DETERMINANTS OF DEPRESSIVE SYMPTOMS AMONG MALE CONSTRUCTION WORKERS IN CAPE TOWN, SOUTH AFRICA

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Individuals working in the construction industry are at a high risk of depression. This study investigates which groups of construction workers are more susceptible to depression through examining the associations between the prevalence of depressive symptoms and demographic factors, social and work-related factors, and behavioural factors. Data were collected from 496 male construction workers drawn from 18 construction sites in the Western Cape. Binomial logistic regression analysis was used to analyse the data. The results show that Black African construction workers experience lower levels of depressive symptoms compared to 'Other' ethnicities. Workers who are single or live with other adults without children experience significantly higher risk of depression compared to workers who are married or in a long relationship or live alone. The study also revealed that substance use is associated with lower levels of depressive symptoms, suggesting that construction workers use substance as a coping strategy for short-term depression reduction. Practical suggestions are provided to protect the mental health of construction workers who are more vulnerable to depression.

Keywords: depression; determinants; male construction workers; South Africa

INTRODUCTION

Depression is a common mental disorder, a leading cause of disability, and a major contributor to the global burden of disease (WHO, 2021). Depressive disorders have a significant impact on all aspects of an individual's life, including work productivity, social relationships, and community participation (WHO, 2023).

Construction is an industry with a particularly high risk of mental ill-health (Boschman *et al.,* 2013). Studies have shown that people working in construction experience a much higher risk of depression than those working in other industries (Al-Maskari *et al.,* 2011). Depression has been reported as a significant cause of suicide (Pincus and Pettit, 2001) and should be noted in the construction industry, where suicide rates for construction workers are significantly higher than for the

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general work population. Male construction workers are twice as likely to commit suicide as non-construction workers (Mates in Construction, 2016).

Research has shown a strong association between construction workers' mental ill-health and a construction work environment characterised by high job demands, low job control, job insecurity, workplace inequity, and poor workplace social support (Chan *et al.,* 2020; Duckworth *et al.,* 2022). While these studies are important in terms of understanding how work contributes to mental disorders in construction workers, they do not suggest which individual or demographic characteristics make specific groups of construction workers more susceptible to mental disorders.

The model of health and disease proposed by the Western Cape Department of Health and Welfare (2007) in South Africa has been adapted to explain mental health as illustrated in Figure 1. The model shows that that an individual's mental health is shaped by a range of upstream and downstream factors. Upstream factors are root causes of mental ill-health including social factors (e.g., living and working conditions) and structural factors (e.g., socio-economic status); while downstream factors are proximal or direct causes of mental ill-health including biological factors (e.g., age and ethnicity) and behavioural factors (e.g., substance abuse). In line with this adapted model, this study investigates the prevalence of depressive symptoms and its association with various demographic factors (i.e., age, ethnicity, education), social and work-related factors (i.e., relationships, living arrangements, work status) and behavioural factors (i.e., alcohol consumption, drug use). The objectives of this study were to focus on the prevalence and nature of depressive symptoms in the South African construction industry, to identify factors contributing to this mental disorder, and to consider strategies by which it may be addressed.

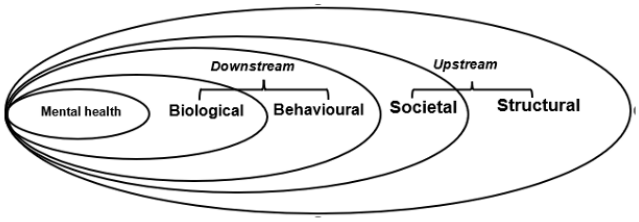

Figure 1: Conceptual mental health model (Western Cape Department of Health and Wellfare, 2007)

Depression and Contributory Factors

Depression and depressive symptoms

Depression falls into two main sub-categories: 1) major depressive disorder or depressive episodes, involving symptoms such as depressed mood, loss of interest or pleasure and lack of energy; depressive episodes can be classified as mild, moderate or severe, depending on the number and severity of symptoms; and 2) dysthymia, a persistent or chronic form of mild depression; symptoms of dysthymia are similar to depressive episodes but tend to be less intense and last longer (WHO, 2017). Depression can recur or become chronic, contributing to functional impairment and inability to adequately perform work, family, and social roles (Pincus and Pettit, 2001).

In the construction industry, mental disorders such as depression have a significant impact on work productivity and safety (Haslam *et al.,* 2005). Construction sites are hazardous, and workers need to have sufficient mental capacity to maintain focus and keep alert to manage site safety hazards (Boschman *et al.,* 2013). When workers

experience depression, these capacities may be impaired, increasing the risk of workplace accidents and injuries.

Age, Ethnicity, and Education

The prevalence of depression varies by age in the general population, peaking in older adults (55-74 years) (WHO, 2017). The same trend has been noted in the construction industry. For example, Park and Jeong (2021) studied a sample of construction workers in South Korea and reported the highest rates of depressive symptoms in the 60-year-old age group compared to the 50s and under-50 age groups. This trend may be related to age-related changes in workers. As people age, they naturally experience physical and cognitive changes, such as declined physiological functions, reduced physical strength, slower information processing speed and decreased ability to respond effectively to stressful events (Varianou-Mikellidou *et al.,* 2019). These changes have a clear impact on workers' mental health in demanding construction work environments. Therefore, it is hypothesised that:

H1: Older workers are more likely to present with more depressive symptoms compared to younger workers in the South African construction industry.

Ethnicity has been identified as a risk factor for mental ill-health (Bailey *et al.,* 2019; Riolo *et al.,* 2005). Ethnically disadvantaged groups are more likely to experience racism, lower socio-economic status, and stressful life events, all of which contribute to an increased risk of depression (Bailey *et al.,* 2019). Studies in the construction industry show that ethnically disadvantaged workers are more likely to experience the challenges of financial hardship and have less access to health resources and services, which increases their risks of psychological distress and depression (Ang *et al.,* 2017; Palaniappan *et al.,* 2022). Therefore, it is hypothesised that:

H2: Black African workers are more likely to present with more depressive symptoms compared to "Other" ethnicities in the South African construction industry.

Education as a socio-economic status indicator is associated with the risk of depression experienced by individuals (Freeman *et al.,* 2016). Ross and Mirowsky (2006) explained that education is an individual resource that influences other socio-economic status indicators such as employment, occupation, and income, which are important protective factors for mental health. However, Palaniappan *et al. (*2022) reported that construction workers with higher levels of education tend to experience higher levels of depressive symptoms than construction workers with lower levels of education. This is because some construction work tasks are manually intensive and require low skills levels. Construction workers with higher education may find that the work tasks they perform are not commensurate with the level of training they have received, contributing to a higher risk of feeling depressed (Palaniappan *et al.,* 2022). Thus, it is hypothesised that in the South African construction industry:

H3: Workers with higher levels of education are more likely to present with more depressive symptoms compared to less educated workers.

Relationship Status, Living Arrangements and Work Status

Research has repeatedly shown that married people have lower levels of depressive symptoms than separated, divorced, widowed and never-married counterparts (LaPierre, 2009). The marital resource model posits that marital status shapes access to resources and exposure to strains, resulting in differences in depressive symptoms between people of different marital status (Cotten, 1999). Being married has also

been identified as a protective factor for construction workers' mental health. In the USA, Dong *et al. (*2022) reported that construction workers who are not married are 1.7 times more likely to experience serious psychological problems and 1.8 times more likely to experience suicidal thoughts than those who are married. It is therefore hypothesised that in the South African construction industry:

H4: Workers who are single are more likely to present with more depressive symptoms compared to workers in married/long-term relationships.

During the apartheid era in South Africa, single-person households were designed to prevent the urbanisation of African families (Posel, 2021). Africans (mainly males) who migrated from their rural homes to cities for work, were often housed in single-person accommodations to ensure that their families remained in their homes. However, post-apartheid, individual migrant labour patterns have continued due to the scarcity of affordable family accommodation in urban areas (Posel, 2021) and a significant increase in poorly conditioned informal settlements that are unsuitable for family living (Hunter and Posel, 2012). Living alone has increased in post-apartheid South Africa. People living alone are more likely to experience social isolation and receive less emotional and instrumental support than those living with others, which may increase their risk of depression (Stahl *et al.,* 2017). Therefore, it is hypothesised that in the South African construction industry:

H5: Workers who live alone are more likely to present with more depressive symptoms compared to workers cohabiting with others.

Work status or employment arrangement is strongly linked to workers' mental health. Over the past few decades, there has been a noticeable increase in precarious employment in the global labour market, including short-term contracts, casual and part-time work (Quinlan *et al.,* 2001). Precarious employment is characterised by uncertainty, instability and insecurity, and workers in precarious employment often receive limited social benefits and legal entitlements (Kalleberg and Hewison, 2013). Among different employment arrangements, research shows that casual full-time workers have the worst exposure to poor psychosocial work conditions and experience the worst mental health (LaMontagne *et al.,* 2012). It is therefore hypothesised that in the South African construction industry:

H6: Workers on casual or temporary contracts are more likely to present with more depressive symptoms compared to permanent workers.

Alcohol Consumption, Drug Use / Abuse and Depressive Symptoms

The literature points to a reciprocal association between substance use and depression. On the one hand, individuals tend to use substances (e.g., alcohol and / or drugs) as a coping mechanism to relieve the mental tension and strain experienced, as explained by the tension reduction theory (Frone, 2008). Substance use, on the other hand, further promotes or exacerbates depression and anxiety problems, leading to poorer mental health (Awaworyi and Farrell, 2017). This reciprocal association can also find evidence in the construction industry (Dong *et al.,* 2022; Langdon and Sawang, 2018). Therefore, it is hypothesised that in the South African construction industry:

H7: Workers who are scored as being at moderate to high alcohol risk of harm are more likely to present with more depressive symptoms compared to workers who are scored as being at low risk of alcohol harm.

H8: Workers who are scored as being at possible risk of drug-related problems or heavily dependent on drugs are more likely to present with more depressive symptoms compared to workers who are scored as having no drug-related.

Method

Survey Instrument and Measures

A survey instrument was employed for primary data collection. It incorporated questions eliciting demographic, social and work-related information, as well as three standardised tests, i.e., the CES-D-10 scale for depressive symptoms (Andresen *et al.,* 1994), the Alcohol Use Disorders Identification Test (AUDIT) for alcohol use (Saunders *et al.,* 1993) and the Drug Use Disorders Identification Test (DUDIT) for drug use (Berman *et al.,* 2003). All three tests are well-validated scales, with higher scores on each indicating higher levels of the construct of interest. Given the education level of most on-site construction workers, the use of open-ended questions was avoided to facilitate ease of data collection.

Participants

The study population was drawn from 18 construction sites in the Western Cape and involved seven construction companies. Convenience sampling was used to select construction sites and survey participants. The participant sample consisted of all male employees who were on site on the day the field researchers were scheduled to visit. Questionnaires were completed in three of South Africa's 11 official languages - Afrikaans, English and isiXhosa (as these are the most often spoken languages in the Western Cape region).

Data Analysis

Data cleaning
Of the 574 responses received, 18 were excluded as participants did not answer key decision-making questions on alcohol and drug use and 60 were deleted as the missing values exceeded 15% (Graham, 2012), resulting in a final dataset of 496 responses. Missing data were imputed using the EM (expectation maximisation) algorithm.

Analysis method
The CES-D-10 depression scale had 10 items, each of which was scored with four response options ranging from 0 = Rarely or none of the time (less than 1 day) to 3 = All of the time (5-7 days). Therefore, the range of CES-D-10 scores was 0-30 and two categories (absence and presence) were created i.e., those below the clinical cut-off level of 10 and those equal to or above 10 (Andresen *et al.,* 1994). The AUDIT scale also had 10 items, with response options for each item ranging from score 0 to score 4. Thus, the score range of AUDIT was 0-40 and scores were placed in one of four categories: 0-7 (low risk of harm), 8-15 (medium risk), 16-19 (high risk or harmful level), and 20 or more (dependence likely). The DUDIT scale had 11 items and the score range was 0-44. The DUDIT scores were categorised as follows: 0-5 (no drug-related problems), 6-24 (possible drug-related problems), 25 and above (probably highly drug dependent).

Descriptive analysis was used to describe categorical data of demographic, social and work-related characteristics. Binomial logistic regression was then used to examine the strength of the relationship between the predictor variables (demographic, social and work-related, and behavioural) and the dependent variable representing depressive symptoms in construction workers.

FINDINGS

Participant Characteristics (N=496)

All participants were male, aged between 18 and 67 years (M=35, Md=34). Almost two-thirds (59%) of the participants were black 'Africans'. Nearly 20% of participants had primary education and 65% had had secondary education or been exposed thereto. Nearly half (48%) were married or in a long-term relationship. In terms of employment status, 53% were in casual or contract employment.

Ninety participants (18%) scored at least 10 on the CES-D-10 depression scale, indicating depressive symptoms. For alcohol consumption, 25% (n=123) showed at least moderate risk of alcohol harm (score 8 or above) on the AUDIT test whilst 7% (n=37) showed high risk to possible dependence (score 16 or greater). For the DUDIT test, 6% (n=29) of the study participants showed possible presence of a drug problem and 1% (n=4) showed high levels of drug dependence.

Binomial Logistic Regression Analysis

Table 1 depicts the significance of the relationship between the various categories of the predictor variables and the depression profile, contrasted against their respective reference categories.

Table 1: Binomial logistic regression model

Characteristics	Adjusted odds ratios (aOR)[+]	
	aOR	95%CI
Demographic characteristics		
Age (years)	.97	.94 – 1.00
Race / ethnicity		
'Black' African	-	-
'Others'	1.90*	1.04 – 3.47
Social and work-related characteristics		
Education (exposed or completed)		
Primary	-	-
Secondary	2.99*	1.21 – 7.41
Tertiary	1.26	.57 – 2.79
Relationship status		
Single	-	-
Married / Long-term relationship	.41**	.21 - .81
Living arrangements		
Live alone	-	-
Live with other adults; no children	12.11*	1.47 – 99.96
Live with other adults and children < 18 yrs.	7.25	.88 – 59.65
Live only with children <18 yrs.	3.92	.50 – 30.93
Work status		
Casual or contract	-	-
Permanent	.65	.37 – 1.14
Behavioural characteristics		
AUDIT score (alcohol consumption) (AC)		
Low risk of harm	-	-
Moderate risk of harm	.20**	.06 - .60
High risk of harm	.23*	.07 - .78
Likely dependence	.25	.04 – 1.60
DUDIT score (drug use / abuse) (DU)		
Absence of drug-related problems	-	-
Possible drug-related problems	.03**	.003 - .04
High level of drug dependency	.03*	.002 - .51

[+]Model adjusted for all covariates; *p< .05; **p< .01; ***p< .001

The associated probabilities (p-values) provide an index of the significance of each category of predictor variable in relation to their reference categories. The odds ratio (OR) is a measure of effect size.

From Table 1, the odds ratio for 'Others' ethnicity is 1.9, indicating that this ethnic grouping is 1.9 times more likely than 'Black' African workers to present with depressive symptoms. Workers having attained or having been exposed to secondary

school education were 2.99 times more likely to present with depressive symptoms than were workers who had experienced at most primary school education. There was no difference between workers with primary or less education and those having obtained or been exposed to a tertiary education.

Married and long-term relationship employees are less likely (odds ratio of .41) than single employees to present with depressive symptoms. Regarding living arrangements, workers living with other adults without the presence of children were 12 times more likely to present with depressive symptoms than were workers who lived alone. There was no difference between workers living with adults and children, or with children only, and those living alone.

In terms of alcohol use, the odds ratios indicate that workers at either moderate risk of harm (.20) or high risk of harm (.23) are less likely than workers at low risk of harm to present with depressive symptoms. Regarding drug use, the odds ratios indicate that workers experiencing either possible drug-related problems (.03) or a high level of drug dependency (.03) are less likely than workers with an absence of drug-related problems to present with depressive symptoms.

There was no association between age and the absence or presence of depressive symptoms. Additionally, no significant differences were noted between the categories of work status and the depressive symptoms classification (see Table 1).

Therefore, Hypotheses 1, 2, 5, 6, 7 and 8 are not supported, Hypothesis 3 is partially supported, while Hypothesis 4 is supported.

DISCUSSION

Contrary to expectations, 'Black' African workers were found to be less likely to exhibit depressive symptoms compared to 'Other' ethnic groups. Research has shown that the association between ethnicity and depression may be influenced by the nature of the scales used to assess depressive symptoms. For example, Riolo *et al. (*2005) reported that the prevalence of major depressive disorder (MDD) was significantly higher in Whites than in Black groups, but the opposite pattern was found for dysthymia or chronic depressive disorder. This is because black people with MDD are less likely to seek and receive treatment. In the present study, the CES-D-10 scale aimed to assess symptoms associated with MDD, which may explain the finding that Black African construction workers experience fewer depressive symptoms than 'Other' ethnic groups.

Different from previous research finding (Stahl *et al.,* 2017), this study showed that construction workers living with other adults without children were at significantly higher risk of depression compared to construction workers living alone. As mentioned earlier, the migrant labour system is widespread in South Africa, with many migrant workers living in informal settlements (Posel, 2021). Construction workers who reported living with other adults without children may share accommodation with other male migrant workers. Informal settlements often lack basic facilities and amenities and are often in poor conditions. Sharing accommodation in such living conditions may contribute to crowding and conflicts and subsequently increase the risk of depression among construction workers.

Interestingly, the study showed that higher levels of substance use were associated with lower levels of depressive symptoms among construction workers. This can perhaps be explained by that substance use is commonly adopted as a coping method by construction workers for short-term reduction of mental disorder (Langdon and

Sawang, 2018). However, Kushner *et al. (*2000) suggest that substance use, and mental disorders can develop into comorbidity through a vicious feed-forward cycle. Therefore, substance use as a short-term strategy to reduce depression may have long-term negative impacts on the health and wellbeing of construction workers.

The present study found that the presence of depressive symptoms was not associated with age or employment status. These results are probably related to the rising unemployment rate in South Africa, which reached a peak of 35.3% at the end of 2021 (Statistics South Africa, 2022). In particular, unemployment is highest among young people. The high unemployment rate and associated insecurity may make younger workers as likely to experience depressive symptoms as older workers. Similarly, in such a labour market, workers who still have a job (regardless of their employment status) may be psychologically protected by the positive effects of being employed. Indeed, Borra and Gómez-García (2016) reported that 'others unemployment' had a positive impact on individuals' wellbeing at work in Spain, where economic recession and high unemployment rates were experienced.

CONCLUSIONS

This study investigates the prevalence of depressive disorders among site workers in the South African construction industry in relation to various demographic, socio- and work-related and behavioural factors. The study shows that sharing accommodation with other migrant males in informal settlements may increase stress levels and increase the risk of depression. The results emphasise the need for governments and construction organisations to provide adequate housing to protect the mental health of migrant construction workers. The study also found that substance use was associated with lower levels of depressive symptoms, suggesting that construction workers use substances as a coping strategy for short-term depressive symptom reduction. Construction organisations should implement initiatives to raise awareness among construction workers about the long-term harm that substance use may cause to their health and wellbeing.

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