The burden of mental, and substance use disorders in Saudi Arabia: results from the Global Burden of Disease Study 2019

Majed Ramadan (ramadhanma@ngha.med.sa)
King Abdullah International Medical Research Center
Doaa A. Aboalola
King Abdullah International Medical Research Center
Rawiah Alsiary
King Abdullah International Medical Research Center
Yara F. Batwa
King Saud bin Abdulaziz University for Health Sciences

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The burden of mental, and substance use disorders in Saudi Arabia: results from the Global Burden of Disease Study 2019.

Majed Ramadan[1*], Doaa Aboalola[1], Rawiah Alsiary,[1] Yara Batwa[2],

[1]King Abdullah International Medical Research Center (KAIMRC), Population Health Section, Jeddah, Saudi Arabia

[2]King Saud Bin Abdulaziz University for Health Sciences, College of Medicine, Jeddah, Saudi Arabia

*Corresponding author name and email address: Majed Ramadan ramadhanma@NGHA.MED.SA

Abstract

Background: Mental and substance use disorders represent a significant global public health challenge causing considerable morbidity and mortality worldwide. This paper assessed the prevalence, incidence, and trends in disability-adjusted life-years (DALYs) rates due to mental and substance use disorders over a 30-year period in Saudi Arabia.

Method: This is a systematic analysis of the Global Burden of Disease (GBD) 2019 study. Data for the disease burden of mental and substance use disorders were used to Saudi Arabia from 1990 to 2019.

Results: In 2019, there were 5,032,669 million (95% uncertainty intervals (UI) 3·5–9·9)) adults in Saudi Arabia with mental disorder, and 166,989 thousand with substance use disorder. The largest proportion of prevalence increase from 1990 to 2019 was in eating disorder with 9.8% (95% UI 7.03-12.6). The most significant proportion of prevalence and incidence increase from 1990 to 2019 was in opioid disorders with 69.72% (95% UI 67-72.5), 42.14% (95% UI 32.414-54.75). Gender and age variations were observed in the DALYs due to mental and substance use disorders. From 1990 to 2019 there was +26.46% increase in the annual change rate of age standardized DALYs due to substance use disorders

Conclusion: This study highlights the modest increase in the prevalence, incidence, and disability-adjusted life years (DALYs) rates associated with mental disorders in Saudi Arabia over the past three decades. However, there has been a significant rise in the prevalence, incidence, and DALYs rates related to substance use disorders across different gender and age groups. These findings underscore the significance of taking into account age and gender differences in mental and substance use disorders when formulating prevention and treatment initiatives. Further research is warranted to identify the factors contributing to the upward trend in substance use disorders and to devise effective strategies for addressing this critical public health concern.

Keywords: mental health, substance use disorders, prevalence, incidence, disability-adjusted life years (DALYs)

1.1 Introduction:

Mental and substance use disorders represent a significant global public health challenge causing considerable morbidity and mortality worldwide [1]. According to the World Health Organization (WHO), these disorders will be the leading cause of disability worldwide in 2030 [2,3]. Mental and substance use disorders can have a profound impact on individuals, families, and communities, contributing to reduced quality of life, increased mortality, and reduced economic productivity [3]. Research on the disease burden of mental and substance use disorders has highlighted the magnitude of the problem worldwide. For example, a global analysis of the burden of disease attributed to mental disorders estimated that mental disorders accounted for 32·4% of years lived with disability (YLDs) and 13% of disability-adjusted life-years (DALYs) in 2016 [4]. In 2019, a study of the burden of mental and substance use disorders in the globe found that mental disorders accounted for the largest proportion of DALYs (56.7%), followed by neurological disorders (28.6%) and substance use disorders (14.7%) [5]. In high-income countries, the burden of mental and substance use disorders is particularly significant. By the year 2030, it is projected that depression will become the second most significant burden of disease worldwide and the leading cause of disease burden in high-income nations [6]. This has

profound implications for the field of global mental health. Additionally, the economic burden of mental disorders in high-income countries is estimated to be $1 trillion per year [7].

According to the World Bank classification, Saudi Arabia is a high-income country, that have also shared some demographic, and population health characteristics of other high-income countries in the world [8, 9]. Saudi Arabia also a high burden of disease associated with mental disorders accounted for about 7.3% of the total burden of disease in the country, with depression being the most common mental health disorder [10]. In response to the increasing burden of mental disorders, the Saudi government has taken steps to improve access to mental health services and reduce the stigma surrounding mental health issues [10]. In 2014, the Saudi Ministry of Health launched the National Mental Health Program, which aims to improve mental health services and promote awareness of mental health issues in the country [10]. In recent years, Saudi Arabia was one of the active countries in the region who has implemented significant reforms in its health system, with a focus on improving the quality of care and increasing access to healthcare services, expanding health insurance coverage, improving primary healthcare services, and investing in medical education and training [11]. These reforms are part of the country's broader Vision 2030 plan, which aims to diversify the economy and improve social services.

Despite these efforts, more work is needed to fill the research gap attributed to the burden of mental and substance use disorders studies in Saudi Arabia. Understanding the disease burden of mental and substance use disorders at a national level is crucial for developing policies and strategies aimed at preventing and treating these conditions. This includes the development of effective prevention and treatment programs, as well as the allocation of resources to address the burden of these conditions. Additionally, reducing the disease burden of mental and substance

use disorders can have significant social and economic benefits, such as reducing the number of days lost due to illness and increasing productivity [12,13].

Therefore, to better understand and evaluate the status of the disease burden of mental and substance use disorders, this study aimed to assess the prevalence, incidence, and trends in disability-adjusted life-years (DALYs) rates due to mental and substance use disorders over a 30-year period in Saudi Arabia. In addition, the researchers aimed to stratify DALYs rates due to mental and substance use disorder by gender, age groups, and diagnosis of mental, and substance use disorder within the Saudi population. This approach helps to provide a comprehensive understanding of the burden of mental and substance use disorders and shed light on specific populations that may be more vulnerable to these conditions. By examining these epidemiological measures and analyzing the trends over time, this study aimed to contribute valuable insights into the disease burden of mental and substance use disorders in Saudi Arabia, offering a comparative perspective with high-income countries and the global population.

2.1 Methodology:

2.2 Source of data:

2.2.1 Data acquisition:

The data was obtained from The Global Burden of Disease (GBD) 2019. The GBD provided inclusive and accessible epidemiological data on 369 diseases and injuries, as well as 87 risk factors, from 1990 to 2019. This comprehensive data encompasses 7 super-regions, 21 regions, and more than 200 countries and territories, and was obtained using a rigorous methodology previously described [14]. To obtain the necessary data, we utilized the Global Health Data Exchange (GHDx) tool (https://ghdx.healthdata.org/gbd-2019).

2.3 Study design, setting, and measure of prevalence, incidence, and DALYs:

This is a systemic analysis of the Global Burden of Disease study 2019. Data for the disease burden of mental and substance use disorders were employed to compare Saudi Arabia from 1990 to 2019. All rates are reported per 100,000 person years. The 'Disability Adjusted Life Years' rates (DALYs) due to mental and substance use disorder are determined by adding the mortality and morbidity associated with these conditions [15]. DALYs, a summary measure of total health loss, were computed by adding years of life lost (YLLs) and years lived with disability (YLDs) for each cause under mental disorders. DALYs are a standardized metric that enables comparisons of disease burdens between different countries, populations, and time periods. In essence, one DALY corresponds to losing one year of healthy life due to premature death, disease, or disability. Therefore, a single DALY represents the loss of one year of good health. Assessing health outcomes by both mortality and morbidity (the prevalent diseases) provides a more encompassing view on health outcomes [15]. The disability weights and by condition and comorbidity were applied to DALY estimate [15]. We further stratified the DALY due to mental health and substance use disorders by gender and age groups (20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74) within the Saudi population. A full description of the estimation of severity, disability-weights, adjustment for comorbidity, and uncertainty intervals are provided in GBD study [16].

***2.4 Mental and substance use disorder measures*:**

Mental health disorders are categorized based on clinical diagnostic criteria outlined in recognized manuals such as the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) or the International Classification of Diseases (ICD-10) [16]. In the Global Burden of Disease (GBD) 2019 cause hierarchy, mental health and substance use disorders are classified under Level 2, which falls under the broader category of noncommunicable diseases (Level 1).

Mental health disorders are further classified into specific subcategories at Level 3, including schizophrenia, depressive disorders, bipolar disorders, anxiety disorders, eating disorders, autism spectrum disorders, attention-deficit/hyperactivity disorder (ADHD), conduct disorders, idiopathic developmental intellectual disability, and other mental disorders. We also included specific subcategories such as major depressive disorder, dysthymia, or the subtypes of substance use disorders (e.g., opioid, cocaine, amphetamine, cannabis, and other drug use disorders) at Level 4 [17] of mental, and substance use disorder within the Saudi population. This approach helps to provide a comprehensive understanding of the burden of mental and substance use disorders and shed light on specific populations that may be more vulnerable to these conditions. By examining these epidemiological measures and analyzing the trends over time, this study aimed to contribute valuable insights into the disease burden of mental and substance use disorders in Saudi Arabia, offering a comparative perspective with high-income countries and the global population.

Statistical analysis:

The rates were age-standardized according to the world standard population as outlined in GBD 2019. To account for uncertainty, each metric was calculated, and this uncertainty was carried forward in the GBD modeling procedure. The range of uncertainty, represented by the 95% uncertainty intervals (95% UIs), was presented using the values at the 2.5th and 97.5th percentiles [18].

The age-standardized rates for mental and substance use disorders were determined using the direct method, which aligns with the world standard population distribution. The corresponding 95% confidence intervals (95% CIs) were estimated using a gamma distribution-based method. The rates were expressed per 100,000 individuals in the population. To analyze the trends, the

average annual percent change, along with its 95% CI, for mental and substance use disorders were calculated using joinpoint regression. This analysis was conducted through the Joinpoint Regression Program software (version 4.9.1.0, April 2022), developed by the Statistical Research and Applications Branch at the National Cancer Institute, USA [20]. The software employs a systematic approach by fitting the simplest joinpoint model allowed by the provided data. It initiates with no joinpoints (indicating a straight line) and evaluates if additional joinpoints should be added to the model (up to five joinpoints) based on statistical significance. The Monte Carlo Permutation method was utilized for conducting significance tests.

3.1 Results:

3.2 Prevalence and incidence of mental and substance use disorders from 1990 to 2019:

In 2019, there were 5,032,669 million (95% uncertainty intervals (UI) 3·5–9·9)) adults in Saudi Arabia with mental disorder, and 166,989 thousand with substance use disorder. In terms of rates per 100,000 population, there were 13071.87 (95% UI 12042.9-14277.9), 433.74 (95% UI 359.14-523.44) respectively. The largest proportion of prevalence and incidence increase from 1990 to 2019 was in eating disorder with 9.8% (95% UI 7.03-12.6), 6.18% (95% UI 3.41-8.95) respectively, followed by incidence of depressive, and anxiety disorders 4.48% (95% UI 2.07-7.61), 6.42% (95% UI 3.65-9.19) respectively. Among substance use disorders, the most significant proportion of prevalence and incidence increase from 1990 to 2019 was in opioid disorders with 69.72% (95% UI 67-72.5), 42.14% (95% UI 32.41-54.75) respectively, followed by cocaine use disorders with 13.1% (95% UI 10.3-15.9), 10.28% (95% UI 7.51-13) (Table.1).

3.3 Trends in the age standardized both gender DALYs rates due to mental and substance use disorders from 1990 to 2019:

Overall, from 1990 to 2019 there was a consistent increase in the annual change rate of age standardized DALYs due to both mental disorders and substance use disorders. From 1990 to 2019 there was a +3.03% increase in the annual change rate of age standardized DALYs due to mental disorders, while there was +26,46% increase in the annual change rate of age standardized DALYs due to substance use disorders (figure.1).

3.4 The Percentage changes in disability adjusted life years' (DALYS) rates due to mental and substance use disorders in Saudi Arabia 1990 to 2019 by age and gender.

In 2019, mental and substance use disorders accounted for 339,168 male, and 443,303 female DALYs. The DALYs rates per 100,000-person year due to mental and substance use disorders tend to increase with age, particularly among individuals aged 30 to 74 years. In the age group of 34 and below, females presented higher percentages of change in DALY's rates due to mental and substance use disorders compared to males (4.19%; 95% UI (3.47-4.91), 2.81%; UI (2.09-3.53), 2%; 95%UI (1.28-2.72) vs. 2.25%; 95% UI (1.53-2.97), 1.58%; 95% UI (0.86-2.3), 1.88%; 95% UI (1.16-2.6). However, for individuals aged 35 and above, males generally had higher percentages of change in the DALYs rates due to mental and substance use disorders than females (Table 2, Figure 2). Notably, in the younger age group of 20 to 29, females had nearly twice the percentages of change in the DALYs rates due to mental and substance use disorders compared to males (Table 2, Figure 2).

3.5 DALY's rate per 100,000 due to mental and substance use disorders by gender in Saudi Arabia 2019:

In 2019, female 149.65; 95% UI (103.42-203.82). had slightly higher rate per 100,000 of DALY's due to drug use disorders, than male 132.96; 95% UI (69.49-173.62). Similarly, female 133.3; 95% UI (89.9-187.25) had higher rate per 100,000 of DALY's due to opioid disorders

than male 102.8; UI (73.42-137.37). On the other hand, male 70.91; 95% UI (61.2-102.1) had more than twice the rate per 100,000 of DALY's due to alcohol use disorders than female 28.33; UI (18.4-39.1). Female 973.89; 95% UI (631.56-1301.11), had a higher rate per 100,000 of DALY's due to depressive disorders than male 618.89; 95% UI (423.65-866.57), similarly female 573.82; 95% UI (937.21.56-822.35), had a higher rate per 100,000 of DALY's due to anxiety disorders than male 340.99; 95% UI (224.63-480) (Figure.3). Figures 4, and 5 show the DALYS rate per 100,000 due to mental and drug use disorders by gender in 1990, and 2019. The dark orange shades indicates that the DALYS of mental and substance use disorders are higher compared to light orange shades. Overall, females had higher burden of mental and drug use disorders compared to male in 1990 and 2019, this is particularly true in anxiety disorders, depressive disorders, eating disorders, and opioid use disorders. Younger ages (20 to 39) in both male and female had higher DALYS rate due to mental and drug use disorders compared to older ages (Figure.4).

4.1 Discussion:

4.2 Trends, prevalence and incidence of mental and substance use disorders from 1990 to 2019:

The study revealed that in 2019, 14.05% of the Saudi population had a mental disorder, and 0.46% had a substance use disorder. The findings also indicated that the highest increase in incidence from 1990 to 2019 was observed in depressive disorders (6.42%), followed by eating disorders (6.18%). Furthermore, eating disorders showed the largest increase in prevalence (9.8%). These results align with previous global studies indicating that the prevalence of eating disorders is highest in high-income regions, particularly among younger populations [21,22]. Given that more than 60% of the Saudi population is under the age of 30 [23], this may explain

the significant increase in eating disorders among the Saudi population over the past 30 years. Overall, despite Saudi Arabia having approximately three times fewer mental health professionals per 100,000 people compared to other high-income countries in 2016 [24,25], this study found that the prevalence and incidence of mental disorders in the Saudi population were relatively lower. This could be attributed to the variations in the prevalence of mental disorders risk factors across these populations such as smoking, dietary factors, and other lifestyle factors [26]. Another significant potential reason could be the stigma associated with mental and substance use disorder in Saudi population that might prevent individual to seek treatment [27]. This might result in under-reporting of mental disorders in this population.

A major key finding in the study was the rapid and substantial increase in the burden of substance use disorder in the last thirty years compared to other mental disorders. One potential reason that could explain the great rising of substance use disorder is the illicit drug availability. As reported by the United Nations Office on Drugs and Crime (UNODC) in 2019, Saudi Arabia has emerged as the top country in terms of seizing the largest quantities of Amphetamine-Type Stimulants (ATS) worldwide [28]. Between 2013 and 2017, the amounts confiscated by Saudi Arabian authorities constituted approximately 25% of the total global seizures, second only to the United States. This might add more burden on the healthcare system, particularly rehabilitation and addiction centers as a higher percentage of individuals might seek treatment for their substance use disorder, which might explain this rapid increase in the burden of substance use disorder [29]. The study findings also showed that the largest increase in both prevalence and incidence from 1990 to 2019 was observed in opioid disorders, with a higher increase among females compared to males. This finding is noteworthy considering the ongoing opioid epidemic in various high-income countries worldwide [30]. It highlights the importance

of evaluating the national and regional patterns of opioid consumption in Saudi Arabia. Given the lack of a national substance use assessment in Saudi Arabia and the potential for an international opioid crisis [30, 31], it remains uncertain how the situation may evolve in Saudi Arabia.

4.3 The DALYs rates due to mental and substance use disorders:

The primary key finding indicates that Saudi Arabia is experiencing a rapid increase DALYs rates due to mental and substance use disorders. This increase might be attributed to a variety of factors, including changes in lifestyle and increased stress levels [32]. The rapid economic and social changes, including urbanization and globalization, have led to significant changes in lifestyle and increased stress levels, which may contribute to the rising prevalence of mental health disorders particularly eating disorders in Saudi population [33]. Furthermore, urbanization in Saudi Arabia could be a potential factor to explain the rapid increase in disease burden of mental health and substance use disorders. According to data from the World Bank, the rate of urbanization in Saudi Arabia has been increasing at a relatively rapid pace compared to other high-income countries [34]. In 1960, only 19% of the population lived in urban areas, but by 2019, the urban population had risen to 84% [34].

4.4 The DALY's rates due to mental and substance use disorders in Saudi Arabia by age and gender (1990 to 2019):

The findings of this study indicated that DALYs rate due to mental and substance use disorders in Saudi Arabia increases with age, particularly among individuals with age 30 to 79. The largest increase DALYs rate was among the oldest age group. This finding highlights the need for specific attention and support for this vulnerable population, as they were also one of the most negatively and mentally impacted age groups during the COVID19 pandemic [35, 36]. Our

results further highlight a gender variation, with younger females experiencing a higher rate of DALYs due to mental and substance use disorders in the same age group. Conversely, among older age groups, males tend to have a higher DALYs rates due to mental and substance use disorders compared to females. Notably, our findings reveal that females in the younger age group of 20 to 29 presented nearly double the increased percentages of change in DALYs due to these disorders compared to males. These findings contribute to our understanding of the complex relationship between age, gender, and the burden of mental health and substance use disorders, emphasizing the need for targeted interventions and support for different age and gender groups. This information can guide the allocation of resources, development of preventive strategies, and implementation of mental health support systems targeting high risk specific age, and gender groups.

The increasing DALYs rates due to mental and substance use disorders in Saudi Arabia, shed the light on the urgent need for more policies to address this growing public health issue. Given the recent pandemic and its potential long-term impact on mental health, it is essential to prioritize mental health services and support in Saudi Arabia, high-income countries, and globally [37,38]. Evidence-based interventions and policies that focus on prevention, early detection, and effective treatment of mental disorders and substance use disorders are crucial to curb the burden of these conditions on individuals, families, and societies [38, 39]. This can include increasing funding for mental health services, expanding access to care, and promoting mental health literacy and awareness [38, 39].

4.5 Limitations: Our results should be interpreted with several limitations in mind. First, the study provides a broad overview of the burden of mental, and substance use disorders in Saudi Arabia, but it may not provide a detailed analysis of the specific factors contributing to the

burden of these conditions in Saudi Arabia. This lack of granularity could limit the study's ability to inform targeted interventions and policies to address the burden of mental and substance use disorders in the country. Second, while DALYs are a widely used metric for measuring disease burden, they may not capture the full impact of mental and substance use disorders on individuals and society. For example, DALYs may not fully account for the impact of stigma, discrimination, and reduced quality of life associated with these conditions.

5.1 Conclusion:

This study highlights the modest increase in the prevalence, incidence, and disability-adjusted life years (DALYs) rates associated with mental disorders in Saudi Arabia over the past three decades. However, the prevalence, incidence, and DALYs rates of substance use disorders have all significantly increased across different gender and age group. These results emphasize the importance of age and gender differences in mental and substance use disorders being taken into account when developing preventative and treatment strategies. Further research is warranted to pinpoint the factors and causes contributing to the upward trend in substance use disorders and to devise effective strategies for addressing this critical public health concern.

Declarations

- **Ethics approval:** This study was performed in line with the principles of the Declaration of King Abdullah International Medical Research Center (KAIMRC). The Biomedical ethics committee in KAIMRC has exempt the study from obtaining IRB approval due to the use pf public use data. All methods were performed in accordance with the relevant guidelines and regulations of KAIMRC.
- **Competing interests** "The authors declare that they have no competing interests."
- **Authors' contributions: M.R:** Conceptualization, Methodology, Software **M.R**: Data curation, Writing- Original draft preparation. **M.R,** Visualization, Investigation. **M.R** Supervision.**: M.R, R.A, D.A**: Software, Validation.: **M.R R.A, D.A, Y.B:** Writing- Reviewing and Editing **M.R. R.A, D.A, Y.B**
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- **Availability of data and material:** The data that support the findings of this study are available from [Global Burden of Disease study]. No restrictions apply to the availability of these data, which were used under Public Use Files (PUF) data. Data are available [at https://vizhub.healthdata.org/gbd-result].

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Table.1 Percentage changes of age standardized prevalence, and incidence of mental and substance use disorder in Saudi Arabia 1990 to 2019

	Prevalence			Incidence		
	1990 (95% UI)[1]	**2019 (95% UI)**	Change % (95% UI)	**1990 (95% UI)**	**2019 (95% UI)**	**Change % (95% UI)**
Mental disorders						
Mental disorders	12874.6 (11842.5, 14065.5)	13071.87 (12042.9, 14277.9)	1.53 (-1.24, 4.3)	5816.61 (5114.7, 6633.54)	6155.17 (5415.99, 6993.74)	5.82 (3.05, 8.59)
Anxiety disorders	4352.49 (3452, 5363.91)	4554.42 (3598.65, 5680)	4.64 (1.87, 7.41)	691.47 (536.61, 870.56)	724.96 (560.48, 912.35)	4.84 (2.07, 7.61)
Attention-deficit/hyperactivity disorder (ADHD)	931.86 (669.67, 1263.17)	929.482 (669.56, 1263.17)	-0.26 (-3.03, 2.51)	46.51 (31.09,67.22)	46.65 (31.47,67.2)	0.3 (-2.47, 3.07)
Autism spectrum disorders	309.96 (252.39, 374.53)	310.9 (253.18, 375.5)	0.3 (-2.47, 3.07)	7.5 (6.08,9.05	7.44 (6.03,8.98)	-0.8 (-3.57, 1.97)
Bipolar disorder	761.74 (589.1, 947.34)	762.24 (589.53, 947.74)	0.07 (-2.7, 2.84)	66.08 (51.87, 81.57)	65.85 (51.58,81.36)	-0.35 (-3.12, 2.42)
Depressive disorders	4015.47 (3482.62, 4599.69)	4216.06 (3680.64, 4857.1)	5 (2.23, 7.77)	4555.99 (3872.3, 5377.22)	4848.4 (4127.2, 5680.66)	6.42 (3.65, 9.19)
Eating disorders	254.09 (186.04, 331.15)	278.99 (202.48, 358.06)	9.8 (7.03, 12.6)	230.47 (153.22, 329.41)	244.71 (163.8, 349.17)	6.18 (3.41, 8.95)
Conduct disorder	586.29 (429.53, 760.69)	584.82 (428.32, 758.33)	-0.25 (-3.02, 2.52)	203.13 (150.42, 262.4)	201.89 (149.44, 260.62)	-0.61 (-3.38, 2.16)
Idiopathic developmental intellectual disability	781.79 (397.77, 1151.35)	586.49 (248.94, 924.29)	-24.98 (-27.8, -22.2)	198.23 (179.33, 232.2)	179.31 (151.42, 281.22)	-9.54 (-12.3, -6.77)
Schizophrenia	264.94	262.85	-0.79	18.86	19.14	1.48

	(213.78, 324.92)	(208.37, 323.13)	(-3.56, 1.98)	(15.98,22.36)	(16.197, 22.65)	(-1.29, 4.25)
Dysthymia	1154.01 (890.03, 1519.97)	1163.1 (897.8, 1507.76)	0.79 (-1.98, 3.56)	177.01 (141.87, 223.18)	178.25 (142.04, 224)	0.7 (-2.07, 3.47)
Other mental disorders	1519.43 (1172.89, 1941.68)	1517.65 (1171.73, 1939.27)	-0.12 (-2.89, 2.65)	------[2]	-------	-------
Substance use disorders						
Drug use disorders	329.28 (265.82, 406.95)	433.74 (359.14, 523.44)	31.72 (28.9, 34.5)	143.35 (116.74, 172.22)	166.89 (138.13, 199.98)	16.42 (13.7, 19.2)
Alcohol use disorders	426.5 (334.54, 531.14)	434.88 (341.64, 539.75)	1.96 (-0.81, 4.73)	223.09 (173.12, 284.38)	227.56 (175.58, 286.68)	2.00 (-0.77, 4.77)
Amphetamine use disorders	36.48 (22.92, 52.72)	37.43 (23.61, 53.71)	2.6 (-0.17, 5.37)	6.58 (4.41,9.03)	6.74 (4.55, 9.21)	2.43 (-0.34, 5.2)
Cannabis use disorders	139.06 (93.23, 203.24)	139.18 (93.21, 203.55)	0.09 (-2.68, 2.86)	23.08 (16.22,34.64)	23.27 (16.52, 35.06)	0.82 (-1.95, 3.59)
Cocaine use disorders	15.11 (10.96, 21.33)	17.09 (12.589, 23.48)	13.1 (10.3, 15.9)	2.14 (1.52,3.04)	2.36 (1.71, 3.27)	10.28 (7.51, 13)
Opioid use disorders	143.51 (107.74, 190.22)	243.56 (193.31, 311.89)	69.72 (67, 72.5)	26.62 (20.08,35.21)	42.14 (32.414, 54.75)	58.3 (55.5, 61.1)
Other drug use disorders	13.86 (10.21, 18.27)	15.56 (11.62, 20.73)	12.27 (9.5, 15)	84.91 (61.425,113.42)	92.36 (67.48, 122.2)	8.77 (6, 11.5)

1 95% Uncertainty interval
2 Unavailable data

Figure 1 Trends in the age standardized DALYs rates due to mental and substance use disorders from 1990 to 2019.

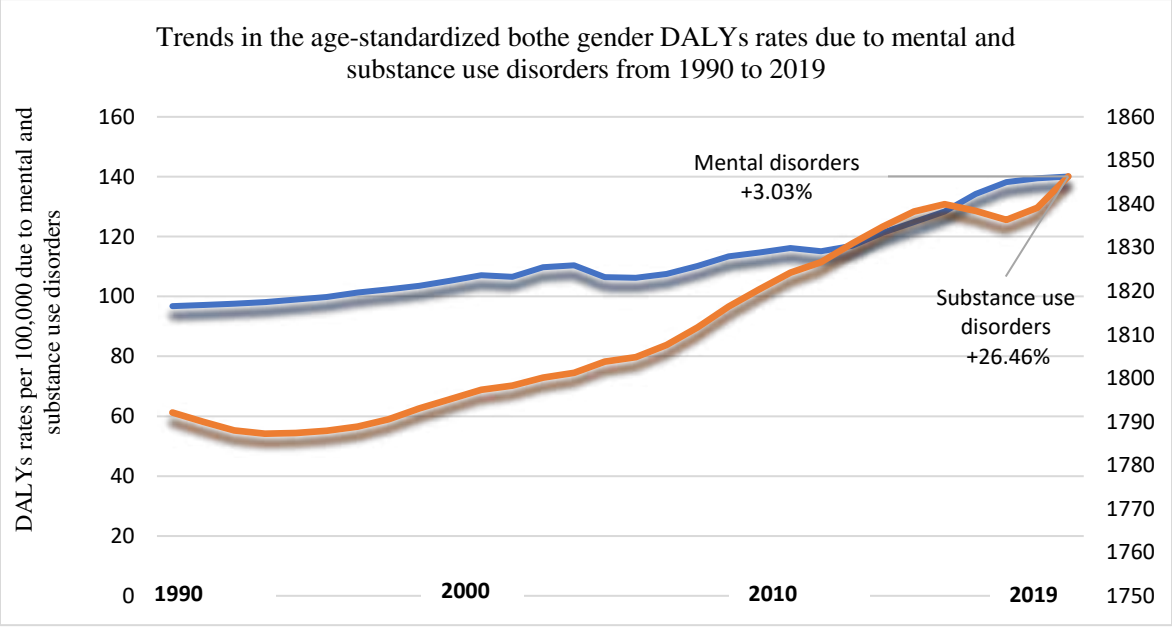


Table.2 Percentage changes in the DALYs rates[3] due to mental and substance use disorders from 1990 to 2019 by age and gender.

	Male			Female		
Age	**1990 (95% UI)[4]**	**2019 (95% UI)**	**Change %[2] (95% UI)**	**1990 (95% UI)**	**2019 (95% UI)**	**Change % (95% UI)**

Age-standardized	1619.63 (1182.75, 2141.86)	1662.59 (1213.91, 2214.61)	2.65 (1.93, 3.37)	2053.83 (1506.97, 2710.96)	2117.02 (1550.33, 2803.76)	3.07 (2.35, 3.79)
20-24	1893.56 (1293.25, 2640.63)	1936.21 (1310.92, 2685.13)	2.25 (1.53, 2.97)	2713.27 (1800.65, 3806.88)	2827.09 (1914.83, 3914.91)	4.19 (3.47, 4.91)
25-29	2033.35 (1405.55, 2767.65)	2065.59 (1430.52, 2833.32)	1.58 (0.86, 2.3)	2834.09 (1897.66, 3897.29)	2913.89 (1981.57, 3995.81)	2.81 (2.09, 3.53)
30-34	2158.58 (1509.04, 2966.38)	2199.23 (1555.93, 3086.57)	1.88 (1.16, 2.6)	2887.03 (1990.07, 3965.36)	2945 (2018.28, 4080.74)	2.00 (1.28, 2.72)
35-39	2248.52 (1625.05, 3026.78)	2311.9 (1649.87, 3156.95)	2.81 (2.09, 3.53)	2934.33 (2099.47, 4011.93)	3000.67 (2113.57, 4136.92)	2.26 (1.54, 2.9)
40-44	2240.6 (1603.85, 2991.92)	2316.41 (1654.85, 3146.97)	3.38 (2.66, 4.1)	2895.84 (2025.37, 4048.22)	2971.87 (2077.61, 4203.79)	2.62 (1.9, 3.3)
45-49	2163.65 (1566.67, 2913.1)	2238.18 (1619.32, 3018.77)	3.44 (2.72, 4.16)	2795.71 (2008.41, 3831.06)	2876.06 (2068.86, 3966.95)	2.87 (2.15, 3.59)
50-54	2068.46 (1501.95, 2792.61)	2139.34 (1545.87, 2824.42)	3.42 (2.7, 4.14)	2654.95 (1938.27, 3628.96)	2737.73 (1954.37, 3680.63)	3.11 (2.39, 3.8)
55-59	1958.53 (1414.32, 2681.63)	2032.61 (1456.59, 2767.87)	3.78 (3.06, 4.5)	2538.61 (1794.95, 3485.98)	2633.29 (1827.28, 3589.32)	3.72 (3, 4.4)
60-64	1822.3 (1295.96, 247967)	1896.82 (1366.85, 2525.13)	4.08 (3.36, 4.8)	2373.97 (1619.31, 3286.31)	2475.15 (1707.02, 3372.69)	4.26 (3.54, 4.9)
65-69	1653.93 (1165.82, 2223.01)	1727.4 (1246.81, 2289.38)	4.44 (3.72, 5.16)	2135.27 (1469.56, 2863.57)	2231 (1586.02, 2999.04)	4.48 (3.76, 5.2)
70-74	1478.01 (1052.49, 1962.58)	1561.5 (1144.25, 2034.72)	5.64 (4.92, 6.36)	1887.871 (1344.95, 2526.39)	1979.95 (1431.52, 2616.89)	4.87 (4.15, 5.5)

1 Change in percentages of DALYS from 1990 to 2019
2 per 100,000 person's year
3 95% Uncertainty interval

Figure 2 Percentage changes in disability adjusted life years' (DALYS) of Mental disorders in Saudi Arabia 1990 to 2019 by age and gender.

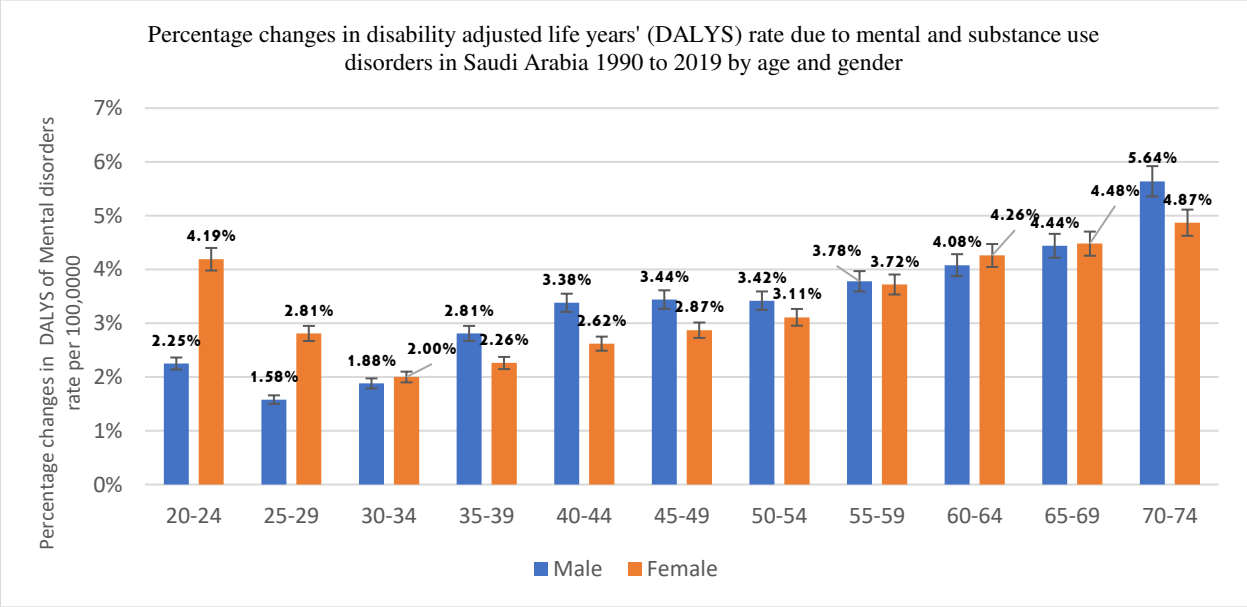
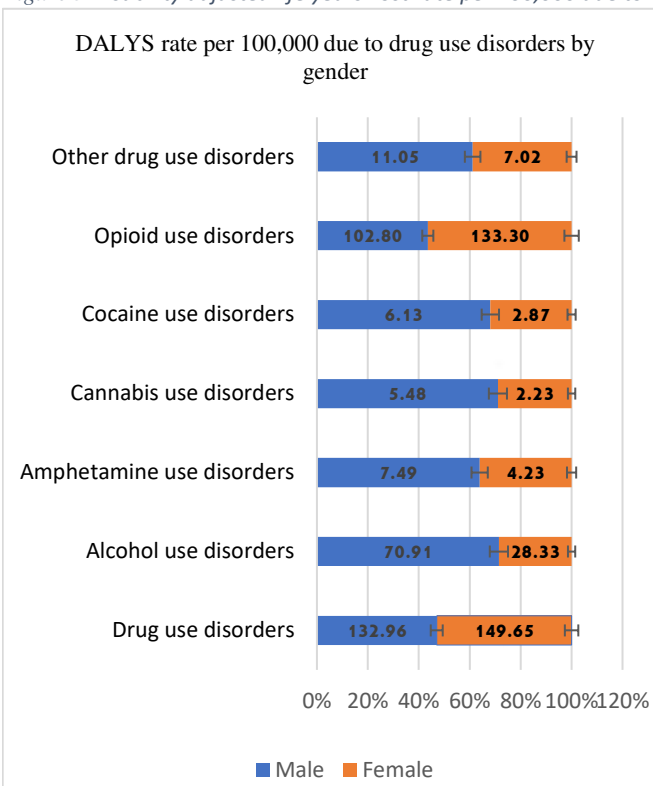


Figure 3 Disability adjusted life years' lost rate per 100,000 due to mental and drug use disorders by gender in Saudi Arabia 2019



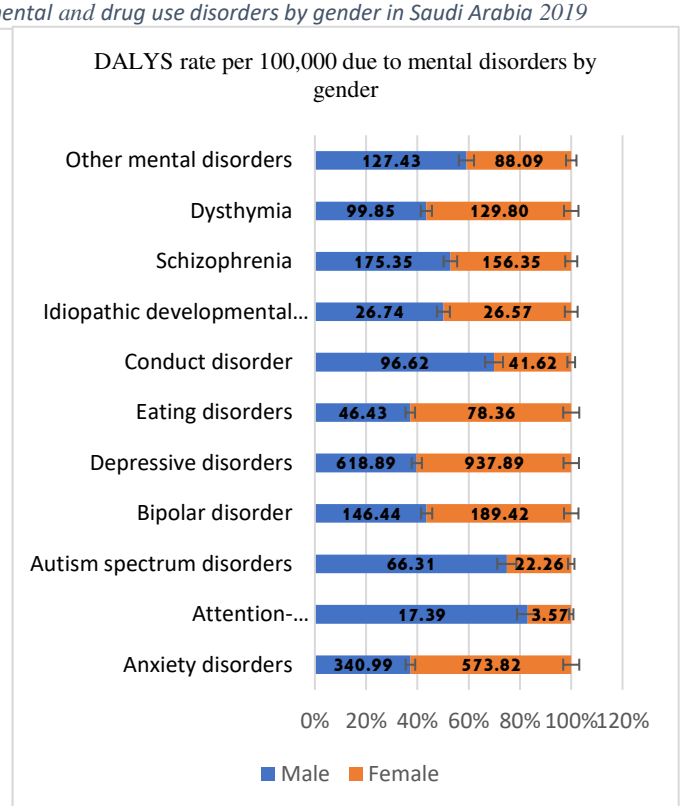


Figure 4 ***DALYS rate per 100,000 due to mental and drug use disorders by gender in 1990***

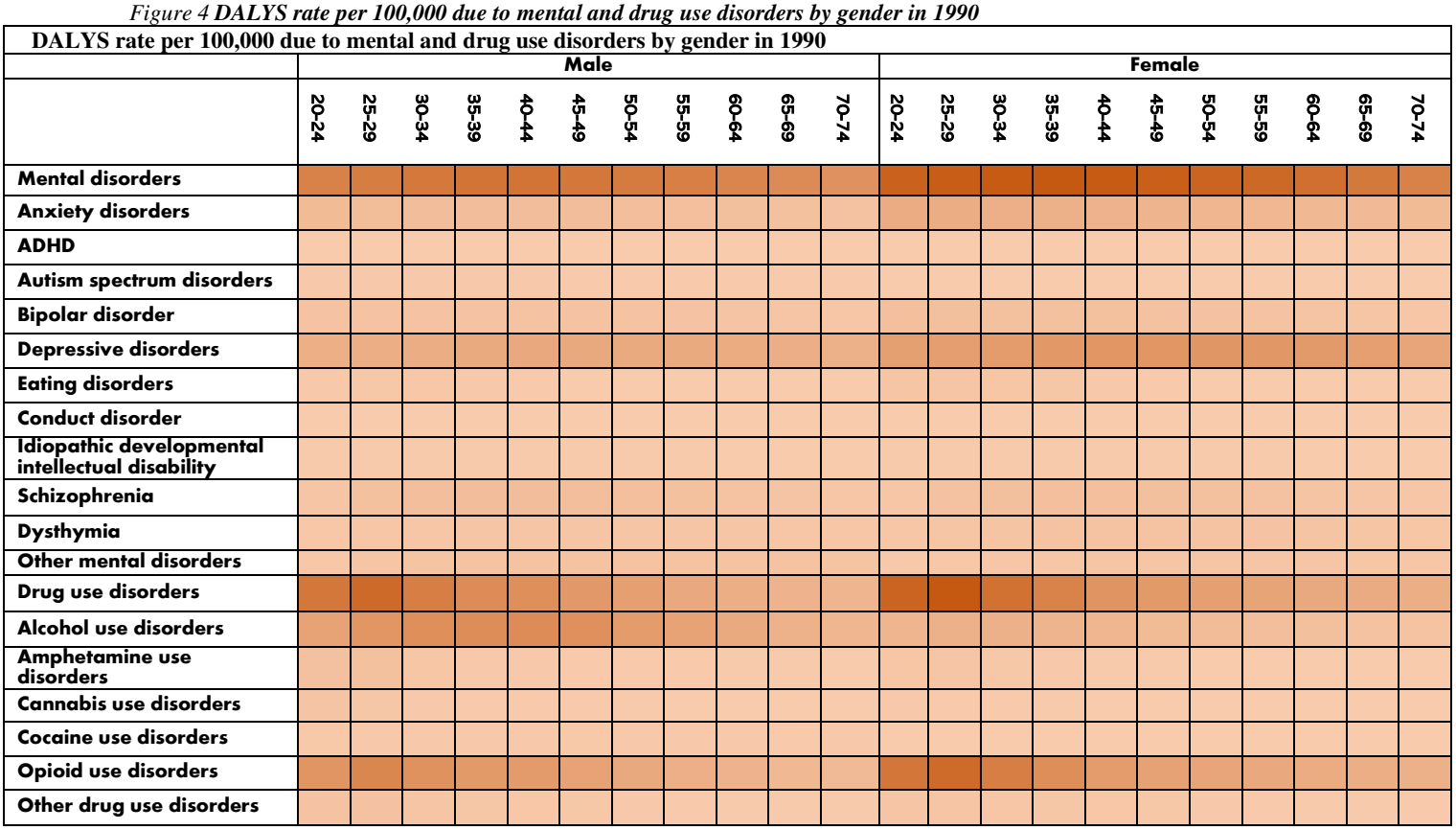


Figure 5 ***DALYS rate per 100,000 due to mental and drug use disorders by gender in 2019***