Assessment of mental health and related concern of students, support staff, and residents at IIT Mandi

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1 Acknowledgements

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2 Executive Summary

Mental health is a state of successful performance of a cognitive function, resulting in productive activities, fulfilling relationships with other people, the ability to adapt to change, and coping with adversity. It is indispensable to personal well-being, family, and interpersonal relations due to repeated exposure to stressful situations and issues which take a significant toll on the mental health of the individuals, thus depriving them of their healthy well-being. Before reaching the stage of problematic mental health, a person keeps appraising the stressful situations around them cognitively, resulting in mental health concerns. To address the mental health problems holistically, it is an essential first step to understand the mental health concerns of people and the factors associated with such concerns.

One of the crucial factors associated with mental health concerns is the remote location, which negatively impacts people living in such areas. Remoteness generates other related concerns such as transport facilities and easy connectivity to nearby developed places, access to health facilities, entertainment, resource generation. These and several factors are investigated in previous studies.

Our study aimed to investigate people's mental health concerns living in an educational campus such as IIT Mandi, built in an area remote from urban social life. It was an interesting proposition to investigate whether people living in such a self-sufficient campus but situated in a remote location have similar mental health concerns as those living in very remote villages of Himachal Pradesh with very scarce resources.

For this purpose, a survey was conducted using an online questionnaire containing questions that assessed five important concerns: remoteness, health facilities, recreational facilities,Working hours/job satisfaction and COVID-19 pandemic. The survey also contained the standard DASS - 21 questionnaire that measures depression, anxiety, and stress scores.

The descriptive analysis of demographic and dependent variables, i.e. depression, anxiety and stress scales on stratified sample showed IIT Mandi students to have highest depression scores, IIT Mandi Staff to have highest anxiety scores and IIT Mandi faculties to have best mental health among IIT Mandi campus residents. Urban residents had the highest mean depression, mean anxiety, and mean stress scores when compared to rural and IIT Mandi residents, but had a little difference in the severity categories.

The correlation analysis showed various relations between our chosen mental health concerns and mental health scores. Most of the correlations were weak to moderate and only a few were strongly correlated. Though, moderate correlations provide justification to the research literature and our investigation.

Our results have implications for understanding the mental health concerns of people and the factors associated with such concerns. Thus, policymakers and researchers should encourage more such surveys to understand further and act accordingly. There are several ways forward in this research, first conducting bigger surveys proportionate to the population will help get clearer insights. Second, the research literature shows many more mental health concerns which can be assessed in future research. Third, motivated by our analysis using zero-order correlation, more statistical tools such as regression analysis can be used to facilitate more meaningful findings. We plan to incorporate some of these ideas soon in this research program and motivate researchers to do the same.

PS: There were certain hindrances faced while data acquisition; one, due to situational restrictions on free movements on account of Covid contributed negatively in approaching remote villages. It was essential to collect data approaching them physically because they did not have the resources to fill the data in an online mode. Therefore, the survey responses we received were demographically skewed. However, we collected a total of 151 responses and have analysed their survey responses in this report.

3 Introduction

Mental health is a state of successful performance of a cognitive function, resulting in productive activities, fulfilling relationships with other people, the ability to adapt to change, and coping with adversity. It is indispensable to personal well-being, family and interpersonal relationships, and contribution to community or society. Development in most parts of the world is centred around big cities and towns. Mental health awareness and resources such as counselling and psychiatric facilities are easily accessible to people who hail there. Easy and smooth accessibility to mental health facilities consciously or subconsciously provides a sense of comfort to people. Even in the United States of America, people living in remote areas such as rural settings or far from the city or urban lifestyles have significant health concerns such as access to mental health care and concerns for suicide, stress,

depression, and anxiety disorders ((12) Ortega, Johnson, Beeson, Craft, 1994). Mental health and mental disorders were identified as the fourth highest-ranking rural health concerns among rural areas ((7) Gamm, Hutchison, Bellamy, Dabney, 2002).

Mental problems are mainly caused due to repeated exposure to stressful situations and issues which take a significant toll on the mental health of the individuals, thus depriving them of their healthy well-being. Despite all these problems, if proper mental care is provided to those individuals in time, they can return to their healthy state of mind. There is a huge sense of relief and security if the resources are at one's disposal, leading to a tension-free cure and relaxation. Thus, there is an urgent need for mental health services to be extended to all people, improving worldwide quality of life.

Many educational campuses are built in areas remote from urban social life due to the availability of larger spaces and greener campuses. It is a trade-off between being part of city life or having a larger area to build a sophisticated and greener campus. One of the qualitative studies conducted in the UK on young college students expressed how urban nature encounters were experienced as accepting and relational, offering a stronger sense of self, feelings of escape, connection, and care with the human and non-human world. However, it was also noted that trees, water, open spaces, and views were frequently experienced in nature typologies offering benefits to mental health ((3) Birch, Rishbeth, Payne, 2020). Thus, it would be interesting to conduct exploratory research and investigate how people of different demographic details living in the IIT Mandi campus perceive mental health and their concerns regarding their mental health.

The primary objective of this study is to assess the mental health of IIT Mandi campus residents by administering their depression, anxiety, and stress scales. We aim to establish relationships between specific concerns and the mental health of residents of an educational campus built in rural areas - the IIT Mandi campus. We also aim to study the impact of these concerns on the mental health of rural and urban residents of Himachal Pradesh and compare those with that of IIT Mandi campus residents.

In what follows, first, we discuss the related work and the hypothesis for this study. Then, we brief the different variables, survey and the survey sample, and analysis used in this study. Finally, we report results and close the report by highlighting the implications of our findings and the need for future research.

4 Literature Review

(10) Kelly, Dwyer, Willis, and Pekarsky (2014) described the difficulties faced by rural and remote aboriginal people who needed to be transported to city hospitals for tertiary treatment. Interviews were conducted with staff and patients using a set of expedited questions. Abnormal patients having a high level of chronic illness, and health professionals reported

that transportation is a major barricade in accessibility to health facilities. Accessibility to transport and support services is needed to be improved for providing suitable treatment for Aboriginal patients.

(9) Joshi et al. (2014) analysed the numbers of Road Traffic accidents, their patterns, the cause of accidents, and the number of patients injured or dead. The bulk of deaths and injuries occurred in the state's hilly districts. Speeding, reckless driving, not wearing a seat belt, and alcohol consumption were among the most frequent causes of road traffic accidents, followed by defective roads in the hilly areas.

(8) Hudson and Doogan (2019) focused on the role of geographic isolation and social isolation in accounting for rates of mental disability in the U.S. The zero-order correlation between geographic isolation and mental disability was found to be positive and moderate, the correlation between social isolation and mental disability was even more positive. The correlation of mental disability with socioeconomic status and economic inequality was also positive but weak. The effectiveness for regression of mental disability rates on geographic isolation and other vital predictors was notable.

(13) Sharma and Rees (2007) analyzed women's mental health living in isolated mining towns with their husbands employed in mines. The isolationism of these places had a severe impact on the life satisfaction of both males and females. Other reasons for mental problems for women included lack of work opportunities and social networks due to the mining-centered economy and unusual work schedules of men in the mines. Similarly, any isolated place with a particular profession-centralized economy confines the lives of its residents and affects their mental health.

(16) Warner-Smith and Brown (2002) studied the effects of leisure on women's lifestyle and mental health in a small Australian town. The participants described the shortcoming of not having a cinema in their town as very disadvantageous and had to resort to binge-watching for long hours.

(2) Alcock, White, Wheeler, Fleming, and Depledge (2013) discussed the effect on the mental health of moving to greener areas from less green urban spaces and vice-versa. It was found that people have apparently adapted fairly rapidly to living in a less green area.

(1) Alanazy, Wark, Fraser, and Nagle (2019) reviewed the differences between emergency services for rural and urban residents. It was found that the urban emergency services had shorter prehospital times, response times, on-scene times, and transport times for the patients as compared to rural hospitals.

The review by (4) Crawford et al. (2011) identified musculoskeletal symptoms in remote workers due to spending a long time in transportation. As the working hours increased, the mental well-being of the workers deteriorated. Better mental well-being was associated with more interaction time with customers for the remote workers.

(11) Malatzky et al. (2020) reviewed the perception of COVID-19 in urban and remote,

rural places where it was observed that the 'urban' shifts from sites of sophistication to places of threat while 'rural' changes from rustic to safe, and how this impacts movement and opposition. The rural areas were thought to be more resourceful, but the poor infrastructure in rural and remote healthcare led to the rethinking of the earlier point of view and caused a fear of COVID-19 among the rural residents. The urban people are more relieved due to having a hospital and medical care on their Speedline but are stressed due to the accumulation of Corona positive cases.

The challenges the residents of rural areas and the urban dwellers face are in contrast. One can see significant differences in mental health concerns such as transport connectivity, medical facilities, recreational facilities, working hours/job satisfaction, and impact of the COVID-19 pandemic. Due to the lack of transportation facilities, poor hospitals, and medical facilities, people of rural areas are always in a threat of availing health which impacts their mental health. Hilly regions are prone to Road Traffic Accidents and landslides which causes fear in mind to the locals. Also, geographic isolation, social isolation, and lack of recreational activities are responsible for loneliness and mental health concerns. There are some mental health benefits of living in green and isolated areas. COVID-19 pandemic has been a significant mental health concern for both rural areas and urban areas.

IIT Mandi campus residents experience mental health concerns other than remotenesses such as medical facilities, recreational facilities, working hours/job satisfaction, and impact of the COVID-19 pandemic, which are studied in the scope of this paper. Each of the concerns mentioned above is frequently discussed in the research literature for various locations and subjects. The individual and cumulative impact of these concerns on the mental health of IIT Mandi campus residents or any similar educational campus in India, especially Himachal Pradesh, are yet to be studied and shall lead to insightful findings.

The comparative study of mental health concerns of IIT Mandi residents and rural (remote) and urban residents of Himachal Pradesh is essential to understand where we stand and which concerns brother us the most. In a broader sense, this study involves conducting initial exploratory research of the nature and scope of mental health concerns of people living in a dedicated residential campus of IIT Mandi, Himachal Pradesh.

4.1 Objective

This study is exploratory in nature to see what would be the impact of remoteness, availability of medical facilities, recreational facilities, working hours/job satisfaction, and effect of COVID-19 pandemic on the mental health of the people living in remote areas versus the people living on the IIT Mandi campus and the people living in urban areas.

5 Methodology

5.1 Overview

The survey primarily targeted the mental health of campus residents of the IIT Mandi campus built in rural areas. We also surveyed the mental health of the rural and urban residents of Himachal Pradesh for a comparative study. We studied the following concerns and their correspondence to mental health: remoteness (in terms of resource availability, travel safety and transport connectivity associated with hilly roads), health facilities (in terms of physical health and emergency health facilities), recreational facilities (in terms of social/community interaction, technological interaction, and environmental interaction), working hours, job satisfaction, and COVID-19 pandemic (in terms of its perceived threats). We measured depression, anxiety, and stress scales to assess the mental health of our subject.

The primary method of gathering data was an online questionnaire made on the google form platform, followed by telephonic interviews. The initial section of the survey informed respondents about the study and its scope, expected time taken to answer the questionnaire, and asked their consent to participate in the study while ensuring confidentiality. The following section asked demographics, i.e. age, gender, area of residence, chronic illness (if any), occupation and annual income. The subsequent sections had questions based on the above-mentioned concerns [1] and the standard DASS-21 questionnaire ((17) Lovibond, S.H. Lovibond, P.F., 1995).

5.2 Sample

The sample size of our analysis is 151 responses collected through online survey mode from IIT Mandi, nearby rural and urban areas. The units of analysis were the IIT Mandi residents, rural area residents of Himachal Pradesh, and urban area residents of Himachal Pradesh. For IIT Mandi residents, the data was collected from Students, Faculties, and Staff. Out of the total number of responses, 100 responses were filled by IIT Mandi Students, 12 responses were filled by IIT Mandi Faculties, 10 responses were filled by IIT Mandi staff, 17 respondents were Rural residents, and 12 respondents were Urban residents. Out of 151 respondents, 7 respondents are having some type of chronic illness. Our sample constituted 151 participants(46 Females and 105 Males, Mean age = 304.95 months, Standard Deviation = 93.69 months). The mode of survey used in this study was online questionnaire on google forms and telephonic interview. Due to the ongoing pandemic the responses for the survey are limited following the constraints of Covid-19.

[1] 46 questions (5 point Likert scale) to assess concerns i.e. remoteness, health facilities, recreational facilities, working hours/job satisfaction and COVID-19 pandemic [see Appendix A].

5.3 Dependent Variables

Depression, anxiety and stress are the dependent variables for this survey which is determined by the DASS-21 scale through a 21-question questionnaire.

5.3.1 Depression, Anxiety and Stress Scale(DASS-21)

There are 21 questions within the standardized DASS scale under three subheadings of Anxiety, Depression and Stress. This contains information on the existence of mental, physical, and emotional problems in the person's past few weeks. The questionnaire provides insight into the individual's style of thinking. The DASS score was calculated for the residents of IIT Mandi, Rural area, and Urban Areas.

Cut-off scores for conventional severity labels ((17) Lovibond, S.H. Lovibond, P.F., 1995)

	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely severe	28+	20+	34+

5.4 Independent variables

1. Concerns related to **Remoteness**: Being distanced from a well-connected and resourceful town/city leads to several problems such as transport connectivity, and resource availability. Our questionnaire[2] had 7 questions on a five point Likert scale to assess this variable.

2. Concerns related with **Medical facilities**: Being able to avail physical and emergency health services in the close vicinity. Our questionnaire[3] had 12 questions on a five point Likert scale to assess this variable.

3. Concerns related with **Recreational facilities**: Being able to do leisure activity, which involves social interaction, technological interaction and environmental interaction. Our questionnaire[4] had 8 questions on a five point Likert scale to assess this variable.

[2]See Appendix A questions 1-7.
[3]See Appendix A questions 8-19.
[4]See Appendix A questions 20-27

4. Concerns related with **Working hours/job satisfaction**: Being satisfied from the work/job and having a healthy work-life balance with adequate work hours. Our questionnaire[5] had 8 questions on a five point Likert scale to assess this variable.

5. Concerns related to **Covid-19 pandemic**: Being impacted by the COVID-19 pandemic and its perceived threats. Our questionnaire[6] had 11 questions on a five point Likert scale to assess this variable.

5.5 Analysis

Preparation of data involved cleaning survey responses and selecting the demographics to be analysed, i.e. age-group, gender, chronic illness. The sample was categorically split into the units of analysis on the basis of residence, i.e. IIT Mandi community (student, staff and faculty), rural, and urban residents. The data files were loaded and analysed using IBM SPSS Statistics software.

The preliminary analysis involved a descriptive analysis of the demographics mentioned above and the dependent variables. The mean and standard deviation of depression, anxiety and stress scores of each category mentioned above was computed and compared. Since the sample was reasonably skewed, a subset of data was similarly analysed, generated using stratified random sampling taking ten responses from each category.

Further, we analysed zero-order correlation analysis of independent variables with dependent variables, i.e. mental health scores. The Pearson correlation coefficients and p (significance) values were calculated. The correlation coefficients were used to understand the strength of correlation (weak, moderate, and strong) between the variables; p values were used to understand whether a correlation is statistically significant or not.

We also performed a regression analysis of mental health scores, i.e. dependent variables on independent Variables, i.e. remoteness and other key predictors, using the ordinary least square method. The Beta coefficients and p (significance) value were calculated. Since the sample was reasonably skewed and small, the regression analysis could not give meaningful findings [7].

6 Results

6.1 Descriptive Analysis demographic and dependent variables

Table 1 describes the descriptive analyses of demographic and dependent variables based on residence divided by age group and gender. There are 2 age groups- first 17 to 35 years

[5] See Appendix A questions 28-35.
[6] See Appendix A questions 36-46.
[7] See Appendix B.

of age, while the second being older than 35 years. The chronic illness column in the tables 1 and 2 shows the total number of people in a particular category with chronic illness. Among the IIT Mandi residents, it was observed that the mean Depression, Anxiety, and Stress score was greatest for Students that is 14.58, 11.78, and 14.76, respectively, and standard deviation 10.003, 8.015, and 8.384, respectively, followed by Staff and Faculty. The mean Depression, Anxiety, and Stress score for Rural residents were 10.35, 9.18, and 11.41, respectively, and standard deviation 7.219, 5.747, and 5.78. While for urban residents, these scores were somewhat similar to Rural residents having a little higher mean depression and stress score. Among IIT Mandi Community, Rural, and Urban residents, the IIT Mandi community was having the highest mean Depression, Anxiety, and Stress score that is 13.57, 11.30, and 14.07 respectively, and standard deviation 9.856, 7.684, and 8.419 respectively.

Table 1: **Descriptive analysis of demographic and dependent variables**

Residence		Valid N	Age Group		Gender		Chronic Illness	DASS-21 Depression Score		DASS-21 Anxiety Score		DASS-21 Stress Score	
			I	II	M	F		M	SD	M	SD	M	SD
IIT Mandi	Student	100	99	1	74	26	2	14.58	10.003	11.78	8.015	14.76	8.384
	Staff	10	7	3	10	0	0	12.80	8.854	10.60	5.892	12.80	8.954
	Faculty	12	8	4	2	10	1	5.83	5.357	7.83	5.219	9.33	7.352
	Community	122	114	8	86	36	3	13.57	9.856	11.30	7.684	14.07	8.419
Rural		17	5	12	12	5	1	10.35	7.219	9.18	5.747	11.41	5.778
Urban		12	10	2	7	5	0	11.33	8.998	9.00	8.023	12.83	10.495

Age Group I: 17-35 years; Age Group II: More than 35 years

M: Mean, SD: Standard Deviation

Table 2 describes the descriptive analyses of demographic and dependent variables based on residence for a subset of the data. This subset was generated using stratified random sampling and had ten responses for each category because our sample was demographically skewed. Among IIT Mandi residents, students had the highest mean depression severity score and had mild depression with a standard deviation of 8.34; staff had the highest mean anxiety and had moderate anxiety with a standard deviation of 5.89; faculty had the least depression, anxiety, and stress score and had almost normal levels. Among the IIT Mandi community, rural residents, and urban residents, urban residents had the highest mean depression, mean anxiety, and mean stress scores. Still, the differences were so less that only the severity level of anxiety reflects the difference.

As per the stratified sample, an average student had mild depression, mild anxiety and normal stress; an average staff had mild depression, moderate anxiety and normal stress; an average faculty had mild depression, normal anxiety and normal stress; the average member from the entire community had mild depression and normal anxiety and stress.

Table 2: **Descriptive analysis of demographic and dependent variables using Stratified Sampling technique (10 responses each)**

Residence		Valid N	Age Group		Gender		Chronic Illness	DASS-21 Depression Score		DASS-21 Anxiety Score		DASS-21 Stress Score	
			I	II	M	F		M	SD	M	SD	M	SD
IIT Mandi	Student	10	10	0	7	3	0	13	8.34	7.8	5.692	11.4	7.058
	Staff	10	7	3	10	0	0	12.8	8.854	10.6	5.892	12.8	8.954
	Faculty	10	7	3	2	8	1	5.2	5.514	8	5.888	10.2	7.33
	Community	10	9	1	7	3	0	12.2	8.917	7.2	6.339	11.6	7.648
Rural		10	3	7	7	3	1	11.2	8.39	9.2	6.052	10.8	5.594
Urban		10	8	2	6	4	0	12.8	9.004	10	8.273	14	10.954

Age Group I: 17-35 years; Age Group II: More than 35 years

M: Mean, SD: Standard Deviation

6.2 Correlation Analysis of independent and dependent variables

Table 3 shows the zero-order correlations of independent variables such as Remoteness, availability of Medical Facilities, recreational facilities,working hours/job satisfaction, and the COVID-19 pandemic with mental health scores for the different categories of people given by the Pearson correlation coefficient r and p values. For IIT Mandi students, Covid-19 Pandemic and Stress are moderately correlated with each other with a zero-order correlation of .448** and p¡.001, while remoteness is moderately correlated with anxiety with a correlation coefficient of 0.417 which shows that Covid-19 and Remoteness have a moderate impact on IIT mandi students.

For the IIT Mandi staff, the Covid-19 pandemic is strongly correlated with depression and stress with the zero-order correlation of .675* and .676* and p-value .032 for both depression and stress, respectively, which shows that Covid-19 has strongly affected the mental health of IIT Mandi staff.

For the whole IIT Mandi Community, the Covid-19 Pandemic is positively correlated with Stress with the zero-order correlation of .375** and p¡.001.

For the rural residents, the working hours/job satisfaction, Covid-19 pandemic, and Medical Facilities are strongly correlated with the Depression with the zero-order correlation of .615, 0.570, and 0.504 with p-values .009, 0.017, and 0.039 respectively which shows that Rural residents have a greater impact on their mental health due to Covid-19,working hours/job satisfaction, and Medical facilities.

For Urban residents, the Covid-19 Pandemic is strongly correlated with the Depression and Stress with the zero-order correlation of .564 and 0.521 respectively but the results were not statistically significant. While remoteness is weakly correlated for urban residents, which shows that Covid-19 pandemic has affected both rural and urban residents equally while remoteness is of little concern to Urban residents.

Table 3: **Zero-order correlations of independent variables with mental health scores for Category-wise residents**

Variables	Depression		Anxiety		Stress	
	Pearson r	p	Pearson r	p	Pearson r	p
IIT Mandi - Students						
Remoteness	.255*	.011	.417**	<.001	.374**	<.001
Medical Facilities	.185	.065	.310**	.002	.266**	.007
Recreation	.297**	0.003	.355**	<.001	.358**	<.001
Nature of work	.392**	<.001	.408**	<.001	.411**	<.001
Covid-19 Pandemic	.357**	<.001	.401**	<.001	.448**	<.001
IIT Mandi - Staff						
Remoteness	.349	.323	.316	.373	.354	.316
Medical Facilities	.198	.583	.284	.426	.143	.693
Recreation	.412	.237	.388	.268	.427	.219
Nature of work	.151	.677	.216	.548	.271	.449
Covid-19 Pandemic	.675*	.032	.676*	.032	.551	.098
IIT Mandi - Faculty						
Remoteness	.069	.831	.202	.528	.099	.760
Medical Facilities	-.052	.874	-.008	.980	.038	.906
Recreation	-.083	.799	.061	.850	-.112	.729
Nature of work	-.289	.363	-.049	.880	-.102	.753
Covid-19 Pandemic	-.182	.527	-.175	.587	-.160	.620
IIT Mandi - Community						
Remoteness	.206*	.023	.365**	<.001	.313**	<.001
Medical Facilities	.123	.177	.248**	.006	.197*	.030
Recreation	.234**	.009	.306**	<.001	.289**	.001
Nature of work	.328**	<.001	.364**	<.001	.352**	<.001
Covid-19 Pandemic	.312**	<.001	.353**	<.001	.375**	<.001
Rural Residents						
Remoteness	0.425	0.089	.340	.182	.328	.199
Medical Facilities	.504*	.039	.364	.151	.247	.339
Recreation	.376	.136	.170	.514	.355	.163
Nature of work	.615**	.009	.174	.505	.113	.665
Covid-19 Pandemic	.570*	.017	.372	.142	.427	.088
Urban Residents						
Remoteness	.175	.587	.050	.878	.139	.668
Medical Facilities	.479	.115	.273	.391	.387	.214
Recreation	.487	.108	.382	.220	.488	.107
Nature of work	.038	.906	.210	.513	.183	.726
Covid-19 Pandemic	.564	.056	.453	.139	.521	.083

Pearson r: Pearson's correlation coefficient, p: p-value

7 Discussion and Conclusion

While being an exploratory one, this study uncovers many pieces of evidence to give satisfactory answers to the questions posed by the literature review for the context of IIT Mandi. In IIT Mandi, the students have the highest depression scores. They predominantly suffer from anxiety and stress due to the impact of the independent variables, such as remoteness, medical facilities, COVID-19, and recreational facilities.

While the anxiety and the stress scores are highest for the staff in IIT Mandi and face a lot of mental issues. The working hours/job satisfaction and the medical facilities have a low correlation for the mental issues in staff, which shows that they are less likely to worry about these issues and feel assured in the IIT Mandi campus. But they still face issues such as stress and depression due to remoteness and the COVID-19 pandemic.

The faculties of IIT Mandi have the best balance in terms of mental state and have the lowest DAS scores. They remain unaffected by the independent variables, which exhibit their adaptability to the problematic issues for the rest of the people.

Looking at the whole of the IIT Mandi community, the anxiety issues are most likely to affect the people due to the independent variables. The working hours/job satisfaction and COVID-19 brings equal amounts of Depression, Anxiety, and Stress for the residents of the IIT Mandi campus. This result is similar to that of the students of IIT Mandi. The reason behind this is that the majority of the survey respondents are students, which diverted the results of the community towards that of the students.

Moving away from the IIT Mandi campus, the rural residents would be the first category of people one would meet, who have lower depression and stress levels, but higher anxiety levels than IIT Mandi residents. The rural people mostly feel depressed due to the effects of the independent variables.

The most significant cause of worry in remoteness is Himachal Pradesh's hilly roads, limited resources in rural locations, and travel safety concerns among rural populations owing to road conditions. Residents, unlike urban residents, are deprived of essential services due to their remoteness. They have to travel to a neighboring city to obtain basic essentials.

Illness concerns, in which remote residents are deprived of basic medical facilities, Physical health of the respondents, and Emergency health situations, in which they must rush immediately to cities for medical treatment, are the main contributing factors to this concern for the Medical Facilities variable. Furthermore, even if they had a medical center in their region, it would be incapable of treating numerous disorders.

The absence of technological, social, and environmental interaction are the key contributing factors to this worry for the Recreational Facilities variable. Due to a lack of resources and capabilities, rural populations lack technology. Urban inhabitants and IIT Mandi students are the most affected by a lack of social connection. In most situations,

urban inhabitants lack environmental contact, whereas rural residents don't.

Concerns about the working hours/job satisfaction variable are largely related to respondents' lack of interest in their occupations, their inability to manage their personal lives with work, and their workplace's uncooperative atmosphere. Many of the respondents wished to quit their occupations, but they were unable to do so due to their responsibilities. Many of the respondents stated they didn't have any motivation to accomplish anything else because of their workload. They also lack social connections since they are unable to find a balance between their personal and professional lives.

The lack of vaccine availability in their location, depression, fear, and awareness of the pandemic are all contributing factors in the Covid-19 pandemic variable. Because of the ongoing epidemic, respondents are unable to work properly; there is a concern of losing their jobs. People are afraid of going to hospitals for treatment because of the fear of pandemics. Due to Covid-19's fear and guidelines, people are unable to socialize properly.

On the other hand, the urban people have the highest DAS scores and have a reasonably high possibility to suffer from mental illness. Low correlation is obtained for remoteness and working hours/job satisfaction variables for the urban residents, which shows that the resources are readily available for the people in towns and cities. The working hours/job satisfaction also doesn't affect them much compared to that of the rural and IIT Mandi community people. They, however, face depression and stress due to the non-availability of medical facilities and recreation. COVID-19 causes depression, stress, and anxiety issues for urban people.

Our results have implications for understanding the mental health concerns of people and the factors associated with such concerns. Thus, policymakers and researchers should encourage more such surveys to understand further and act accordingly. There are several ways forward in this research, first conducting bigger surveys proportionate to the population will help get clearer insights. Second, the research literature shows many more mental health concerns which can be assessed in future research. Third, motivated by our analysis using zero-order correlation, more statistical tools such as regression analysis can be used to facilitate more meaningful findings. We plan to incorporate some of these ideas soon in this research program and motivate researchers to do the same.

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9 Appendices

9.1 Appendix A

Table 4: **Questionnaire**

Questions		Rating				
1	Travelling to a nearby city and towns is a very pleasing experience because of good transport facilities	1	2	3	4	5
2	Getting things of daily needs is fairly simple because of the easy availability	1	2	3	4	5
3	I feel safe to travel to nearby places for visiting relatives or arranging for things that we require	1	2	3	4	5
4	I feel concerned whenever my family member travels to a nearby city or town	1	2	3	4	5
5	I feel restless till my family member returns from their travel to a nearby city or town	1	2	3	4	5
6	My concern with the travel is more because of hilly terrain and windy roads	1	2	3	4	5
7	Sending my kids to nearby schools is a big concern for me because of transport facilities and windy roads	1	2	3	4	5
8	I get always bothered if I get slightest of illness	1	2	3	4	5
9	My botheration and worry related with illness is due to lesser medical facilities in my area of living	1	2	3	4	5
10	Most of the time when I am ill, I keep thinking what if I don't reach the doctor/hospital within time because of poor transport connectivity	1	2	3	4	5
11	I always doubt about the credibility of hospitals and doctors in my area, and have to consider medical facilities of farther areas	1	2	3	4	5
12	I have a little trust on the medical facilities available near me within 2 hours of travel time	1	2	3	4	5
13	I don't trust emergency medical advice and facilities through telemedicine	1	2	3	4	5
14	Even if I am earning sufficient here, it will not be useful in getting proper medical help when needed due to distant location	1	2	3	4	5
15	I fear organ theft while my treatment in nearby hospitals	1	2	3	4	5

16	There are often shortages of medical supplies of health facilities in the nearby hospitals and dispensaries.	1	2	3	4	5
17	I am afraid I might catch some disease that can't be treated by the nearby hospital	1	2	3	4	5
18	The doctors available here are lesser qualified and experienced	1	2	3	4	5
19	The doctors available here do not attend to the patients well.	1	2	3	4	5
20	We have social events that keep us engaged	1	2	3	4	5
21	Watching movies is difficult due to the long distance from theatres	1	2	3	4	5
22	Lesser social events/gatherings make our life boring	1	2	3	4	5
23	I feel that more recreational activities are needed in our locality	1	2	3	4	5
24	My kids feel disheartened because of lack of parks/green areas	1	2	3	4	5
25	We don't feel a lack of park availability due to a lot of green areas.	1	2	3	4	5
26	My leisure time is not well used due to poor internet connectivity	1	2	3	4	5
27	I feel bad due to the lack of social centres like shopping malls, markets, restaurants etc.	1	2	3	4	5
28	I am not motivated to work in my workspace due to constant pressure from my superiors	1	2	3	4	5
29	I want to change/quite my works but am unable to do so due to my responsibilities	1	2	3	4	5
30	I feel exhausted returning to my home from the workspace and unable to spend time with my family	1	2	3	4	5
31	My colleagues don't treat me well	1	2	3	4	5
32	My relationship with my family is worsening due to long work hours	1	2	3	4	5
33	I have to work for long hours with lesser pay.	1	2	3	4	5
34	My work allows me to learn new things and encourages me to explore	1	2	3	4	5
35	I find it hard to adapt to new technologies/challenges in my work.	1	2	3	4	5
36	The work environment in my workspace is badly affected due to COVID-19 pandemic.	1	2	3	4	5
37	I am worried about missing out on vaccines, insurance or other essentials/government policies due to lack of technology	1	2	3	4	5
38	I will not go to the hospital for a checkup of COVID-19 pandemic since there are more chances of getting affected	1	2	3	4	5
39	I feel depressed due to COVID-19 pandemic and having missed out on social interactions recently.	1	2	3	4	5
40	I am worried that vaccines may not be sufficient to protect me during COVID-19 pandemic	1	2	3	4	5

41	I fear going to work due to the threats of COVID-19 pandemic	1	2	3	4	5
42	Discussions related to COVID-19 pandemic make me feel threatened	1	2	3	4	5
43	I don't watch the news on TV/read newspapers due to a lot of COVID-19 pandemic related news	1	2	3	4	5
44	The nearby medical supplies will be insufficient to treat severe COVID-19 positive cases	1	2	3	4	5
45	I am constantly stressed about losing my job due to COVID-19 pandemic	1	2	3	4	5
46	I am not happy with the work-from-home mode of working during the COVID-19 pandemic	1	2	3	4	5

This is the Google form used to survey the target population sample, whose responses are contained in the response sheet.

9.2 Appendix B

Table 5: **Regression of Mental Health Scores on Independent Variables (Remoteness and other predictors) for Category-wise residents using the OLS method**

Variables	Depression		Anxiety		Stress	
	Beta	p	Beta	p	Beta	p
IIT Mandi - Students						
Remoteness	-0.007	0.96	0.201	0.113	0.135	0.28
Medical Facilities	-0.058	0.642	0.024	0.843	-0.041	0.73
Recreation	0.106	0.422	0.049	0.7	0.072	0.568
Nature of work	0.268	0.032	0.169	0.159	0.167	0.161
Covid-19 Pandemic	0.175	0.168	0.17	0.165	0.266	0.03
IIT Mandi - Staff						
Remoteness	0.701	0.118	0.402	0.519	0.612	0.289
Medical Facilities	-1.094	0.054	-0.692	0.349	-1.255	0.095
Recreation	0.348	0.354	0.185	0.747	0.407	0.438
Nature of work	-0.402	0.286	-0.223	0.694	-0.035	0.943
Covid-19 Pandemic	1.095	0.018	0.968	0.102	0.9	0.089
IIT Mandi - Faculty						
Remoteness	0.192	0.771	0.52	0.435	0.38	0.546
Medical Facilities	0.363	0.69	0.073	0.935	0.753	0.395
Recreation	-0.188	0.801	-0.192	0.794	-0.686	0.348
Nature of work	-0.252	0.631	0.117	0.82	0.09	0.855
Covid-19 Pandemic	-0.365	0.585	-0.474	0.477	-0.657	0.314

IIT Mandi - Community						
Remoteness	0.021	0.866	0.201	0.091	0.142	0.232
Medical Facilities	-0.142	0.239	-0.057	0.625	-0.123	0.295
Recreation	0.081	0.515	0.042	0.73	0.057	0.637
Nature of work	0.221	0.047	0.17	0.115	0.166	0.125
Covid-19 Pandemic	0.211	0.071	0.167	0.141	0.247	0.031
Rural Residents						
Remoteness	0.658	0.252	0.469	0.502	0.092	0.899
Medical Facilities	-0.248	0.613	0.065	0.914	0.102	0.871
Recreation	-0.673	0.172	-0.67	0.266	-0.001	0.999
Nature of work	0.567	0.119	-0.08	0.852	-0.292	0.517
Covid-19 Pandemic	0.524	0.154	0.669	0.144	0.513	0.272
Urban Residents						
Remoteness	0.04	0.964	-0.694	0.467	-0.203	0.828
Medical Facilities	0.216	0.804	0.35	0.706	0.147	0.874
Recreation	-0.142	0.841	0.317	0.675	0.214	0.776
Nature of work	-0.264	0.684	0.51	0.467	0.063	0.926
Covid-19 Pandemic	0.604	0.488	0.008	0.993	0.288	0.751