

RESEARCH ARTICLE

The role of demographic characteristics on mental health disorders among Turkish construction workers

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Abstract

The construction sector is one of the cornerstones of economic development around the world, and it is the small and medium-sized construction companies working in this sector that are the driving force behind this economic growth. While many factors affect the project performance of these companies, one of these factors is thought to be the mental health status of the workers. In this context, the aim of this research is to examine the mental health disorders of workers in small and medium-sized construction companies. The research aims to evaluate various demographic factors that may affect the mental health of workers and to suggest appropriate strategies. The study was carried out using a quantitative method and the data was obtained from surveys conducted among Turkish construction workers in SMEs. The survey form, consisting of a total of 31 questions, was administered to 216 randomly selected construction workers in SMEs. As data analysis methods, ANOVA statistical methods and t-tests were used to examine the relationship between mental health disorders such as depression, anxiety, and stress and demographic variables. It was found that the participants' living area affected the group average level of depression, but did not affect the group's average levels of stress and anxiety. Finally, it was found that the depression scores of the participants living on the construction site were higher than those of the participants living in the apartment. It was also found that the chronic illness status of the participants affected the group's average level of anxiety, while stress and depression did not affect the group's average level. We also found that the anxiety scores of participants with chronic illnesses were higher than those of participants without chronic illnesses.

1. Introduction

Today, the construction sector is one of the cornerstones of economic development around the world, and small and medium-sized construction companies operating in this sector stand out as the driving force behind this economic growth [1]. Small and medium-sized construction enterprises

(SMEs) play a crucial role in the economic and social development of a country. They are often key players in revitalising local economies, creating jobs and promoting regional development. Small and medium-sized construction companies also develop the country's basic infrastructure systems such as transport, energy, water and communications through infrastructure projects [2].

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On the other hand, construction workers in these SMEs face many challenges on a daily basis. High levels of stress, physical fatigue, uncertainty and constantly changing working conditions are among the factors that can negatively affect workers' mental health [3]. The dynamic nature of construction work, characterised by evolving job demands and hazards, highlights the complex environment of the construction industry [4]. Effectively addressing the mental health wellbeing of workers in SMEs is an important issue, and can improve both job and project performance in construction.

The mental health status of construction workers is a critical issue due to several factors highlighted in the literature. Construction workers face challenges such as job insecurity, financial problems, low socio-economic status and marital problems, all of which have been identified as risk factors for mental health problems [5, 6]. The nature of the construction industry, with its dynamic and stressful environment, exposes workers to workplace stress, poor mental health and a high prevalence of psychological distress [7]. Research suggests that several factors such as job stress, burnout and work-related stressors influence the mental health of construction workers [8, 9]. Improving the mental health of construction workers is critical to their overall wellbeing and productivity. Addressing issues such as acculturation stress, job satisfaction and social status can have a positive impact on the mental health of migrant workers in the construction industry [10]. However, none of the previous studies focused on the relationship between mental health disorders and demographic characteristics of construction workers in SMEs in Turkey. In other words, it is not well known how mental health disorders change according to the demographic characteristics of construction workers working for SMEs. Therefore, the main aim of the current research is to assess the importance of demographic characteristics on mental health disorders among Turkish construction workers. It is hoped that this research will contribute to a better understanding of the mental wellbeing of construction workers in

SMEs. It may also provide an important reference point for practitioners in the construction sector, helping to put relevant strategies and policies into practice. Furthermore, the implementation of evidence-based mental health programmes and the promotion of collaboration between mental health professionals and other stakeholders may lead to improved mental health outcomes in the construction sector [11]. We believe that the findings of this study could help decision makers to promote and improve the mental health status of construction workers.

2. Background

2.1. Challenges of SMEs in construction

SMEs in the construction sector face a number of challenges that affect their operations and growth. One major issue is the shortage of skilled workers, with SMEs in Dubai, UAE, facing a shortage of 500,000 skilled workers due to factors such as job dissatisfaction and inadequate support from top management [12]. In addition, the financial constraints faced by SMEs are of concern to policymakers and researchers worldwide, as these firms are critical to the private sector and are perceived to be financially constrained [13]. The impact of crises, such as the post-crisis period analysed in Turkey, particularly affects SMEs, which are considered essential for economic growth, innovation and job creation. Moreover, the challenges faced by SMEs extend to financing issues, as evidenced by studies on SME financing in emerging markets, where younger and smaller firms in non-manufacturing sectors face significant financing barriers and often rely heavily on internal financing [14]. Access to finance has been highlighted as a growth constraint for SMEs, emphasising the importance of addressing financial barriers to support their development [15]. In addressing these challenges, the role of management control, employee productivity and well-being, integrated information systems and financial resources becomes critical for the resilience of SMEs, especially in times of crisis such as the COVID-19 pandemic [16].

Research shows that SMEs also have higher security risks than larger companies, and find it difficult to control these risks [17]. Safety culture and the role of project managers are critical to improving safety performance in construction projects, particularly in SMEs. In terms of cost overruns, SMEs tend to have a lower safety margin compared to larger firms [18]. Contrary to the belief that cost overruns are smaller for small projects, studies have shown that they can be significant in SMEs, highlighting the need for effective cost management practices. Occupational health and safety management in SMEs, including those in the construction sector, is a critical area of concern. Studies have shown that the implementation of appropriate occupational health and safety systems in SMEs can significantly improve safety conditions [19]. However, there are challenges in implementing comprehensive safety management systems in SMEs due to resource constraints [20]. In summary, SMEs in the construction sector face a wide range of challenges, from skills shortages and financial constraints to issues of management control and access to finance. Addressing these challenges requires a comprehensive approach that takes into account the unique circumstances of SMEs in different regions and sectors in order to support their sustainability and growth.

2.2. Mental health status of construction workers

The physical working environment in construction is constantly changing, influenced by weather conditions and project phases, which affects worker productivity and safety [21]. The negative image of the construction industry, combined with challenging working conditions, discourages new entrants from entering the field [22]. Safety challenges in construction work require tailored interventions to address specific work environments and job conditions [23]. The Job Demands-Resources model emphasises the impact of employees' perceptions of the work environment on job demands and resources [24].

Factors contributing to mental health problems in the construction industry include job stressors,

workplace bullying, substance use and environmental risk perceptions. Studies have shown that construction workers are vulnerable to mental health problems due to the nature of their work environment, which can be physically demanding and stressful [25–28]. In addition, the prevalence of pain, injury and job insecurity in the construction industry may further exacerbate mental health problems among workers [6, 25]. Research has highlighted the importance of addressing job quality and adverse working conditions to improve the mental health of construction workers [10]. Studies have also highlighted the need for multi-level intervention strategies and policies to improve the psychological well-being of construction workers [6, 29]. Addressing the mental health status of construction workers requires a comprehensive approach that considers job stressors, workplace conditions, socioeconomic factors, and the impact of external events such as the COVID-19 pandemic. By implementing interventions that focus on improving job quality, addressing stressors, and promoting a supportive work environment, the construction industry can better support the mental well-being of its workforce.

Demographic characteristics play an important role in understanding different aspects of construction workers. Studies have shown that factors such as age, gender, nationality and lifestyle habits can influence the well-being, mental health, safety perceptions and productivity of construction workers [30–32]. For example, younger construction workers have been found to be at higher risk of work-related injuries [30], while migrant construction workers tend to be younger and work under more pressure compared to native workers [33]. In addition, individual characteristics such as age, obesity, alcohol consumption and sleep habits may affect the health of construction workers [31]. In addition, demographic factors have been associated with safety perceptions and safety citizenship behaviours among construction workers, suggesting that these factors may contribute to human errors leading to accidents. Furthermore, the physical demands and repetitive

nature of construction work expose workers to a higher risk of work-related disability compared to other industries [34]. On the other hand, previous studies have not focused on the influence of demographic characteristics on mental health disorders among construction workers. As construction workers in SMEs are a more disadvantaged group due to the working environment compared to other large companies, it is worth focusing on these groups to assess this relationship between demographic variables and mental wellbeing. Therefore, the main aim of this study is to understand the relationship between demographic characteristics and mental disorders in construction workers.

Understanding the demographic influences on the mental health status of construction workers is crucial for implementing targeted interventions to improve their wellbeing, safety and productivity. By taking into account factors such as age, nationality, lifestyle and health conditions, tailored strategies can be developed to address the specific needs of construction workers and create a safer and healthier working environment for them.

3. Research Methodology

This study was conducted to examine the relationship between demographic characteristics and mental health disorders of workers in small and medium construction companies. The study was conducted using quantitative method and the data were obtained from questionnaires administered to workers in SME construction companies in Istanbul province. All of them were working in building projects. The Depression, Anxiety, Stress Scale (DASS) proposed by Lovibond and Lovibond [35] was used to assess the mental health of workers. DASS measures depression, anxiety and stress with 7 seven questions of each item and total 21 questions in 5 Likert scale form. In addition, the demographic characteristics such as living area, tobacco use, working area, experience, age, marital status, chronic diseases, working hours per week, income were included in the survey. The

questionnaire, consisting of a total of 31 questions, was administered to 216 people randomly selected from the target group. Participation in the research was voluntary and ethical approval was obtained from the University Ethics Committee.

The normality assumption of the general scales was evaluated by examining the Q-Q graphs, skewness, and kurtosis coefficients. This provides information to the choice of parametric or non-parametric test methods. After verifying the normal distribution of the variables, we examined the differentiation of group scores related to participant personal information. The independent sample t test was used to compare variables between two groups (e.g., married or unmarried, living in apartment or camp site, tobacco use) that met the normality assumption, while the ANOVA test was used for comparisons involving three or more groups (e.g., experience, income level, working hour per week). The tests were conducted using the total score of mental health disorders, which was derived from seven questions for each variable [35]. Post hoc tests were also utilized in this research to further investigate significant differences found in the primary analysis ANOVA. These tests are crucial in determining specific variations between groups that were not initially apparent (Fig. 1).

4. Results

The descriptive statistics reveal that out of the participants, 141 reside in apartments while 75 live on construction sites or campsites. Additionally, 145 participants reported smoking while the remaining did not. The study found that 55% of the participants were married and 79% had chronic illnesses. Furthermore, 73% of the construction workers who participated in the study were under 30 years old. Finally, 47% of the construction workers had more than 10 years of experience in construction (Table 1).

4.1. Independent t-test results

First, we checked the normality of the data set by looking at the skewness and kurtosis values.

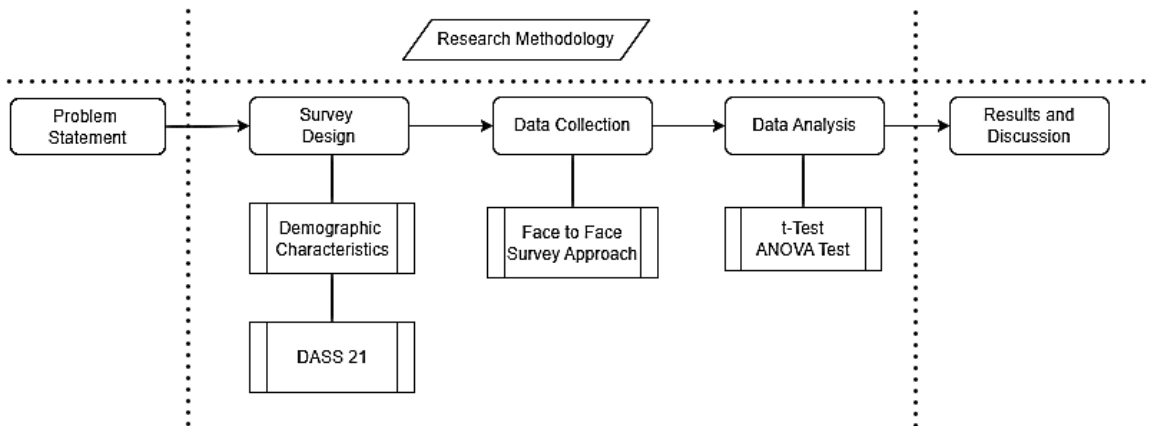


Fig. 1. Research workflow

Table 1. Descriptive statistics of respondents

Demographic Characteristics	Variable	N	Percentage(%)
Living Area	Apartment	141	65.28
	Labor Camp	75	34.72
Tobacco Use	Yes	145	67.13
	No	71	32.87
Marital Status	Married	120	55.56
	Unmarried	96	44.44
Chronic Illness	Yes	44	20.37
	No	172	79.63
Age (years)	Between 20-30	82	37.96
	Between 30-40	76	35.19
	Between 40-50	38	17.59
	More than 50	20	9.26
Experience (years)	Between 0-5	49	22.69
	Between 5-10	66	30.56
	Between 10-15	56	25.93
	More than 15	45	20.83
Income Level (per month)	12k-15k TL	54	25.00
	15k-18k TL	49	22.69
	18k-21k TL	58	26.85
	More than 21k	55	25.46
Occupation	Masonry	17	7.87
	Formworker	38	17.59
	Iron worker	38	17.59
	Fine Workmanship	65	30.09
	Façade	16	7.41
	Plumbing	16	7.41
	Other	26	12.04

For each mental disorder these values are between -3 and +3 (depression=1.874, anxiety=2.131 and stress=0.973), which shows that the dataset has a normal distribution and we used parametric test for our data analysis [36]. This section provides statistical information about the differences in mean scores among variables such as living space, smoking, marital status, chronic disease since these variables were measured in binary form (0=yes, 1=no).

The analysis results indicate a statistically significant difference ($p < 0.05$) in depression scores among participants based on their living area. However, there was no statistically significant

difference ($p > 0.05$) in stress and anxiety scores based on living area (Table 2). The study found no statistically significant difference ($p > 0.05$) in stress, depression, and anxiety scores between participants who smoked and those who did not (Table 3). The analysis revealed that there were no significant differences ($p > 0.05$) in stress, depression, and anxiety scores among participants based on their marital status (Table 4). The anxiety scores of the participants varied significantly based on chronic illness ($p = 0.027$). However, there was no significant difference in stress and depression scores between participants with and without chronic illness ($p > 0.05$) (Table 5).

Table 2. T-test results for living area

Mental Disorders	Living Area	N	\bar{X}	SS	t	p
Stress	Apartment	141	19.04	7.99	-1,929	0,055
	Labor Camp	75	21.17	7.29		
Depression	Apartment	141	19.39	8.90	-2,721	0,007
	Labor Camp	75	22.85	8.92		
Anxiety	Apartment	141	18.70	8.51	0,403	0,687
	Labor Camp	75	19.17	7.92		

N: number of participants; \bar{X} : Mean; SS: Standart Deviation; t: t value; p: significant value

Table 3. T-test results for tobacco use

Mental Disorders	Tobacco Use	N	\bar{X}	SS	t	p
Stress	Yes	145	19.15	7.72	-1,711	0,089
	No	71	21.07	7.86		
Depression	Yes	145	20.18	9.14	-0,960	0,338
	No	71	21.44	8.82		
Anxiety	Yes	145	18.51	8.10	-0,888	0,375
	No	71	19.58	8.69		

N: number of participants; \bar{X} : Mean; SS: Standart Deviation; t: t value; p: significant value

Table 4. T-test results for marital status

Mental Disorders	Marital Status	N	\bar{X}	SS	t	p
Stress	Married	120	19.98	7.83	0,432	0,666
	Unmarried	96	19.52	7.81		
Depression	Married	120	21.33	9.40	1,350	0,179
	Unmarried	96	19.67	8.51		
Anxiety	Married	120	19.42	8.16	1,102	0,272
	Unmarried	96	18.17	8.45		

N: number of participants; \bar{X} : Mean; SS: Standart Deviation; t: t value; p: significant value

Table 5. T-test results for chronic illness

Mental Disorders	Chronic Illness	N	\bar{X}	SS	t	p
Stress	Yes	44	21.64	7.47	1,779	0,077
	No	172	19.30	7.84		
Depression	Yes	44	21.18	9.60	0,484	0,629
	No	172	20.44	8.91		
Anxiety	Yes	44	21.32	6.99	2,223	0,027
	No	172	18.23	8.50		

N: number of participants; \bar{X} : Mean; *SS*: Standart Deviation; *t*: *t* value; *p*: significant value

4.2. ANOVA test results

The ANOVA test was used to compare mean scores of mental health disorders for three or more groups such as experience, income level, working hour per week, occupation. In addition, a post-hoc test was used to identify significant differences between two specific groups. In analysis of variance (ANOVA), a post-hoc test is used when the ANOVA shows that there are significant differences between group means, but does not tell us which specific groups are different. Post-hoc tests help to identify exactly which pairs of groups have significant differences in their means. In addition, post-hoc tests include adjustments (such as Bonferroni correction, Tukey's HSD, etc.) to control the overall Type I error rate, ensuring that the probability of making one or more Type I errors remains at the desired level (e.g. 0.05). Post-hoc tests are crucial in ANOVA analysis because they provide detailed insights into specific group differences that ANOVA alone cannot provide. They also ensure that the overall error rate is controlled, thereby maintaining the integrity of the statistical conclusions [37, 38].

The statistical analysis revealed significant differences in stress ($F=3.127$; $p=0.027$) and anxiety ($F=2.963$; $p=0.033$) scores among participants based on their age ($p<0.05$). Specifically, participants aged 50 and over had higher stress scores compared to other age groups, while those aged 30-40 had higher anxiety scores compared to other age groups (Table 6). The study found no statistically significant difference in

stress, depression, and anxiety scores between participants with different levels of experience ($p>0.05$). In other words, experience did not affect the group mean scores for stress, depression, and anxiety (Table 7). The study found statistically significant differences in stress ($F=3.544$; $p=0.015$) and anxiety ($F=3.604$; $p=0.014$) scores among participants based on their working hours ($p<0.05$). Specifically, participants working 40-45 hours per week reported higher stress and anxiety scores compared to those in other working hour groups. These results suggest that working hours may have an impact on stress and anxiety levels (Table 8). The analysis reveals statistically significant differences in stress ($F=7.638$; $p=0.000$), depression ($F=4.180$; $p=0.007$), and anxiety ($F=4.225$; $p=0.006$) scores among participants based on their age ($p<0.05$). Participants with an income of 12k-15k TL exhibit higher stress, depression, and anxiety scores than those with other income levels. We can determine that the income level of the participants had an impact on the group mean scores for stress, depression, and anxiety (Table 9). The analysis results also indicate that participants' stress ($F=3.171$; $p=0.005$), depression ($F=6.673$; $p=0.000$), and anxiety ($F=4.434$; $p=0.000$) scores differed significantly based on their occupation ($p<0.05$). Plumbers had higher anxiety scores than participants in other occupational groups. Additionally, construction workers in the 'other' category had higher stress and depression scores compared to other occupational groups (Table 10).

Table 6. ANOVA test results for age

Mental Disorders	Age (years)	N	\bar{X}	SS	F	p	Post-Hoc
Stress	Between 20-30	82	18.02	8.28	3,127	0,027	1→4
	Between 30-40	76	20.82	7.34			
	Between 40-50	38	19.74	7.46			
	More than 50	20	23.10	6.85			
Depression	Between 20-30	82	19.12	8.86	2,081	0,104	-
	Between 30-40	76	20.63	9.57			
	Between 40-50	38	21.74	8.65			
	More than 50	20	24.30	7.49			
Anxiety	Between 20-30	82	17.85	8.92	2,963	0,033	1→4
	Between 30-40	76	19.03	7.38			2→4
	Between 40-50	38	18.11	8.45			3→4
	More than 50	20	23.80	7.31			

N: number of participants; \bar{X} : Mean; *SS*: Standart Deviation; *F*: the ratio of two mean square values; *p*: significant value

Table 7. ANOVA test results for experience

Mental Disorders	Experience (years)	N	\bar{X}	SS	F	p	Post-Hoc
Stress	Between 0-5	49	19.59	7.79	0,576	0,631	-
	Between 5-10	66	19.82	7.62			
	Between 10-15	56	20.75	8.41			
	More than 15	45	18.71	7.40			
Depression	Between 0-5	49	19.27	9.35	0,558	0,643	-
	Between 5-10	66	21.24	8.77			
	Between 10-15	56	20.43	8.83			
	More than 15	45	21.29	9.46			
Anxiety	Between 0-5	49	17.67	8,00	0,703	0,551	-
	Between 5-10	66	19.61	8.25			
	Between 10-15	56	18.40	8.03			
	More than 15	45	19.64	9.04			

N: number of participants; \bar{X} : Mean; *SS*: Standart Deviation; *F*: the ratio of two mean square values; *p*: significant value

Table 8. ANOVA test results for working hour (per week)

Mental Disorders	Working Hour	N	\bar{X}	SS	F	p	Post-Hoc
Stress	40-45	71	21.92	7.76	3,544	0,015	1→2
	45-50	65	17.72	7.95			
	50-55	42	19.05	6.95			
	More than 55	38	20.11	7.75			
Depression	40-45	71	20.93	9.03	0,210	0,889	-
	45-50	65	19.85	9.63			
	50-55	42	20.86	8.38			
	More than 55	38	20.95	8.98			
Anxiety	40-45	71	21.30	8.96	3,604	0,014	1→2
	45-50	65	17.17	7.63			
	50-55	42	18.90	7.46			
	More than 55	38	17.16	8.12			

N: number of participants; \bar{X} : Mean; *SS*: Standart Deviation; *F*: the ratio of two mean square values; *p*: significant value

Table 9. ANOVA test results for income level

Mental Disorders	Income Level (per month)	N	\bar{X}	SS	F	p	Post-Hoc
Stress	12k-15k TL	54	23.30	8.00	7,638	0,000	1→3,4
	15k-18k TL	49	20.82	6.92			2→4
	18k-21k TL	58	18.24	7.54			
	More than 21k	55	17.02	7.31			
Depression	12k-15k TL	54	24.07	9.28	4,180	0,007	1→3,4
	15k-18k TL	49	20.57	9.00			
	18k-21k TL	58	19.31	8.26			
	More than 21k	55	18.55	8.85			
Anxiety	12k-15k TL	54	22.07	8.88	4,225	0,006	1→3,4
	15k-18k TL	49	18.61	7.61			
	18k-21k TL	58	18.03	7.50			
	More than 21k	55	16.80	8.38			

N: number of participants; \bar{X} : Mean; *SS*: Standart Deviation; *F*: the ratio of two mean square values; *p*: significant value

Table 10. ANOVA test results for occupation

Mental Disorders	Occupation	N	\bar{X}	SS	F	p	Post-Hoc
Stress	Masonry	17	18.47	5.94	3,171	0,005	
	Formworker	38	17.26	9.13			2→7
	Iron worker	38	17.79	5.90			3→7
	Fine Workmanship	65	21.60	7.39			
	Façade	16	17.88	10.41			
	Plumbing	16	20.00	6.81			
	Other	26	23.69	7.06			
Depression	Masonry	17	20.24	7.41	6,673	0,000	
	Formworker	38	16.58	8.12			2→4,7
	Iron worker	38	17.68	7.98			3→4,7
	Fine Workmanship	65	23.08	8.85			4→5
	Façade	16	15.75	8.19			5→7
	Plumbing	16	21.63	8.92			
	Other	26	27.08	8.58			
Anxiety	Masonry	17	19.53	8.76	4,434	0,000	
	Formworker	38	14.53	7.58			2→4,6
	Iron worker	38	16.42	8.18			3→4
	Fine Workmanship	65	21.51	7.63			
	Façade	16	18.63	10.16			
	Plumbing	16	22.88	8.64			
	Other	26	19.38	5.93			

N: number of participants; \bar{X} : Mean; *SS*: Standart Deviation; *F*: the ratio of two mean square values; *p*: significant value

5. Discussion

The study found a statistically significant difference in depression scores among participants based on where they lived ($p < 0.05$). However, there was no

statistically significant difference in stress and anxiety scores based on living area ($p > 0.05$). Specifically, participants living on the construction site had higher depression scores than those living in apartments. Workers living on construction sites

often live in cramped, unhygienic and dangerous conditions. This can lead to problems such as stress, sleep disturbance and social isolation, which can increase the likelihood of depression. In addition, social support is thought to have a significant positive impact on mental health. Employees who live in housing can develop closer relationships with their family and friends and receive more social support. It could be argued that people living on construction sites may experience a lower quality of life than those living in housing, which increases the risk of depression. Construction sites can often lead to a more stressful lifestyle due to factors such as noise, crowds and limited personal space. The lack of adequate social interaction and support at work can increase the likelihood of depression. A work-life imbalance can also contribute to an increased risk of depression. Intense work schedules, long working hours and difficulties in spending time with family could increase the likelihood of workers showing symptoms of depression. Working away from the family or not spending enough time with them can also increase the risk of depression. Palaniappan et al [39] conducted a study on the effectiveness of peer support in reducing depression, anxiety and stress among migrant construction workers in Singapore. The study found that workers with stronger social relationships experienced lower levels of anxiety and depression. Wu and Liu [40] reported that social support was effective in reducing stress and anxiety levels among construction workers. It is important to note that the study focused on the effect of social support on anxiety and stress levels of construction workers. We can interpret that the results of this study are consistent with previous research.

The study found a statistically significant difference in anxiety scores between participants with and without chronic conditions ($p < 0.05$). Participants with chronic conditions had higher anxiety scores, which is consistent with established research on the relationship between chronic conditions and anxiety. Many academic studies have examined the impact of chronic conditions on mental health [41–43]. These studies show that

chronic conditions have a detrimental effect on individuals' quality of life. They also show that mental health problems, such as depression and anxiety, are more common in people with chronic conditions. It is important to note that there is a complex relationship between physical and mental health problems. Physical illness can be a significant risk factor for mental health.

The study results suggest that participants aged 50 and over have higher levels of stress, depression and anxiety compared to other age groups. This finding may have implications for the levels of mental health disorders in older workers. This finding suggests that age is an important factor in mental health. In particular, life experiences, family responsibilities, work pressures and career stages may affect stress and anxiety levels in middle-aged and older people. In addition, balancing work and family life can be challenging for people in this age group, leading to increased levels of stress and anxiety. Some previous studies suggest that stress and anxiety levels may increase with age [44–46]. Increasing responsibilities with age, such as caring for children, elderly parents and work stress, may contribute to higher levels of stress and anxiety, and the incidence of chronic health problems tends to increase with age, which may also lead to stress and anxiety. On the other hand, young age has been identified as a significant factor in the prevalence of mental health disorders among construction workers. Studies have shown that young construction workers face unique challenges that contribute to mental health problems. Factors such as workplace bullying, substance use, poor psychosocial job quality, and exposure to stressful working conditions have been associated with mental health problems in this population [47, 48]. In addition, the 'masculine' culture of the construction industry and the pressures associated with it, particularly for apprentices and new entrants, can exacerbate mental health problems in young workers [47]. Studies have also shown that young adults are more affected by their work environment in terms of mental health than older colleagues [49].

The results also show that low income is significantly associated with mental health disorders in construction workers. The levels of mental health disorders (e.g. depression, anxiety and stress) are higher among construction workers with lower incomes compared to other workers. Studies have shown that financial strain, socio-economic status and work-related factors play a crucial role in the relationship between income and depression [50–52]. While there is a clear link between low income and depression, it is important to consider other confounding variables such as demographic, social and economic characteristics when examining this relationship [53]. Research has also shown that mental illness is more prevalent among people with low incomes [54]. Furthermore, a positive correlation has been found between income and mental health, suggesting that better mental health outcomes are associated with higher income levels [50]. On the other hand, While stress can lead to burnout and work-family conflict, negatively affecting job performance [55], it can also serve as a motivating factor that enhances job performance [56]. The construction industry, known for its demanding nature and tight schedules, often exposes workers to high levels of stress [57].

A significant association has also been found between occupation and mental health disorders in construction workers. In this context, studies suggest a positive association between occupational status and depression, highlighting how the nature of work can affect mental health [58]. The psychosocial impact of workplace injuries on mental health has also been explored, highlighting the link between occupational injuries and depression [30]. Studies have examined the effects of occupational stress on the mental health of workers in specific settings, such as oil fields, highlighting the causal relationship between occupational stress and mental disorders [28].

Organisational interventions have been proposed as effective strategies to improve the mental health of construction workers. These interventions target stress, burnout, depressive symptoms and anxiety, ultimately improving overall wellbeing [59]. In

addition, promoting acts of civility and increasing employee morale and engagement have been identified as critical strategies for improving the mental health of construction workers [6, 25, 29]. Positive mental health and well-being have been shown to act as protective factors against psychopathology [60]. Therefore, promoting positive mental health practices and resilience mechanisms such as self-compassion may contribute to better mental wellbeing outcomes for construction workers [61]. Social support in the workplace has also been highlighted as influential in encouraging participation in health promotion programmes, which can have a positive impact on workers' mental health and wellbeing [62]. Personalized support for construction workers based on their demographic characteristics could also be provided to achieve more effective outcome.

In order to improve the working environment of small and medium-sized enterprises (SMEs) in the construction sector, several strategies can be implemented based on the findings of relevant research studies. Firstly, it is crucial to focus on improving safety practices within SMEs. Research has shown that managing safety within SMEs is essential to their overall performance [17]. Identifying barriers and implementing strategies to improve safety practices can significantly contribute to a safer working environment [63]. In addition, factors that influence workplace wellbeing such as salary, schedule, and physical conditions should be considered to ensure a positive working environment in construction projects [64]. Embracing technological advancements, such as Industry 4.0, can also benefit SMEs in the construction sector. Embracing digitalisation and new technologies can improve productivity and competitiveness [65]. Furthermore, focusing on absorptive capacity and knowledge management can help SMEs absorb new knowledge and improve their performance [66]. Implementing total productive maintenance concepts, such as mobile maintenance, can improve operational efficiency and overall equipment effectiveness in SMEs [67].

Procurement strategies play a critical role in the growth of construction SMEs, with traditional and management-oriented strategies being essential to achieving growth plans [68]. To address these challenges, SMEs need to focus on developing core competencies, enhancing strategic vision, and centralising advantageous resources [69]. Implementing cloud computing for information construction can help overcome bottlenecks and improve flexibility in operations. In addition, SMEs should consider agile methods to adapt to the competitive environment and deal with challenges effectively. Financial management is another critical aspect for SMEs, with issues such as poor funding capacity, lack of awareness of financial risk management and weak financial systems posing significant hurdles. Risk management is essential, but its implementation in SMEs in the construction industry remains a relatively unexplored area [70]. Furthermore, SMEs often neglect sustainable practices such as reverse logistics, which can affect their overall operations and waste management [71].

In conclusion, by addressing safety practices, resilience, skills development, technological integration and knowledge management, SMEs in the construction sector can create a more conducive and productive working environment. In addition, improving the mental wellbeing of construction workers could be beneficial for construction SMEs. These strategies can contribute to the long-term sustainability and growth of construction SMEs.

6. Conclusion

The current study attempts to understand the relationship between demographic characteristics and mental health disorders among construction workers from different perspectives. For this purpose, a survey was conducted among Turkish construction workers in SMEs and independent t-tests and ANOVA tests were performed. The results show that the level of mental health disorders among construction workers changes significantly according to some demographic characteristics.

The following recommendations can be made in order to improve the mental health of workers and

create a healthier working environment at the workplace:

- The fact that workers living on construction sites have higher levels of depression than those living in housing highlights the impact of living conditions on mental health. It is therefore important for employers to make efforts to improve workers' living conditions. Comfortable and safe accommodation should be provided and common areas should be created to increase social interaction among construction workers.
- The finding that workers with chronic illnesses have higher levels of anxiety suggests that these workers should be provided with special support and resources. Employers should facilitate access to health care and take measures to support the management of chronic conditions in the workplace.
- Research also shows that certain working hours affect stress and anxiety levels. Employers should therefore manage employees' working hours in a balanced way and offer flexible working arrangements. In addition, increasing rest and leave time can also improve work-life balance.
- Research shows that low income levels have a significant impact on workers' levels of stress, depression and anxiety. Employers should therefore adopt fair pay policies and take supportive measures to meet workers' basic needs.
- Recognising that different occupational groups may have different mental health needs, employers can offer specific support and resources to more disadvantaged occupational groups. For example, professional support programmes can be organised for specific occupational groups.

These recommendations include potential strategies that employers can implement to support the mental health of workers in SMEs in the construction sector. Implementing these strategies can improve workers' mental health and their overall work performance by creating a healthier working environment in the workplace. All these

recommendations could be useful for construction professionals and decision makers, which could be a practical contribution of this study.

This study also has some limitations. The survey was conducted only among Turkish construction workers in SMEs, which prevents the generality of the study results. More data can be collected on mental health disorders in large construction companies and in other countries. Also, more construction workers could be included for this study. We used simple t-tests to assess the relationship between demographic background and mental health disorders among construction workers. Different statistical methods and data

collection systems can be used, such as more objective assessment rather than subjective measurement. Other personal variables, such as job satisfaction, and organisational factors, such as job demands and resources, could also be included. All of these limitations could be addressed in future studies.

We believe that the mental wellbeing of construction workers can be improved with relevant and appropriate strategies. Achieving a healthier workforce will result in a healthier public. However, it is also likely that workers' job performance will increase if personalized support is provided.

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Author Contributions

B. Ceyhan: Conceptualization, Methodology, Software, Validation, Writing- Reviewing and Editing; G. Kazar: Data curation, Writing- Original draft preparation, Visualization, Investigation, Software, Validation, Supervision, Writing- Reviewing and Editing.

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Data Availability Statement

The data presented in this study are available on request from the corresponding author.

Ethics Committee Permission

The authors acquired ethics committee permission for surveys implemented in this paper from the Istanbul Gelişim University Ethics Commission (Decision Number: 2023-08-112).

Conflict of Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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