The Burden of Mental Illness: An Emerging Global Disaster

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ABSTRACT

The global burden of disease (GBD) has shifted from communicable to non-communicable diseases, and from premature death to years live with disabilities (YLDs) over the past 30 years. Mental and substance use disorders constitute a major component in the scenario of the global health with a significant impact on the global burden of disease, especially in the developing countries. The 1990 GBD study listed depression as the fourth common cause of global burden of disease; while lower respiratory infections, diarrheal diseases and conditions arising during perinatal period are top in the list. In GBD 2000 study depressive disorders climbed to the third place, however still behind lower respiratory infections and diarrheal diseases. The subsequent 2010 GBD study ranked depression in the second place of the global disability burden, and are also considered as a major contributor to the burden of suicide and ischaemic heart disease. The WHO predicted that depressive disorders will be the leading cause of global burden in 2030.

KEYWORDS: Global burden of disease (GBD), Mental illnesses, Substance use disorders

INTRODUCTION

The growing interest in the burden of chronic and disabling illnesses, which includes mental disorders, has increased in the last 30 years. This was followed by a rapid change in health needs of the world population over the next two decades. In developing countries for instant, non-communicable diseases, such as mental disorders and heart disease, will overtake infectious disease and malnutrition as the leading causes of morbidity. By the year 2020, death due to non-communicable diseases is also expected to increase to seven out of every ten deaths, as compared with less than half 30 years ago. It is estimated that death from non-communicable diseases will jump from 28.1 million per year in 1990 to 49.7 million in 2020, an increase of 77% [1].

The majority of these changes are expected to occur in developing countries as compared to developed and underdeveloped countries, due to increased life span and rapid aging processes. With a significant fall of birth rate in most developed countries; the ratio of adults to children will be increased and subsequently the prominent health problem will be those of adults' because less number of children are affected. These changes, termed 'epidemiological transition', has been observed in a few countries in Asia and South America. More countries are expected to experience this phenomenon in the next few years [1].

Mental Health in Malaysia

The National Health and Morbidity Survey (NHMS), has been an important platform for monitoring the health of the population in Malaysia. The objectives of the NHMS are to provide community-based data on the pattern of common health problems, health service utilisation, and health expenditure in the community. The prevalence of mental health problems among adults have steadily increased in the last few years. It increased from 10.7% in 1966, to 11.2% in 2006, to 29.2% in 2015 (NHMS-V) [2]. With the current prevalence of 29.2%, every three in ten adults aged 16 years and above will have some sort of mental health problem(s) in the course of their lives; which means that 4.2 million

out of 14.4 million Malaysians aged 16 and above will suffer from a form of mental illness. Although the difference was not significant, the prevalence in females was slightly higher than in males. The at risk groups include females, younger adults, and adults from low income families. The overall prevalence of mental health problem among children (five to 15 years old) was 12.1%. The prevalence was as follows: peer problems (32.5%), conduct problems (16.7%), emotional problems such as anxiety and depression (15.7%), poor-social skills (11.2%), and hyperactivity (4.6%). Risk factors for children are boys, younger age group, and from rural areas.

Although the NHMS-V [2] did not assess the prevalence of any specific mental illness, anxiety and depression are among the common mental health problems in the community across social classes. In Malaysia, depression affects approximately 2.3 million people at some point in their lives [3]. Depression is a debilitating illness, and has become a leading cause of morbidity globally. The lifetime occurrence of depression in any country is between 8 and 10%. The World Bank predicted that 340 million people will suffer from depression by 2020; and by 2030 depression will be the most disabling disease, as it will have the highest number of days lost due to a disability [4].

There is no exact figure on the prevalence of depression in Malaysia. In his review, Ng (2014) [5] found that the prevalence of depression in Malaysia was estimated to be between eight and 12%. The figures were higher among women of low socio-economic background or those with medical comorbidity. According to Firdaus and Tian (2011) [6], the prevalence in the primary care setting was 6.7% to 14.4%; however, it is higher in the elderly and among those with co-morbid illnesses. Meanwhile, Malaysian life expectancy has been rising lately. Life expectancy at birth in 2015 was 72.5 years for males and 77.4 years for females. As Malaysia progresses towards an ageing nation, the population over 65 should come to 15% of the population by 2035 [7]. Thus, we expect that larger numbers of the elderly population will be suffering from depression as a result of longer life span; this is in accordance with the WHO prediction that major depressive disorder will be the leading cause of burden in 2030 [4].

Quantifying the Global Burden of Illness and Disability

Although diseases such as neuropsychiatric disorders and chronic mental illnesses are considered as serious illnesses, the mortality rate is low. Therefore, it is important to have a single data or a common parameter to measure for survival and health status of the overall population for the benefit of health policy makers. In this aspect, two vital parameters are required: premature death and disability. The previous research agrees that the appropriate parameter is time (in years) lost through premature death, and time (in years) lived with a disability. A range of time-based variation measurements has been developed world-wide; the so-called quality-adjusted life year (QALY). For the Global Burden of Disease (GBD) Study, an internationally standardised form of the QALY was used, known as the disability-adjusted life year (DALY) [8].

DALYs are population health measures that combined mortality and morbidity rates in a single measure. DALYs are also defined as years of healthy life lost. The DALY expresses years of life lost to premature death (YLL) and years lived with a disability (YLD) or poor health of specified severity and duration. The effect of fatal cases (disease or injury) is captured by YLL (years of life lost due to premature mortality), while YLD (years of lived with disability) captures the future health consequences in terms of sequelae of diseases, injuries, or accidents that were not fatal. To calculate total DALYs for a given condition in a population; YLL and YLD for that condition each must be estimated first, and then totalled [8]. One DALY represents the loss of a healthy year of life.

WHO Global Burden of Disease (GBD) Study 1990 and 2000

Historically the GBD enterprise was started in early 1990s (GBD 1990) [1, 9]. The study was commissioned by The World Bank; while the founders of the study were Dr Christopher Murray and Dr Alan Lopez. It then grew to become a global effort in GBD 2010 study. The GBD study utilised the most comprehensive effort to analyse and quantify the world health problems. The Disease Burden Unit of WHO continuously updated and published GBD findings. The GBD has helped

transform health care policy in numerous countries, and has greatly influenced research, policy and education. The GBD study is used by numerous organisations as a primary source of data information and analysis; including The World Bank and U.S National Institutes of Health [9].

The Global Burden of Diseases, Injuries, and Risk Factors Study 1990 (GBD 1990) [1] provides a comprehensive reference for policy-makers of the world current and future health needs for the first time. The researchers involved in this ambitious five-year project developed a new approach of measuring health status. Their method quantifies not merely the number of death but also the impact of premature death and disability on a population; and combines these into a single unit of measurement or parameter of the overall "burden of disease" on the population. The series also presents the first estimates of the proportion of mortality and disability that can be attributed to certain risk factors for any illness throughout the world.

Due to limited data available, policy makers had difficulty to plan for future health services. There was no single measurement or parameter that combined the fatal and non-fatal outcome of disease or injury from the exposure to multiple major health risks prior to the first GBD study. Most of the available epidemiological data fails to capture the impact of non-fatal outcomes of chronic illness and injury, such as dementia or blindness on population health. The traditional health statistics also do not allow policy-makers to compare the relative cost-effectiveness of different interventions, such as the treatment of ischaemic heart disease versus long term care for schizophrenia. The GBD set out to address these problems by incorporating non-fatal conditions into assessments of health status; and measurement of disease and injury burden in a single parameter that can also be used to assess the cost-effectiveness of the interventions. It is an exceptional effort to introduce a common metric or parameter to summarise the disease burden and major risk factors that cause those health outcomes according to International Classification of Diseases (ICD) diagnoses.

The 1990 GBD [1] study had a significant contribution in analysing and assessing the impact of damage from diseases, injuries and risk factors of the

Table 1 Change in range order of disease burden for 15 leading causes, worldwide, 1990-2020

1990			2020
Disease / Injury	Rank	Rank	Disease / Injury
Lower respiratory infection	1	1	Ischaemic heart disease
Diarrheal disease	2	2	Unipolar major depression
Conditions arising during perinatal period	3	3	Road traffic accidents
Unipolar major depression	4	4	Cerebrovascular disease
Ischaemic heart disease	5	5	COPD
Cerebrovascular disease	6	6	Lower respiratory infection
Tuberculosis	7	7	Tuberculosis
Measles	8	8	War
Road traffic accidents	9	9	Diarrheal disease
Congenital abnormalities	10	10	HIV
Malaria	11	11	Conditions arising during perinatal period
COPD	12	12	Violence
Fall	13	13	Congenital abnormalities
Iron-deficiency anaemia	14	14	Self-inflicted injuries
Protein-energy malnutrition	15	15	Trachea, bronchus and lung cancers

Reference [1]: World Health Organization 1996

world population at large. Various governments and non-government agencies plan their strategic allocations in health resources and prevention programs based on the finding of this study. The results of the study confirmed that many are suffering from non-communicable diseases and injuries that significantly contribute to health burden, especially in a rapidly

Table 2 Ten leading causes of burden of disease, worldwide, 2004 and 2030

2004	% of total DALYs	Rank	Rank	% of total DALYs	2030
Disease/Injury					**Disease/Injury**
Lower respiratory infection	6.2	1	1	6.2	Unipolar depressive disorders
Diarrheal disease	4.8	2	2	5.5	Ischaemic heart disease
Unipolar depressive disorders	4.3	3	3	4.9	Road traffic accidents
Ischaemic heart disease	4.1	4	4	4.3	Cerebrovascular disease
HIV/AIDS	3.8	5	5	3.8	COPD
Cerebrovascular disease	3.1	6	6	3.2	Lower respiratory infection
Prematurity and low birth	2.9	7	7	2.9	Hearing loss, adult onset
Birth asphyxia & birth trauma	2.7	8	8	2.7	Refractive errors
Road traffic accidents	2.7	9	9	2.5	HIV/AIDS
Neonatal infection & others	2.7	10	10	2.3	Diabetes mellitus
COPD	2.0	13	11	1.9	Neonatal infection & others
Refractive errors	1.8	14	12	1.9	Prematurity & low birth weight
Hearing loss, adult onset	1.8	15	15	1.9	Birth asphyxia & birth trauma
Diabetes mellitus	1.3	15	18	1.6	Diarrheal diseases

Reference [10]: World Health Organization 2008

industrialising region in Asia and developing countries. Neuropsychiatric disorders were major causes of disability as measured by DALYs; however, they were misleading when measured by mortality alone, as the mortality rate due to these illnesses is low.

Table 1 [1] and Table 2 [10] summarise the leading causes of burden and projected burden from GBD 1990 and 2000 study respectively. The GBD 1990 ranked depressive disorders as the fourth leading cause of burden worldwide (equivalent to 3.7% of all DALYs), after lower respiratory infections, diarrhoeal diseases, and conditions arising during the perinatal period; and one of the leading causes of years lived with disability (YLD), accounting for 10.7% of total YLDs.

In 2001, the WHO embarked on a new assessment of the Global Burden of Disease for the year 2000 (GBD 2000) [10] using new epidemiology parameters. Parts of the findings were analysed and presented in the WHO Report (2002, 2008) [10, 11]. The data also had been published by Mathers et al. (2002) [12]) and Ustun et al. (2004) [13]). The GBD 2000 found that depressive disorders were the third leading cause of burden (equivalent to 4.3% of all

Table 3 DALYs of neuropsychiatric disorders in middle-income countries, 2004

	Neuropsychiatric disorders	DALYs (thousands)
1	Unipolar depressive disorders	28,983
2	Alcohol use disorders	14,853
3	Schizophrenia	8,429
4	Bipolar affective disorder	7,041
5	Alzheimer's and other dementias	4,772
6	Drug use disorders	3,664
7	Migraine	3,512
8	Panic disorder	3,348
9	Epilepsy	3,201
10	Obsessive compulsive disorders	2,484
11	Post-traumatic disorders	1,663
12	Insomnia (primary)	1,485
13	Multiple Sclerosis	730
14	Parkinson disease	670

Reference [10]: World Health Organization 2008

DALYs), after lower respiratory infections and diarrhoeal diseases. It was also the leading cause of disability, responsible for 13.4% of YLDs in women and 8.3% in men. By the year 2030, it is predicted that depression will be the most burdening illness worldwide [10].

Unipolar depression was the largest disease burden among neuropsychiatric disorders in middle-income countries in 2004, accounting for 28,983 DALYs. The other five top burdens in the list are bipolar disorder, schizophrenia, epilepsy, alcohol use disorder, and Alzheimer disease and other dementia (Table 3) [10]. Although the disability burden of neuropsychiatric disorders is almost the same for males and females, the major contributing causes are different. Although depression is the leading causes of burden for both males and females, the burden is 50% higher in females than males. The GBD 2000 study also showed that in all the regions, neuropsychiatric disorders are the most important causes of disability, accounting for around one third of YLDs among adults aged 15 years and above.

Mental and Substance Use Disorders in GBD 2010

The Global Burden of Disease Study 2010 (GBD 2010) [9] is the largest ever systematic effort to quantify the global distribution and causes of a wide array of major diseases, injuries, and health risk factors. The GBD 2010, which was launched in 2007 is a consortium of seven partners and it is co-sponsored by Bill & Melinda Gates Foundation. It celebrated the 20th anniversary in Seattle, USA recently on 25-27th September 2017 [14]. Although the earlier work of GBD was conducted mainly by researchers from Harvard and the World Health Organization (WHO) in a relatively small scale; the GBD 2010 grew extensively in a bigger scale as a global effort. It involved nearly 500 experts in epidemiology, statistics and other relevant disciplines in 50 countries throughout the world. The work had been highlighted in The Lancet which published seven papers, commentaries and extensive web appendices [14].

The GBD 2010 was a comprehensive analysis of burden, with an expanded number of mental and substance use disorders as well as improved definitions, data collection, and methodology. The inclusion of childhood disorders was especially important in regions such as Africa, where up to 40% of the population are children. The burden estimation techniques were changed substantially in GBD 2010. Among the notable changes are, prevalence rather than incidence based and YLDs were estimated without age weighting and discounting. The GBD 2010 also provides new estimates of years of life lost to premature mortality (YLL), years lived with disability (YLD), and disability-adjusted life years (DALY). It is developed from the weakness of 1990 and 2004 GBD study [10].

Throughout the world in 2010, the mental and substance use disorders constituted 183.9 million DALYs (95% UI 153.5-216.7 million) or 7.4% of the total burden. On the whole, mental and substance use disorders were the leading causes of YLDs and the fifth highest disorder of global DALYs (Table 4). Mental and substance use disorders were also the main cause of non-fatal burden of disease in 2010, which accounted for 175.3 million (95% UI 144.5-207.8 million) YLDs (Table 5) [15]. Depressive disorders contributed most of the non-fatal burden of mental and substance use disorders, followed up by anxiety disorders, drug use disorders, and schizophrenia. Among the mental and substance use disorders group, depressive disorders accounted for most DALYs, followed by anxiety disorders, drug use disorders, and alcohol use disorders (Table 5). While eating disorders, childhood behavioural disorders, and pervasive developmental disorders, which were assessed for the first time in GBD 2010, estimates contributed about 9% of DALYs accounted for by mental and substance use disorders [13, 16-17].

In 2010 Major Depressive Disorder (MDD) constituted 8.2% of the global YLDs; it is also the second highest in the list of global disability and eleventh leading cause of global burden. Another depressive illness which is less severe, dysthymia accounted for 1.4% of global YLDs. Women suffered a higher burden of depression as compared to men, while the adults of working age group formed the largest proportion of YLDs. Between 1990 and 2010, the global burden of depression increased by 37.5% due

to population growth and aging. The GBD 2010 demonstrated that MDD contributed additional burden of 16 million DALYs and 4 million DALYs when it implicated with a risk factor for suicide and ischaemic heart disease, respectively. This additional burden contributed to the increased of overall burden of depression to 3.8% of global DALYs. The 2010 GBD study concluded that depressive disorders are a leading direct cause of the global disease burden and depression also contributes to additional burden related to suicide and ischaemic heart disease [18, 19].

Table 4 Proportion of YLDs, YLLs, and DALYs explained by the ten leading causes of total burden in 2010

		Proportion of total DALYs (95% UI)	Proportion of total YLDs (95% UI)	Proportion of total YLLs (95% UI)
1.	Cardiovascular and circulatory diseases	11.9% (11.0-12.6)	2.8% (2.4-3.4)	15.9% (15.0-16.8)
2.	Diarrhoea, lower respiratory infections, meningitis, and infectious diseases	11.4% (10.3-12.7)	2.6% (2.0-3.2)	15.4% (14.0-17.1)
3.	Neonatal disorders	8.1% (7.3-9.0)	1.2% (1.0-1.5)	11.2% (10.2-12.4)
4.	Cancer	7.6% (7.0-8.2)	0.6% (0.5-0.7)	10.7% (10.0-11.4)
5.	Mental and substance use disorders	7.4% (6.2-8.6)	22.9 (18.6-27.2)	0.5% (0.4-0.7)
6.	Musculoskeletal disorders	6.8% (5.4-8.2)	21.3 (17.7-24.9)	0.2% (0.2-0.3)
7.	HIV/ AIDS and tuberculosis	5.3% (4.8-5.7)	1.4% (1.0-1.9)	7.0% (6.4-7.5)
8.	Other non-communicable disease	5.1% (4.1-6.6)	11.1% (8.2-15.2)	2.4% (2.0-2.8)
9.	Diabetes, urogenital, blood and endocrine disease	4.9% (4.4-5.5)	7.3% (6.1-8.7)	3.8% (3.4-3.3)
10.	Unintentional injuries other than transport injuries	4.8% (4.4-5.3)	3.4% (2.5-4.4)	5.5% (4.9-5.9)

DALYs=disability-adjusted life-years. YLDs=years lived with disability. YLLs=years of life lost.
Reference [15]: Lancet 2013

Table 5 The percentages of YLDs, YLLs and DALYs of each mental and substance use disorders groups in 2010

	Disease	YLDs (%)	YLLs (%)	DALYs (%)
1	Depressive disorders	42.5	-	40.5
2	Schizophrenia	7.4	7.1	7.4
3	Bipolar disorder	7.4	-	7.0
4	Alcohol use disorders	7.9	44.4	9.6
5	Drug use disorders	9.4	41.7	10.9
6	Anxiety disorders	15.3	-	14.6
7	Pervasive development disorders	4.4	-	4.2
8	Childhood behavioural disorders	3.5	-	3.4
9	Eating disorders	1.1	2.4	1.2
10	Idiopathic intellectual disability	0.6	-	0.6
11	Other mental disorders	0.6	4.3	0.8

DALYs=disability-adjusted life-years. YLDs=years lived with disability. YLLs=years of life lost.
Reference (15): Lancet 2013

CONCLUSION

The high burden of depression was one of the key findings of the GBD studies. These studies found a consistent increased in the burden of depression, as shown in GBD 1990, 2000, and 2010 studies. Although there were some variations by region, patterns but the trends are remarkably similar worldwide. Depressive disorders constitute a large proportion of the global burden of disease, both in the developed and developing countries. The high burden is resulting from the combination of a high prevalence of depression, high impact on functioning, and early age of onset. These results of the GBD studies have provided powerful scientific and advocacy support for mental health to date. Thus, it is imperative to apply these findings for policy-making, planning, and intervention programs.

Conflict of Interest

Author declare none.

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