Behavioural Research Statistical Methods

Project Report

Analysing Social and Psychological Effect of the Covid-19 Pandemic in Turkey

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Contents

1 Introduction

The COVID-19 pandemic, originating in Wuhan, China, in December 2019, swiftly spread across the globe, impacting societies and economies in unprecedented ways. Among the countries affected, Turkey stands out as one that faced unique challenges and experiences during this global crisis. As the virus reached Turkish shores on March 10, 2020, it brought with it not only medical challenges but also profound social and psychological effects on its population.

Understanding the multifaceted impact of the COVID-19 pandemic on Turkish society requires a comprehensive analysis that delves into its social and psychological dimensions. This study aims to explore the intricate interplay between the pandemic and the social fabric of Turkey, shedding light on how individuals and communities have coped with the challenges imposed by the crisis.

At the heart of this investigation lies a dataset compiled from a survey conducted on a sample of 2,817 Turkish adults aged 18 to 65 and older. This dataset offers a rich source of information, encompassing demographic factors such as location, income, employment status, and family background. Additionally, it delves into individuals' responses regarding their experiences during different phases of the pandemic, captured across four waves of data collection.

Through the formulation and testing of hypotheses, this study aims to uncover significant relationships and patterns within the data. By employing statistical tests such as the Chi-square test, Mann-Whitney U test, and Kruskal-Wallis test, the study seeks to discern meaningful associations between variables and identify factors that may influence individuals' responses to the pandemic.

Ultimately, this research endeavors to contribute to a deeper understanding of the social and psychological impact of the COVID-19 pandemic in Turkey. By elucidating the intricate interplay between demographic factors, emotional states, and societal perceptions, it aims to provide valuable insights for policymakers, public health officials, and researchers seeking to mitigate the effects of future crises and promote societal well-being.

2 Literature Review

The literature on the social and psychological effects of the COVID-19 pandemic provides a comprehensive understanding of the multifaceted impact of the crisis on individuals and communities worldwide. Studies have documented disruptions to daily life, increased social isolation, and changes in behaviors such as heightened concerns about personal hygiene and stockpiling. Moreover, research has highlighted the psychological toll of the pandemic, with elevated levels of stress, anxiety, and post-traumatic stress symptoms reported among affected populations. Resilience and coping mechanisms, including the importance of social support networks and access to mental health resources, have emerged as crucial factors in mitigating the adverse effects of the crisis. Furthermore, context-specific studies have underscored the need for region-specific research to understand the unique experiences and challenges faced by different populations. Through a synthesis of existing literature, this review aims to provide insights into the social and psychological dynamics of the pandemic, shedding light on strategies for promoting resilience, well-being, and recovery in the post-pandemic era.

2.1 Social Effects of the COVID-19 Pandemic

Disruptions to Daily Life and Increased Social Isolation: Studies have documented changes in employment patterns, economic instability, disruptions to social interactions, and heightened feelings of social isolation and loneliness, particularly among vulnerable populations such as the elderly and those with pre-existing mental health conditions (Holmes et al., 2020; Loades et al., 2020).

2.2 Behavioral Changes

Heightened Concerns about Personal Hygiene and Stockpiling Behaviors: The pandemic has led to increased emphasis on personal hygiene practices, frequent handwashing, and sanitization, alongside changes in consumption patterns such as stockpiling of essential goods, driven by psychological factors such as fear and uncertainty (Brooks et al., 2020; Garfin et al., 2020).

2.3 Psychological Impact

Elevated Levels of Stress, Anxiety, and Post-Traumatic Stress Symptoms: Research has documented elevated levels of stress, anxiety, and depression among affected populations, with factors such as fear of infection, social isolation, exposure to distressing media coverage, and traumatic experiences related to the pandemic contributing to adverse mental health outcomes (Xiong et al., 2020; Cao et al., 2020).

2.4 Resilience and Coping Mechanisms

Importance of Social Support and Access to Mental Health Resources: Studies have highlighted the crucial role of social support networks and access to mental health resources and services in promoting resilience, adaptive coping strategies, and well-being in the face of adversity (Mancini Bonanno, 2009; Prime et al., 2020).

2.5 Context-Specific Studies

Need for Region-Specific Research and Insights from Regional Studies: While much of the existing literature has focused on the global impact of the pandemic, there is a growing recognition of the importance of context-specific studies to understand the unique experiences and challenges faced by different populations. Studies examining the social and psychological effects of the pandemic in specific regions, such as Turkey, can provide valuable insights into the dynamics of crisis response, societal resilience, and the role of cultural factors in shaping individual and collective outcomes.

3 Purpose of study

The purpose of this study is to comprehensively analyze the social and psychological effects of the COVID-19 pandemic on the Turkish population. By leveraging a rich dataset compiled from a survey of 2,817 Turkish adults across four waves of data collection, the study aims to explore the multifaceted impact of the pandemic on individuals' behaviors, attitudes, and emotional well-being. Through hypothesis testing and statistical analysis,

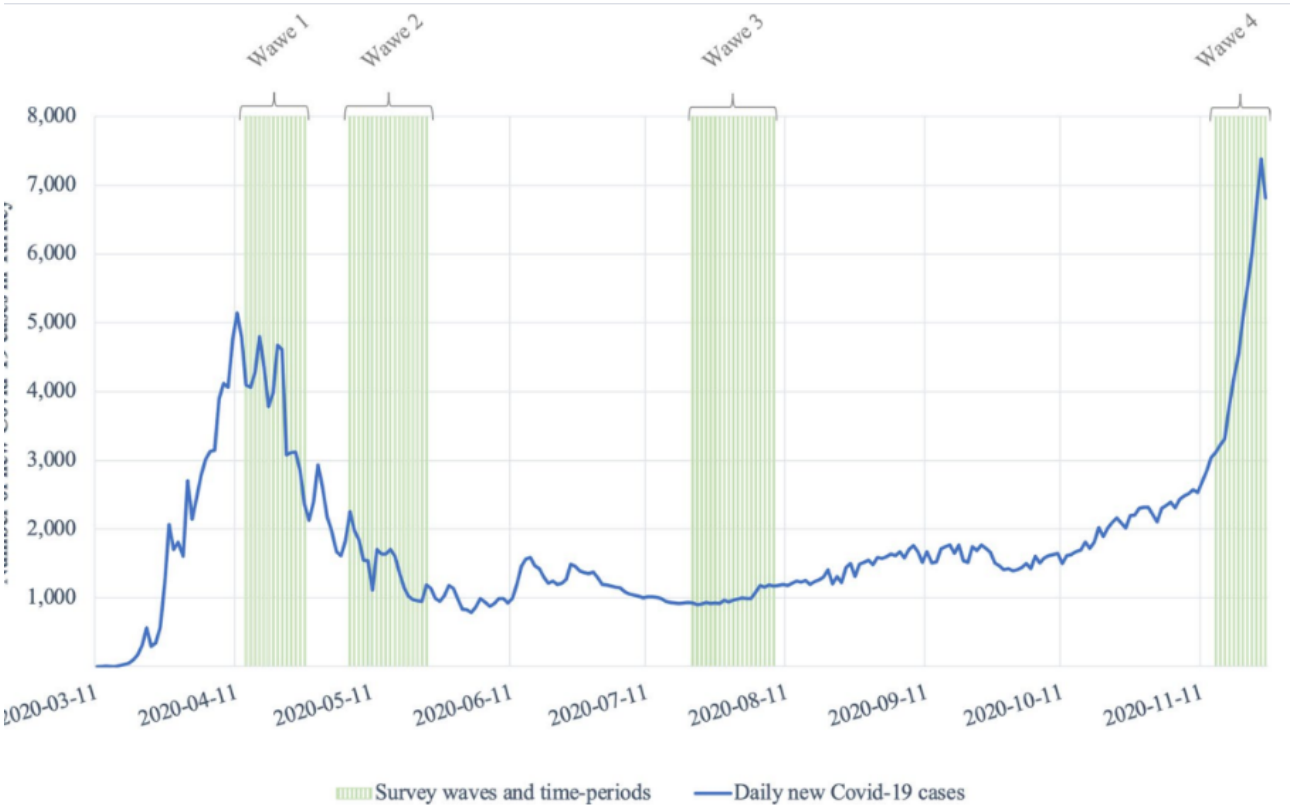


Figure 1: Data demographics

the study seeks to uncover significant relationships between demographic factors, pandemic experiences, and psychological outcomes, providing valuable insights that can inform public health interventions, policy decisions, and future research endeavors aimed at promoting societal resilience and well-being amidst crises.

4 Methods

4.1 Data Preparation

4.1.1 Data selection

The raw dataset and the information related to it were obtained from (https://data.mendeley.com/datasets/sv95c7ydpy/9) The dataset comprising responses from 2,817 individuals offers a comprehensive snapshot of the diverse demographic landscape amidst the COVID-19 pandemic. Capturing insights from adults aged 18 to 65 and beyond, the dataset encompasses a wide array of socio-economic variables including location, income, employment status, occupation, and family structure. By incorporating such a broad range of demographic factors, the dataset enables nuanced analyses regarding how different segments of the population have been affected by the pandemic.

	Population	Sample size
Total population of Turkey	80,810,525	
Above 15-year-old population	62,100,651	
Total survey participation		**2,817**
Survey waves		
Wave 1: *April 13–26*		1,124
Wave 2: *May 6–23*		975
Wave 3: *July 20 - August 8*		515
Wave 4: *November 14–25*		203

Figure 2: Data stats

Moreover, the inclusion of gender identity and marital status allows for an exploration of potential disparities and inequalities in the impact and response to the crisis.

The survey's four waves, strategically timed to coincide with key moments in the pandemic's trajectory, offer valuable temporal insights into public sentiment and behavior. From the initial peak of COVID-19 cases to subsequent periods of decline and resurgence, each wave provides a unique perspective on how individuals have adapted and responded to evolving circumstances. By contextualizing responses within these temporal frames, researchers can discern patterns, trends, and shifts in attitudes and behaviors over time, shedding light on both short-term responses and longer-term adaptations to the ongoing challenges posed by the pandemic.

4.1.2 Data preprocessing

In preprocessing the dataset for analysis, several steps were undertaken to ensure that the data is appropriately structured and ready for statistical modeling. One key transformation involved converting the continuous variable 'Age' into categorical levels to facilitate analysis. The age groups were defined as <20, <=34, <=44, <=54, <=64, and 65+, enabling the segmentation of the population based on age cohorts. This categorical representation offers a clearer understanding of how different age groups may have been impacted by the COVID-19 pandemic. Additionally, categorical variables such as 'Marital Status,' 'Sex,' 'Working Sector,' 'Working Situation,' and 'Occupation' were already mapped to integer values, simplifying further analysis. Similarly, ordinal

variables like 'Education,' 'Mother-Education,' 'Income,' and 'Previous Year Income' were treated as such, acknowledging the inherent order within these variables. Questions with binary responses, such as 'Stockpiling,' 'Diagnosed with Chronic Illness,' and 'Diagnosed with COVID-19,' were encoded as categorical variables with 'Yes/No' values.

Ordinal variables relating to personal behaviors and beliefs, such as 'Personal Security Concern,' 'Belief on Government for People Security,' 'Change in Hygiene Habits,' and 'Usage of Credit/Debit Card,' were encoded with ordinal values reflecting the intensity of the response, ranging from 'Increased a Lot' to 'Decreased a Lot.' Furthermore, the State-Trait Inventory and distress tolerance questions, totaling 20 and 10 respectively, were treated as ordinal variables with response options indicating varying levels of trait or state characteristics.

By preprocessing the dataset in this manner, it becomes structured and standardized, laying the groundwork for subsequent statistical analyses to uncover insights into the complex interplay between demographic factors, personal behaviors, and attitudes during the COVID-19 pandemic.

4.2 Hypotheses

4.2.1 Hypothesis 1

H0 (Null Hypothesis): There is no significant relationship between individuals or household members being diagnosed with COVID-19 and changes in personal cleaning behavior, online spending habits, or stockpiling behavior. H1 (Alternative Hypothesis): There is a significant relationship between individuals or household members being diagnosed with COVID-19 and changes in personal cleaning behavior, online spending habits, or stockpiling behavior.

Statistical Test:

Chi-Square Test of Independence: This test is used to determine whether there is a significant association between two categorical variables. In this case, it will assess whether there is a relationship between being diagnosed with COVID-19 and changes in personal cleaning behavior, online spending habits, or stockpiling behavior. Mann-Whitney-U Test: This non-parametric test is used to compare two independent groups when the dependent variable is ordinal. In this case, it can be applied to assess the relationship between being diagnosed with COVID-19 and ordinal variables such as changes in stockpiling behavior and personal hygiene behavior.

Findings:

The Chi-Square Test of Independence revealed a significant relationship between being diagnosed with COVID-19 and changes in stockpiling behavior and personal hygiene behavior. However, the Mann-Whitney-U Test did not indicate a significant relationship or difference in online spending habits based on COVID-19 diagnosis.

4.2.2 Hypothesis 2

- H0 (Null Hypothesis): There is no significant relationship between demographic factors (age, marital status, sex, urban/rural) and self-rated health status given by the patients. - H1 (Alternative Hypothesis): There is a significant relationship between demographic factors (age, marital status, sex, urban/rural) and self-rated health status given by the patients.

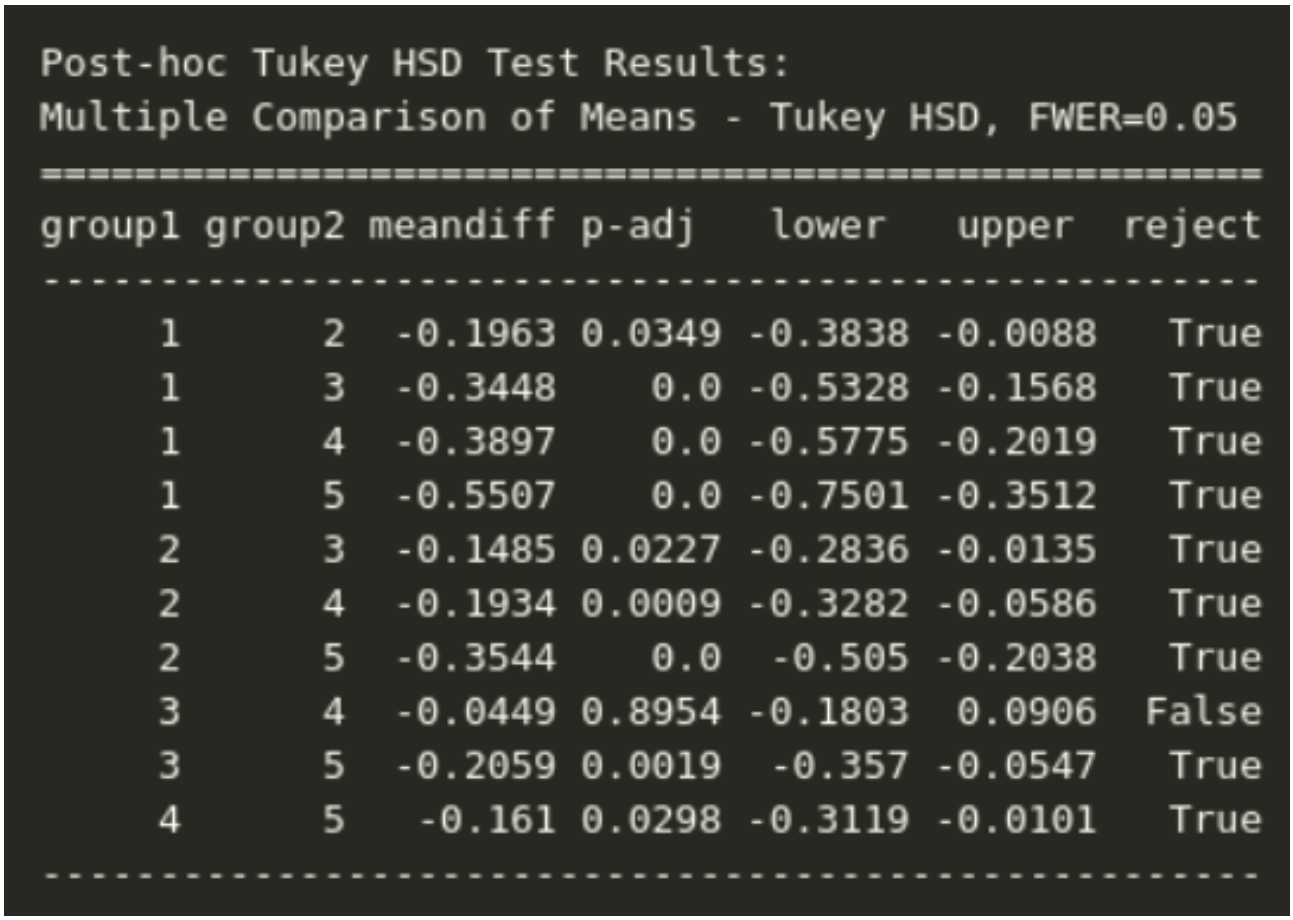
	Variable	Chi2	p-value	Dof	
0	sto_n	6.088586	0.013606	1	significant,
1	hyg_n	18.903093	0.000821	4	significant,
2	int_n	6.707053	0.152203	4	not significant, fai

	Variable	Stats	p-value	
0	sto_n	171535.5	0.010212	significant,
1	hyg_n	149924.5	0.645847	not significant, fai
2	int_n	141846.0	0.154336	not significant, fai

Figure 3: Hypothesis 1

	factor	p-value	Result
0	age_n	1.728047e-12	Reject H0
1	sex_n	2.280859e-17	Reject H0
2	mar_n	1.829332e-12	Reject H0
3	urb_n	7.376307e-01	Fail to reject H0
4	edu_n	1.448996e-07	Reject H0
5	med_n	1.940519e-02	Reject H0
6	iin_n	6.273135e-23	Reject H0
7	hin_n	1.999993e-14	Reject H0
8	hom_n	1.543757e-09	Reject H0

Figure 4: Hypothesis 2



Post-hoc Tukey HSD Test Results:
Multiple Comparison of Means - Tukey HSD, FWER=0.05

group1	group2	meandiff	p-adj	lower	upper	reject
1	2	-0.1963	0.0349	-0.3838	-0.0088	True
1	3	-0.3448	0.0	-0.5328	-0.1568	True
1	4	-0.3897	0.0	-0.5775	-0.2019	True
1	5	-0.5507	0.0	-0.7501	-0.3512	True
2	3	-0.1485	0.0227	-0.2836	-0.0135	True
2	4	-0.1934	0.0009	-0.3282	-0.0586	True
2	5	-0.3544	0.0	-0.505	-0.2038	True
3	4	-0.0449	0.8954	-0.1803	0.0906	False
3	5	-0.2059	0.0019	-0.357	-0.0547	True
4	5	-0.161	0.0298	-0.3119	-0.0101	True

Figure 5: Hypothesis 4

Statistical Test: - Kruskal-Wallis Test: This non-parametric test is used to compare three or more independent groups when the dependent variable is ordinal or continuous, but the data do not meet the assumptions of normality required for parametric tests. In this case, it will assess the relationship between demographic factors and self-rated health status. - Shapiro-Wilk Test: This test is used to assess the normality of variables. Since the variables (age, urban/rural, marital status, sex, education, income, previous income, etc.) do not exhibit normal distribution, the Kruskal-Wallis Test is chosen. - Post hoc Test: After finding significant results from the Kruskal-Wallis Test, post hoc tests can be performed to determine which specific groups for each demographic factor differ significantly from each other in terms of self-rated health status.

Findings: - The Kruskal-Wallis Test revealed a significant relationship between self-rated health status and at least one demographic factor (age, marital status, sex, urban/rural). - Post hoc tests can be performed to identify specific demographic groups that differ significantly from each other regarding self-rated health status.

4.2.3 Hypothesis 4

- H0 (Null Hypothesis): There is no significant difference in the mean perception scores of the consequences of COVID-19 on personal security (dan) among individuals with different perceptions of the adequacy of state protection of individual and community security during the COVID-19 pandemic (gov). - H1 (Alternative Hypothesis): There is a significant difference in the mean perception scores of the consequences of COVID-19 on personal security (dan) among individuals with different perceptions of the adequacy of state protection of individual and community security during the COVID-19 pandemic (gov).

Statistical Test: - One-Way ANOVA (Analysis of Variance): This parametric test is performed for comparing mean perception scores across multiple levels of the independent variable (gov). It determines if there are significant differences in perceptions of personal security among individuals with different perceptions of state protection adequacy during the COVID-19 pandemic.

ANOVA Test Results: - F-statistic: 18.83 - P-value: 2.72e-15

Post-hoc Test: - Tukey Honestly Significant Difference (HSD) Test: This test is used after ANOVA to determine specific differences between groups when there are significant differences found. It provides insights into the specific groups that differ significantly in terms of their perception scores of the consequences of COVID-19 on personal security.

Findings: - The ANOVA test resulted in a significant difference in perception scores among individuals with different perceptions of state protection adequacy (gov) during the COVID-19 pandemic. - The post-hoc Tukey HSD test can be conducted to identify the specific differences between groups and provide further insights into the differences in perception scores.

5 Results

5.1 Normality Testing and Statistical Tests Selection

Normality tests were conducted for variables such as age, urban/rural divide, marital status, sex, education, income, and previous year income. Since these variables did not follow a normal distribution, non-parametric tests like Kruskal-Wallis and Mann-Whitney U tests were chosen for hypothesis testing.

For categorical variables like working situation and sector, the Chi-square test of independence was selected to analyze differences across survey waves.

5.2 Hypothesis results (performed by me)

5.2.1 Relationship between COVID-19 Diagnosis and Behavioral Changes

Stockpiling Behavior and Personal Hygiene: Our analysis revealed a significant relationship between being diagnosed with COVID-19 and changes in stockpiling behavior and personal hygiene. Individuals diagnosed with COVID-19 reported higher levels of stockpiling behavior and greater emphasis on personal hygiene practices

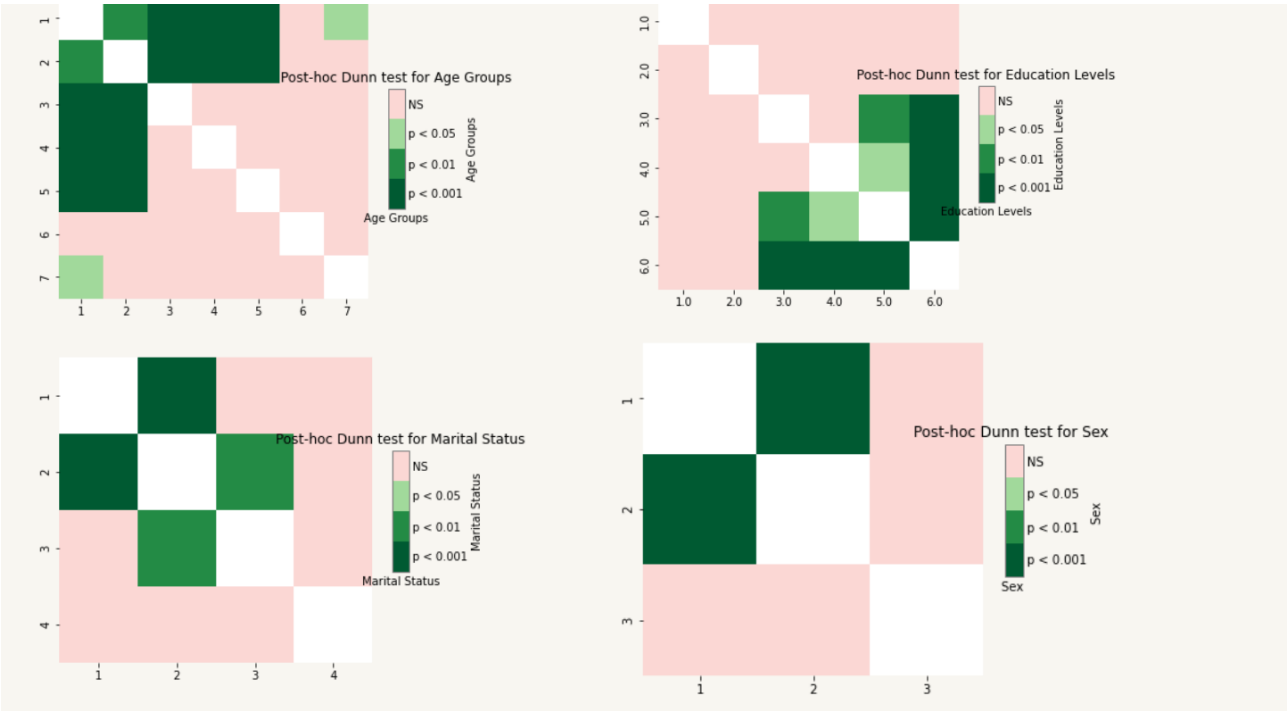


Figure 6: Hypothesis 2 result

compared to those without a diagnosis. However, no significant relationship was found between COVID-19 diagnosis and online spending habits.

5.2.2 Relationship between Demographic Factors and Self-Rated Health Status

Age, marital status, gender, and urban/rural divide were examined for their relationship with self-rated health status. Kruskal-Wallis tests revealed significant associations between these demographic factors and individuals' self-rated health status, indicating that age, marital status, gender, and urban/rural divide influence how individuals perceive their health.

5.2.3 Perception of Personal Security and Government Protection Adequacy

One-way ANOVA tests were conducted to examine the differences in perception scores of personal security among individuals with varying perceptions of government protection adequacy during the COVID-19 pandemic. Results indicated a significant difference in perception scores, suggesting that individuals' views on government protection adequacy influenced their perception of personal security during the pandemic.

5.3 Hypothesis results (performed by teammates)

Relationship between Emotional States and Overall Well-being: Spearman correlation analysis and multiple linear regression were employed to explore the relationship between individuals' emotional states and overall

well-being. Positive emotions such as feeling happy and comfortable exhibited a significant positive correlation with self-rated health, while negative emotions such as feeling nervous and being in a bad temper showed a significant negative correlation.

Differences in Emotional States between Different Waves of COVID-19: Man-Whitney U tests were utilized to compare emotional states between different waves of COVID-19. Results revealed significant differences in the distribution of emotions between waves, indicating that individuals' emotional experiences varied across different phases of the pandemic.

Distress Tolerance Levels across Survey Waves: Kruskal-Wallis tests were conducted to assess differences in distress tolerance levels across the four survey waves. Significant differences were observed, suggesting variations in distress tolerance levels over time during the pandemic.

Changes in Working Situations and Sectors across Survey Waves: Chi-square tests were employed to examine changes in working situations and sectors across survey waves. Significant differences were found between wave 1 and wave 2 but not between subsequent waves, indicating fluctuations in working situations and sectors during the early stages of the pandemic.

Usage of Credit/Debit Cards and Online Spending Habits among Urban and Rural Populations: Mann-Whitney U tests were conducted to compare the usage of credit/debit cards and online spending habits between urban and rural populations. Results revealed no significant differences between urban and rural populations in terms of credit/debit card usage or online spending habits.

6 Discussion

The findings of this study shed light on the complex interplay between the COVID-19 pandemic and various social and psychological factors in Turkey. The significant relationship observed between COVID-19 diagnosis and changes in stockpiling behavior and personal hygiene underscores the profound impact of the pandemic on individuals' behaviors and attitudes. Furthermore, the associations between demographic factors and self-rated health status highlight the importance of considering sociodemographic characteristics in understanding individuals' perceptions of their health during crises. The correlations between emotional states and overall well-being emphasize the intricate link between mental health and subjective health assessments, pointing to the need for holistic approaches to health interventions. Moreover, the disparities in perception of personal security among individuals with different views on government protection adequacy underscore the role of trust in public institutions in shaping individuals' sense of security during crises. Overall, these findings contribute to a deeper understanding of the social and psychological dynamics of the pandemic in Turkey, informing efforts to address the diverse needs and challenges faced by individuals and communities in times of crisis.

7 Conclusions

In conclusion, this study provides valuable insights into the social and psychological effects of the COVID-19 pandemic in Turkey. Through rigorous analysis of a comprehensive dataset, we have identified significant relationships between COVID-19 diagnosis and behavioral changes, demographic factors and self-rated health status, emotional states and overall well-being, and perceptions of personal security amid varying levels of government protection adequacy. These findings highlight the multifaceted nature of the pandemic's impact, underscoring the importance of considering both individual and contextual factors in understanding and addressing the challenges faced by Turkish society. By elucidating these dynamics, this study contributes to the growing body of knowledge on pandemic responses and resilience, informing targeted interventions and policy initiatives aimed at promoting societal well-being and recovery in the aftermath of the crisis. Moving forward, continued research and collaboration are essential to effectively address the ongoing and future challenges posed by global health crises.

8 Acknowledgements and Supplementary materials

I extend my heartfelt gratitude to all the teammates who generously shared their time and insights for this study Abhishek Sharma, Tarun Jindal. Their contributions are invaluable in advancing our understanding of the social and psychological effects of the COVID-19 pandemic in Turkey. We also express our appreciation to the researchers and institutions involved in collecting and making the dataset available, as well as to our colleagues and mentors for their guidance and support throughout this research endeavor.

The supplementary materials for this study, including detailed statistical analyses, additional tables, and figures, can be requested from authors. These supplementary materials provide comprehensive insights into the methodologies employed and the results obtained, facilitating a deeper understanding of the findings presented in the main report.