors before presenting the choice to their employees to work from home.

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This paper attempts to capture the experience of people while WFH. A survey was conducted in which we considered following variables adopted from literature:

- Career growth opportunities are most beneficial for shaping employees during WFH [2],
- WFH leads to a positive work attitude for employee [3]
- WFH leads to job satisfaction and therefore contributes to nurturing a work-family life balance [3]
- Productivity has improved since workers began working remotely [4]
- WFH has led to stress
- The benefits of work from home can lead to high motivation for workers and may therefore lead to enhanced job's satisfaction[5].

According to various studies, work from home faces many challenges such as work family conflict, isolation, reduced productivity [9]. Hence, the objective of this research paper is to analyses the effects of WFH during COVID'19 in Pakistan.

Beyond the workplace settings, the findings of this study can also be applied to academic sector. The stress factor, work-life balance and productivity challenges are also applicable in academic and societal settings. The study not only adds contribution to remote work but also applied to the pedagogy of online teaching that was very relevant in pandemic era.

This research draws an inspiration from Boundary theory [13] and other similar WFH studies [7, 11] and perform an analytical study in the next few sections. But, before proceeding towards discussion, we will first provide a brief literature review.

2. Literature Review

In literature, there have been various studies analyzing the impact of work from home and the various factors such as satisfaction of people, stress level, work family balance etc. We will highlight the literature first on Covid-19 and work from home. Then, its impact on behavioral and mental health have been analyzed.

a. Literature Review: WFH during the COVID-19 Pandemic

In literature, there have been several studies that concluded that the model for work from home has emerged to a great magnitude after the Covid-19 pandemic. The authors in [6] have done a survey of 5000 individuals of US who have been effectively working from him after the pandemic. In one of the studies, the impact of working from home has been analyzed for Indonesian teachers during pandemic [8]. For this purpose, semi-structured interviews were conducted. It was identified that work from home ensures flexible hours of working, reduced transportation cost, minimizes the stress level and people have more free time for family and other leisurely activities. In another study, Covid-19 was termed an intractable adversary and the impact of work from home has been analyzed [14]. 24 middle and senior level managers were surveyed. The domain was manufacturing and technology firms in India. The observations were increased level of stress, increased working hours, changes in roles and reduced productivity. The analysis was performed using MAXQDA software. In another study, the experience of students on learning online have been analyzed for Malaysian education system [15]. 384 respondents from different public and private sector universities participated in this survey. Most of the respondents were satisfied with current system; however several

improvements have been suggested. The pandemic has been found to hurt international enrollments. This has led to financial crisis in universities. The effect of work from home on life scientists has been done in [16]. In [17], three women illustrated their personal experiences and related them with work from home during Covid-19. The work from home can affect women in different ways such as work-life balance and social issues. The author in [18] identified various types of work from home jobs in developing countries. The author also concluded that negative impact of downsizing in companies can be alleviated by working from home. In [25], impact of Covid-19 on different studies has been analyzed. By analyzing six industries, suggestions have been drawn up for policy makers.

b. Literature Review: Effect of COVID-19 on researches related to job satisfaction

The impact of work from home on employees has not been properly analyzed and current literature has a limited understanding in this regard [13]. Boundary theory has been used in [13] to analyze work and home boundary violations. According to [7], work from home is a newly paradigm that has been taken very positively by employees all over the world. For this purpose, they have analyzed the 100,000 tweets of various individuals. A cross-sectional study on work from home's impact on family-work conflicts, social isolation, productivity and self-leadership has been done in [9]. A questionnaire was filled by 209 employees for this purpose. The impact of work from home on job satisfaction in Indonesia has been analyzed in [10]. It was found that work from home; work-life balance and work stress have both direct and indirect effect on job satisfaction. It was concluded that work from home is a new paradigm of working that should be considered by organization in future. According to [11], work from home can be a detrimental factor for employee work behavior. For testing this hypothesis, 467 middle managerial-level hospitality employees were surveyed in China. They also advocated that digital technology has a major role to play in working from home. Similar conclusion has been drawn in [12]. The authors in [26] analyzed the role of digital technologies in Covid-19 crisis. The behavioral impact of work from home on employees has been analyzed in [19]. They concluded that stress levels are moderate to high in employees. The impact of Covid-19 on environment and society has been analyzed in [20]. The impact of lock down and other factors such as biodiversity has been highlighted. The impact of Covid-19 on mental health has been analyzed in [21].

We conclude this section with highlighting the research on impact of Covid-19 for developing countries. The authors in [22] have highlighted the occupation in which work from home can be done for Pakistan. The author also highlighted issues such as slow internet connection and lack of proficiency in using digital technology. The impact of work from home on teaching performance during Covid-19 has been analyzed in [23]. The target domain was universities in Pakistan. The challenges of medical education in Pakistan for Covid-19 period have been analyzed in [24].

Based on the extensive study of literature, it has been found that work from home is an emerging domain and a lot of research is underway. Most of the studies propose have fragmentation in scope and methodology. This leads to a gap in having a complete

understanding of the overall impact. There are studies such as for US that examine the problem, but lack the missing context of organization and culture. There are some studies in the smaller domain such as for Indonesia or India [8, 14], but they have very limited generalizability. In addition, we found an inconsistency of findings in various studies. This points towards cultural differences. However, very few works have been cited for developing countries like Pakistan. Specifically, we have not found any study on the impact of work from home on job satisfaction, stress level and work family balance. This is the first study in this regard that performed a comprehensive examination of work from home and its impact in Pakistani environment.

3. Methodology

We will now present the methodology along with dataset details, questionnaire and descriptive statistics. One of the unique distinction of the study was incorporating social values and habits specific to Pakistani society during the design of the survey. The cultural consideration adds on to contextual relevance and also makes it different from earlier global studies for WFH.

a. Dataset

To collect the data, we conducted an online questionnaire survey during the period February 2022. Table 1 shows the questionnaire. Some of the initial questions were about the demographics of the person, number of hours they work and the number of years they have worked from home. The questions asked were about the satisfaction of the participant working from home, positive work attitude and benefits of working from home. A total of 83 participants participated in the survey that belongs to Pakistan. Despite a small sample size, the finding still provides a valuable foundation for analyzing the WFH dynamics of Pakistani environment. However, the work can be expanded further for larger and diverse groups to have more generalized and valuable insights to guide policy development more effectively.

All items were measured on a five-point Likert scale (from strongly agree to strongly disagree). People from various domains participated in the survey such as academic, auditing, banker, biomedical engineering, medical science, computer, marketing, mechanics, immigration, house wife, telecom and students. Table 1 shows the location of the participants.

Table 1: Location of the participants

City	Count
Bahawalpur	1
Cambridge	1
Gambat	1
Karachi	64
Khairpur	6
Lahore	1
Unknown	1
Multan	1
Rahim Yar Khan	1

Ranipur	1
Rawalpindi	1
Shikarpur	1
Sukkur	3

Q. No	Question				
1-5	Country	City	Gender	Age	Marital Status
6-10	Education Level	Experience of WFH	Career Field	Organizational Tenure (years)	Number of hours worked per week
11	For how long have you been working remotely?				
12	During COVID-19 while working from home, people are satisfied with their job.				
13	Career growth opportunities are most beneficial for shaping employees during WFH				
14	WFH leads to a positive work attitude for employee				
15	WFH leads to more job satisfaction by and therefore contributes towards family life balance.				
16	Productivity has improved since workers began working remotely				
17	WFH has led to stress.				
18	The benefits of work from home can lead to high motivation for workers and may therefore lead to enhanced job's satisfaction				
19	WFH can cause issues in relationships with family/ colleagues, and therefore resulting in job dissatisfaction				
20	Creating time and space to fulfill the hobbies, and enhance job satisfaction				
21	Start-ups /side business / boomed while WFH				
22	Overall physical and mental well-being improved while working from home				
23	During an outbreak, home-based employees often face conflicts between caring for their families and working.				
24	Work from home can lead to better performance as it provides flexibility in working				
25	Employees that are doing WFH can have conflicts between taking care of their families and their jobs during an epidemic				
26	Work from home can lead to reduced expenses				

Figure 1: Questionnaire for the participants

b. Preprocessing

After the dataset has been acquired, a set of preprocessing operations have been performed over the data. One label encoding has been performed over some of the columns that were nominal in nature. Missing values were identified and filled with default values. Figure 2 shows the snapshot of the data. Table 2 shows the demographics of the participants.

	Timestamp	Country	City	Gender	Age	Marital Status	Education Level	Experience of WFH	Career Field	Organizational Tenure (years)	...	stress	motivati
0	2022/02/11 5:08:29 PM GMT+5	Pakistan	Karachi	Male	21-30	Married	Bachelor	Experienced	Computer Science	4-6	...	Disagree	Agri
1	2022/02/11 5:09:23 PM GMT+5	Pakistan	Karachi	Female	21-30	Married	Masters	Experienced	Software Engineer	4-6	...	Neutral	Neur
2	2022/02/11 5:10:16 PM GMT+5	Pakistan	karachi	Male	21-30	Single	Bachelor	Experienced	Software Engineer	1-3	...	Neutral	Agri
3	2022/02/11 5:13:03 PM GMT+5	Pakistan	Karachi	Male	21-30	Single	Bachelor	Experienced	Software Engineer	Less than 1 year	...	Neutral	Neur
4	2022/02/11 5:22:24 PM GMT+5	Pakistan	Karachi	Male	21-30	Single	Bachelor	Experienced	Developer	Less than 1 year	...	Strongly disagree	Agri

5 rows × 27 columns

Figure 2: Snapshot of the data

Table 2: Demographics of the participants

Gender	Male	39
	Female	44
Education Level	Bachelors	58
	Intermediate	4
	Masters	21
Experience of WFH	With previous experience	52
	No previous experience	31
Organizational tenure	Less than 1 year	37
	1-3 years	29
	Others	17
Age	15-20 years	8
	21-30 years	70
	31-40	5

Table 3 shows the descriptive statistics for various questions related to work from home asked to the participants. The responses are on a Licker scale from 0-4 i.e. strongly agreed, agreed, neutral, disagreed, and strongly disagreed. It can be seen that the participants' responses are positive towards work from home whether it is concerned about job satisfaction, career growth, stress, motivation or other factors.

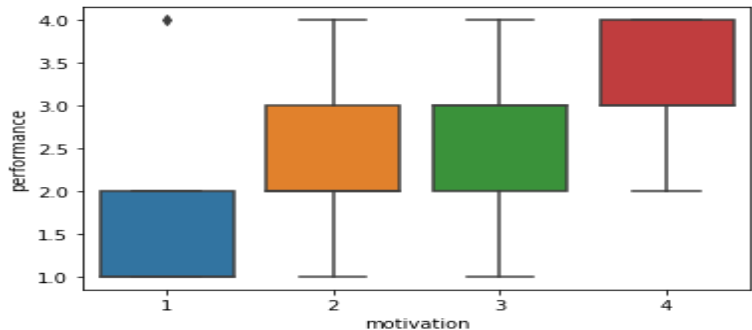
Table 3: Descriptive statistics of the data

	job_satisfaction	career_growth	stress	motivation	performance	expenses	conflict	hobbies	work_family_balance
ount	83.000000	83.000000	83.000000	83.000000	83.000000	83.000000	83.000000	83.000000	83.000000
nean	2.265060	1.903614	1.951807	2.469880	2.397590	2.963855	2.421687	2.493976	2.493976
std	1.001028	0.957823	0.961498	0.704296	0.909835	0.861731	0.912254	0.831887	0.992330
min	0.000000	0.000000	0.000000	1.000000	1.000000	1.000000	0.000000	0.000000	0.000000
25%	2.000000	1.000000	1.000000	2.000000	2.000000	2.000000	2.000000	2.000000	2.000000
50%	2.000000	2.000000	2.000000	2.000000	2.000000	3.000000	3.000000	3.000000	3.000000
75%	3.000000	3.000000	3.000000	3.000000	3.000000	4.000000	3.000000	3.000000	3.000000
max	4.000000	4.000000	4.000000	4.000000	4.000000	4.000000	4.000000	4.000000	4.000000

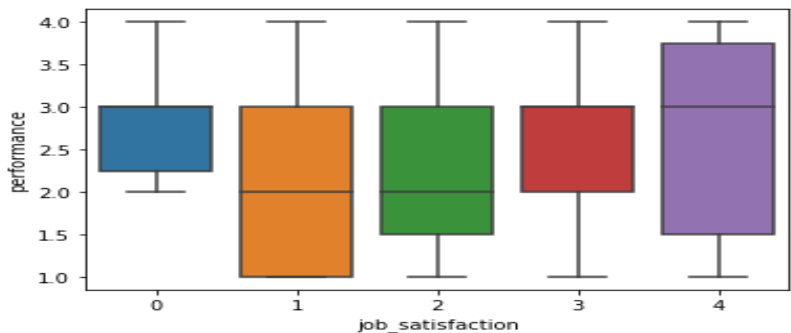
4. Results

Fig 2a shows the relation between job satisfaction and stress. It can be seen that as the job satisfaction increases, the stress decreases. This highlights that employees who are satisfied with work settings are able to deal with work related pressures. The Figure 2b shows the relation between motivation and performance. The performance increases with the increase in motivation to some extent. However, this trend can be observed to a certain extent. Figure 2c shows the relation between job satisfaction and performance. Figure 2d shows the relation between stress and expenses. Figure 2e and 2f shows the correlation between different variables. It can be seen that job satisfaction is positively correlated with hobbies, expenses, career growth and work family balance. On the other hand, job satisfaction is negatively correlated with conflict and stress. Similarly career growth is correlated to performance, expenses, work family balance. Other relations can also be seen. Finally, from Figure 2g, it can be seen that job satisfaction and stress are inversely related.

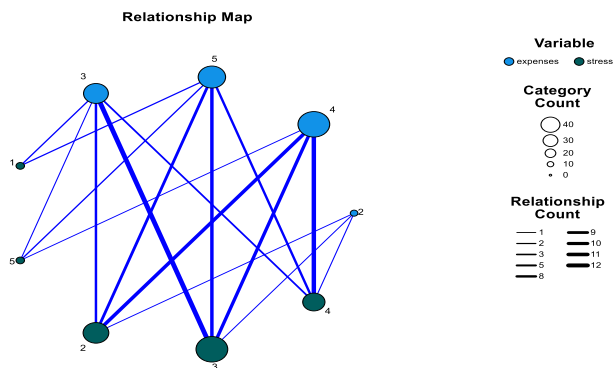




b. Performance Vs. Motivation



c. Job satisfaction Vs. performance



d. Relationship map between expenses and stress

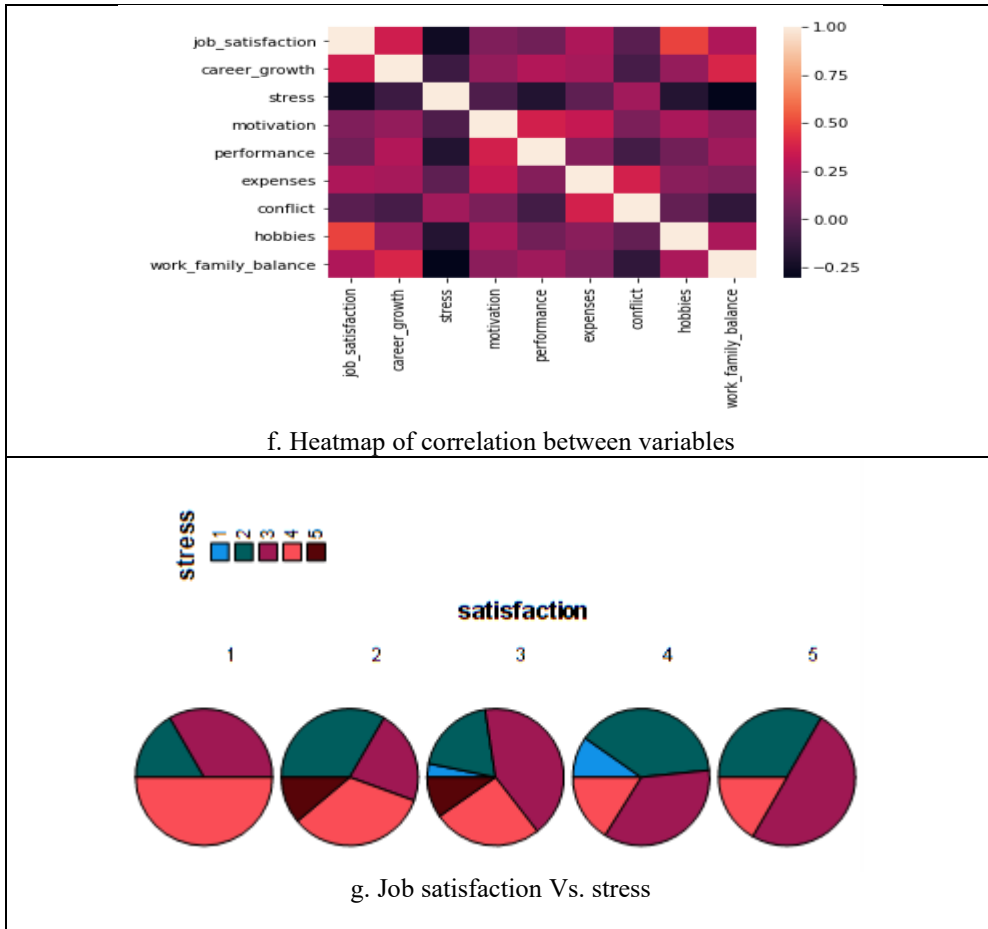
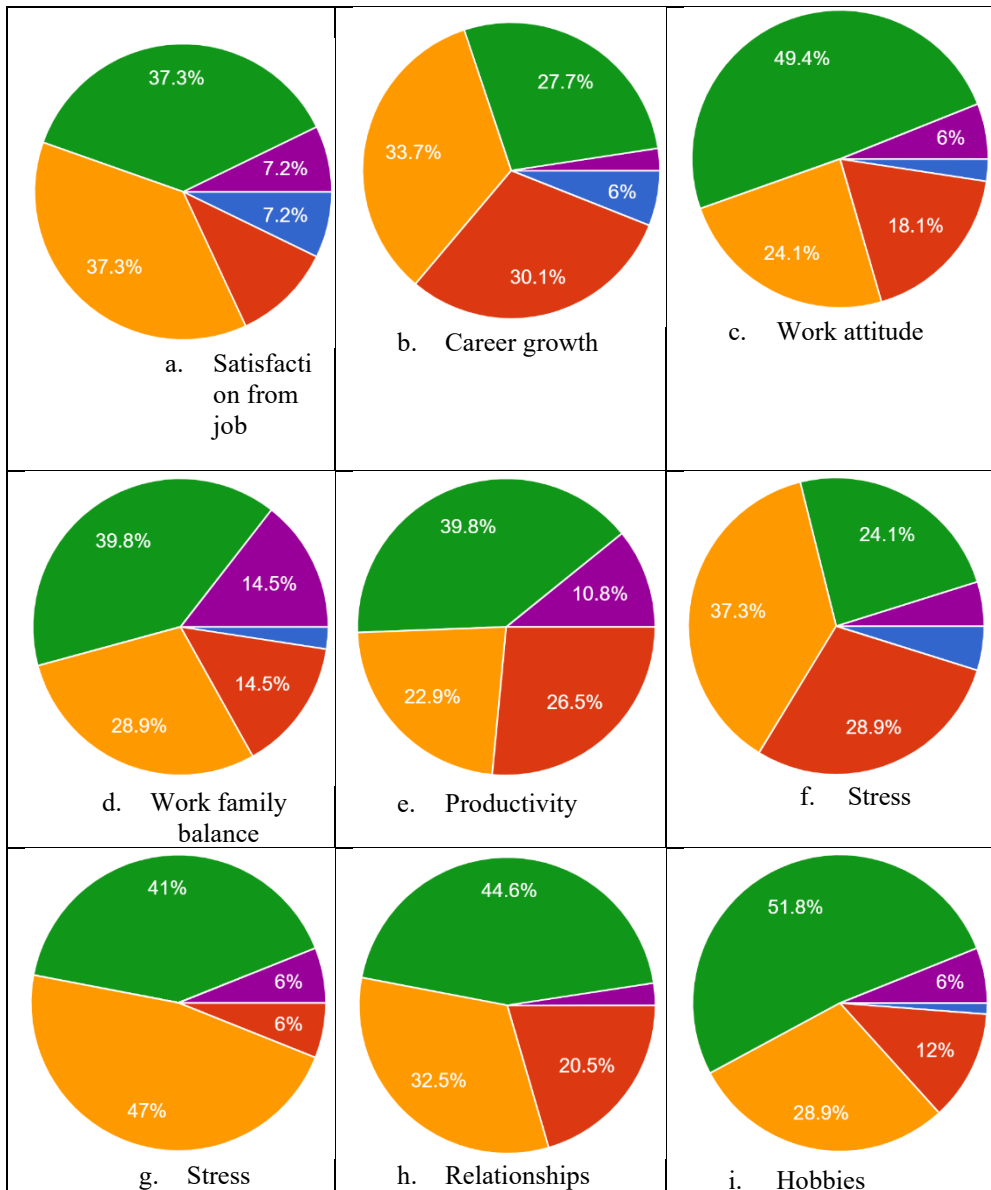


Figure 3: Analysis of relation between variables

We will now analyze the data from different dimensions. From Fig 4a, it can be seen that most of the people expressed satisfaction with working from home. This highlights the flexibility and convenience. However, there are not career growth options (Fig 4b). What this highlights is that employees value the immediate benefits of WFH, they are generally more concerned about long term career implications for professional development and advancements. Work from Home presents positive work attitude (Fig 4c). From our analysis we have also found following information:

- Work from home provides a work-family balance.
- Work from home leads to more productivity.
- People are neutral about stress factor while working from home
- Trustworthiness and responsibility over the individual increased while working from home
- There can be issues of relationship while working from home
- There is time for hobbies while working from home.
- People are doing side jobs / part time work while working from home.

- The physical and mental well being has improved while working from home according to responses
- People find it difficult while balancing job with other responsibilities
- Work from home can improve performance due to its flexible nature
- Work family imbalance may occur while working from home,
- Expenses are reduced while working from home.



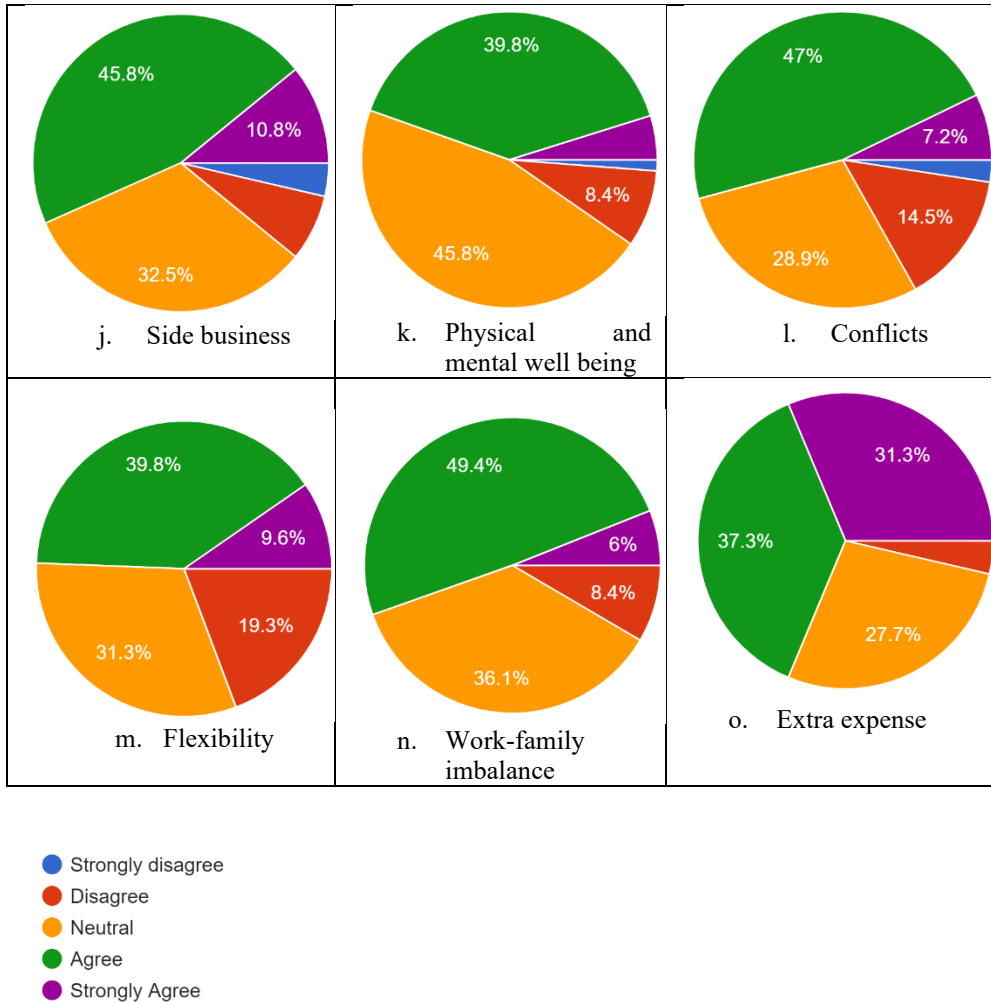
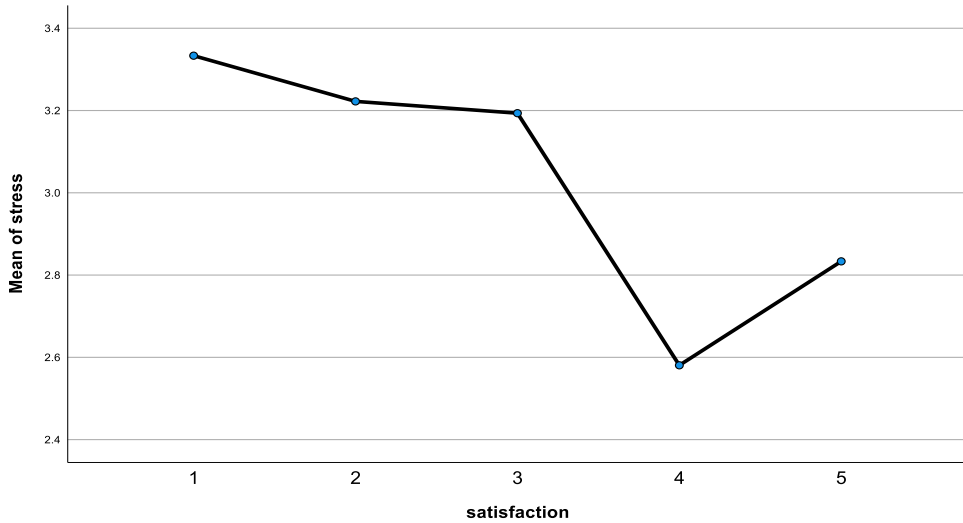
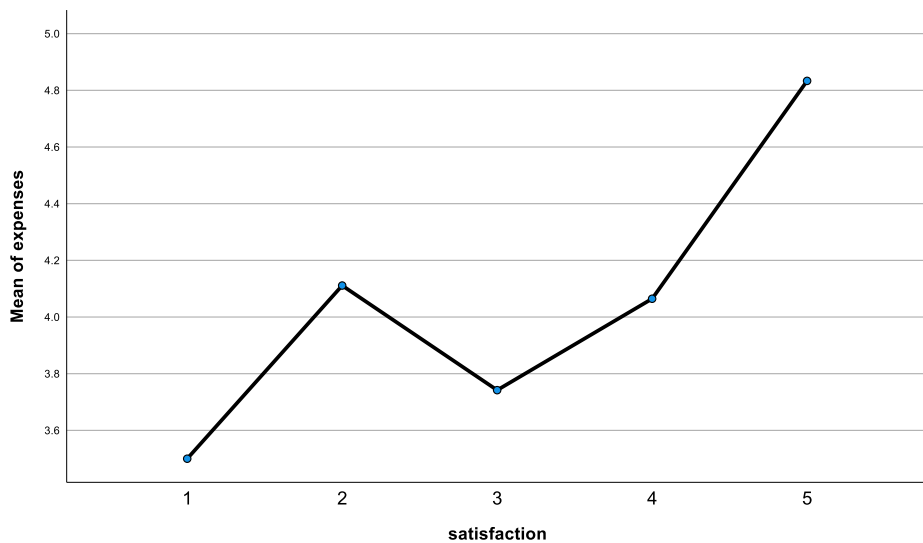


Figure 4: Visualizing data from various dimensions while working from home

Now, we will try to understand relation between job satisfaction and stress. Figure 5a shows that as the job satisfaction increases, the stress factor is reduced. Employees who feel content with their job settings are good at managing their psychological health as well. On the other hand, Figure 5b shows that with the increase in satisfaction, the expenses increase. This concludes that WFH improves the employee morale and stress it may shift financial burdens onto employees.



a. Job satisfaction Vs. stress while working from home



b. Job Satisfaction Vs. expenses while working from home

Figure 5: Relationship between different variables while working from home

Finally, we have performed the ANOVA test. The analysis has been done on SPSS on one way stress and expenses by satisfaction Table 5 shows the results. The significance value for stress is greater than 0.05 while for expenses, it is less than 0.05. Table 6 shows the results of plum ordinary regression. The results show the positive effects of work from home during COVID-19. Survey also reveals that due to certain factors people are neither satisfactory nor unsatisfactory while working from home during COVID-19

Table 5: ANOVA test results

		Descriptives					
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
stress	1	6	3.33	.816	.333	2.48	4.19
	2	9	3.22	1.093	.364	2.38	4.06
	3	31	3.19	.980	.176	2.83	3.55
	4	31	2.58	.886	.159	2.26	2.91
	5	6	2.83	.753	.307	2.04	3.62
	Total	83	2.95	.961	.106	2.74	3.16
expenses	1	6	3.50	1.049	.428	2.40	4.60
	2	9	4.11	1.054	.351	3.30	4.92
	3	31	3.74	.682	.122	3.49	3.99
	4	31	4.06	.892	.160	3.74	4.39
	5	6	4.83	.408	.167	4.40	5.26
	Total	83	3.96	.862	.095	3.78	4.15

		Descriptives	
		Minimum	Maximum
stress	1	2	4
	2	2	5
	3	1	5
	4	1	4
	5	2	4
	Total	1	5
expenses	1	2	5
	2	2	5
	3	3	5
	4	2	5
	5	4	5
	Total	2	5

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
stress	Between Groups	7.698	4	1.924	2.204	.076
	Within Groups	68.109	78	.873		
	Total	75.807	82			
expenses	Between Groups	7.863	4	1.966	2.891	.027
	Within Groups	53.029	78	.680		
	Total	60.892	82			

ANOVA Effect Sizes

			95% Confidence Interval	
			Lower	Upper
stress	Eta-squared	.102	.000	.201
	Epsilon-squared	.055	-.051	.160
	Omega-squared Fixed-effect	.055	-.051	.158
	Omega-squared Random-effect	.014	-.012	.045
expenses	Eta-squared	.129	.000	.236
	Epsilon-squared	.084	-.051	.197
	Omega-squared Fixed-effect	.084	-.051	.195
	Omega-squared Random-effect	.022	-.012	.057

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

Table 6: Ordinary regression**Case Processing Summary**

		N	Marginal Percentage
stress	1	4	4.8%
	2	24	28.9%
	3	31	37.3%
	4	20	24.1%
	5	4	4.8%
satisfaction	1	6	7.2%
	2	9	10.8%
	3	31	37.3%
	4	31	37.3%
	5	6	7.2%
Valid		83	100.0%
Missing		0	
Total		83	

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	98.382			
Final	89.699	8.683	5	.122

Link function: Logit.

Goodness-of-Fit

	Chi-Square	Df	Sig.
Pearson	39.036	59	.979

Deviance	42.045	59	.953
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Link function: Logit.

Pseudo R-Square

Cox and Snell	.099
Nagelkerke	.106
McFadden	.038

Link function: Logit.

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval Lower Bound
Threshold	[stress = 1]	-2.063	1.492	1.911	1	.167	-4.987
	[stress = 2]	.342	1.431	.057	1	.811	-2.463
	[stress = 3]	2.039	1.449	1.980	1	.159	-.801
	[stress = 4]	4.212	1.531	7.566	1	.006	1.211
Location	expenses	.177	.253	.488	1	.485	-.319
	[satisfaction=1]	1.277	1.116	1.308	1	.253	-.911
	[satisfaction=2]	.909	.985	.853	1	.356	-1.021
	[satisfaction=3]	.874	.865	1.022	1	.312	-.821
	[satisfaction=4]	-.347	.839	.171	1	.679	-1.992
	[satisfaction=5]	0 ^a	.	.	0	.	.

Parameter Estimates

95% Confidence
Interval

Upper Bound

Threshold	`TOIMUYTGFRE WSASR	.862
	[stress = 2]	3.148
	[stress = 3]	4.880
	[stress = 4]	7.213
Location	expenses	.672
	[satisfaction=1]	3.464
	[satisfaction=2]	2.839
	[satisfaction=3]	2.569
	[satisfaction=4]	1.298
	[satisfaction=5]	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Based on the results, following predictive insights were obtained. The results show an inverse relation between job satisfaction and stress. In other words, higher job satisfaction will reduce perceived stress among employees working from home. It is also observed that motivation is a strong predictor of performance. Career growth is strongly associated with family and work-life balance. Finally, expense tends to increase with higher satisfaction.

5. Conclusion

In this study, we have performed a survey of the people and determined various factors while they work from home. This includes questions about their satisfaction, work-family balance, maintaining relationships. It can be seen that most of the people are satisfied with working from home. The people are neutral about the questions or agree with most of the statements. The scenario for work from home emerged as most people lost their jobs during Covid-19 pandemic [6]. It has been found that the performance of the employees is not actually affected working from home. Following the pandemic, people from various classes (educated, high income and white collared) have shifted to this new model.

Although, this study didn't do a full factor analysis, the consistency of findings across correlation, ANOVA and regression analysis substantiate the stability of the results. This triangularization concludes that survey measures were both reliable and valid for the analysis.

Work from home is a new working paradigm [10] and in future, more work can be done on analyzing the acceptability of organizations and their attitude towards work from home. Isaac Newton worked on his ground breaking research while working from home during a pandemic[16].

The research provides insights for Pakistani environment, but this also highlights the career growth significance in remote settings. This will ensure long term employee engagement and performance. At the core policy level, it also supports ongoing debate around hybrid work model even applicable on post-pandemic. This can balance productivity, well-being and organization stability.

Finally, work from home is not a temporary option but a major transformation in how industry should work. The ultimate long term sustainability depends on channelizing career development, mentorship and coping with the dynamics of virtual environments. By employing the findings of this study, the work from home will no longer be a reactive approach but proactive strategy for resilient and future ready workplaces.

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