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Variations in Suicide and Depression

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An independent academic psychologist, based in England, who has written extensively on different areas of psychology with an emphasis on the critical stance towards traditional ideas.

A complete listing of his writings at http://kmbpsychology.jottit.com.

CONTENTS

1. VARIATIONS IN SUICIDE AND SELF-HARM

1.1. INTRODUCTION

Suicide rates vary with region, gender, age, time, ethnicity, and practice of death registration, for example (Yoshioka et al 2014).

From a survey of 8580 adults in Britain, Meltzer et al (2002) found lifetime suicidal ideation among 14.9% [1], suicide attempts by 4.4%, and deliberate self-harm reported by 2.4%. Table 1.1 lists some of the significant risk factors found for these behaviours.

Suicidal thoughts	Suicide attempts	Deliberate self-harm
Greater: • 16-24 yrs • Female • Divorced Less: • Black • South Asian • Manual worker	Greater: • 16-24 yrs • Female • "Probable psychosis" • Generalised anxiety disorder Less: • Black	Greater: • 16-24 yrs • Female • "Probable psychosis" Less: • Higher social class

(Data from Meltzer et al 2002)

Table 1.1 - Selected significant risk factors for lifetime suicidal thoughts and attempts, and deliberate self-harm.

Suicide soon after discharge from hospital is common

[1] This compares to 18.5% in Christchurch, New Zealand in 1989, and 9.5% in Puerto Rico (1987) (Meltzer et al 2002).

[2]. For example, 1-3 months after discharge from a psychiatric hospital (Dougall et al 2014).

In an analysis of over 10 000 suicides in Scotland between 1981 and 2010, Dougall et al (2014) found that two-thirds of individuals had been previously hospitalised (general or psychiatric) for a physical or mental illness. More suicides were discharges from general than psychiatric hospitals, and the majority of cases had no mental disorder recorded in their medical records.

The median time from discharge to suicide was twenty months. But this varied greatly between individuals with a psychiatric diagnosis at discharge (median: seven months) and none in their lifetime (median: 33 months).

Deliberate self-harm is a repetitive behaviour. About one-sixth of self-harmers will do so again within a year, and one-quarter within four years (Owen et al 2002). Repetition of self-harm is a risk for subsequent suicide (Zahl and Hawton 2004) [3].

Chen et al (2010) found that the repetition risk was less in Taiwan - 6% of individuals in the following year, and 10% within four years. Chen et al (2010) used data from Nantou County to see how many of 970 individuals who self-harmed repeated it between July 2000 and December 2005. Ninety individuals (9.3%) did repeat (most only once).

Repetition was significantly higher for women, and for individuals using self-cutting or self-poisoning. Suburban or rural residence, marital status, and education level did not differ between repeaters and non-repeaters.

The study only included individuals who came to the notice of authorities (eg: hospital treatment for self-harm).

1.2. COUNTRY DIFFERENCES

1.2.1. India

Manoranjitham et al (2010) used the "verbal autopsy" method to understand the risk factors for suicide in rural India. Information was collected from local community workers and medical staff, and relatives, neighbours of the deceased, and village elders to help classify the death and to understand the background.

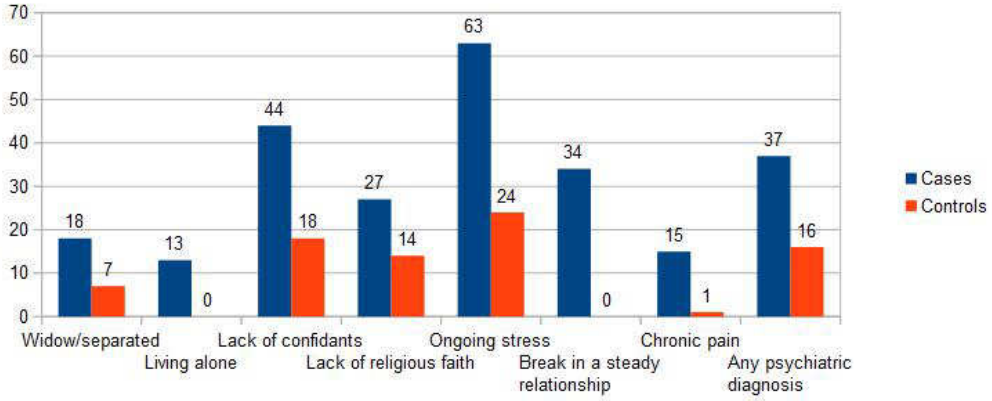
One hundred suicides from a rural district in south

[2] Suicide is also higher during the time in hospital (appendix 1A).

[3] But there are differences between individuals who only self-harm, and those who self-harm and suicide attempt (appendix 1B).

India [4] from July 2006 to February 2008 were the cases in this case-control study, and 100 matched neighbours were the controls [5]. Semi-structured interviews were used to collect the information.

The suicides were distinguished from the controls by psychiatric illness (37% vs 16%); most commonly alcohol dependence and adjustment disorder, but this was less important than the other risk factors. The suicide victims were significantly more likely to be widowed or separated/living alone, lack confidants/relationship breakdown, lack religious faith, experience ongoing stress and chronic pain (figure 1.1).



(Data from Manoranjitham et al 2010 table 2 p28)

Figure 1.1 - Percentage of cases and controls (significant differences only).

1.2.2. Greece

Economou et al (2013) found that suicidal thoughts and attempts had increased in Greece since the global financial crisis in 2008. In 2010, a memorandum of economic and financial policies was signed by the Greek government to allow for financial support, but this has produced higher unemployment and declining national wealth.

Economou et al (2013) performed nationwide random telephone surveys in 2009 (before the signing of the memorandum) and in 2011 (after signing). The samples were 2192 and 2256 respectively. Questions were asked about suicide, and financial stress as well as general ones (eg: family status) to adults aged 18 to 69 years (table 1.2).

[4] 85 villages in part of Vellore district in Tamil Nadu state.
[5] Rate of suicide in district: 95 per 100 000 (vs 10 in whole of India).

- Sampling process - national telephone number database (but misses those individuals not included and/or without a telephone). Within each household the individual with a birthday last was selected for interview.
- Response rates = 82.2% (2009) and 80.5% (2011).
- Interviews performed by trained graduates in the social sciences.
- A random sample of calls were rated by ten interviewers to check for reliability. Also a random sample of respondents were re-interviewed by psychiatrists.
- Standard definitions of suicidal thoughts and attempts used (but only self-reports with no independent verification).
- Psychometric measure of financial stress - Index of Personal Economic Distress (Madianos et al 2011). This has eight items about daily household finances in last six months, which are scored 1-3. Scores of 15 or above are seen as "high financial distress".

Table 1.2 - Methodology of Economou et al (2013).

In 2009 5.2% of the respondents admitted to thoughts about suicide compared to 6.7% in 2011 [6]. This was a significant increase. The increase was greater among men, older adults (55-64 years), and married individuals, while the rate decreased between the surveys among younger individuals (18-24 years), and unmarried respondents [7].

In terms of suicide attempts, there was a significant increase from 1.1% of respondents in 2009 to 1.5% in 2011 [8]. The increase was greater among men, younger adults (25-44 years), married individuals, those unemployed, and individuals with the highest educational qualifications [9], but a significant decrease for 45-64 year-olds.

Altogether, in 2011, suicidal thoughts and attempts were significantly more likely among individuals with a current or recent diagnosis of Major Depressive Disorder, adults with financial hardship, and those with a previous history of suicide. Low trust of others was associated with suicidal thoughts only, while being male, and being

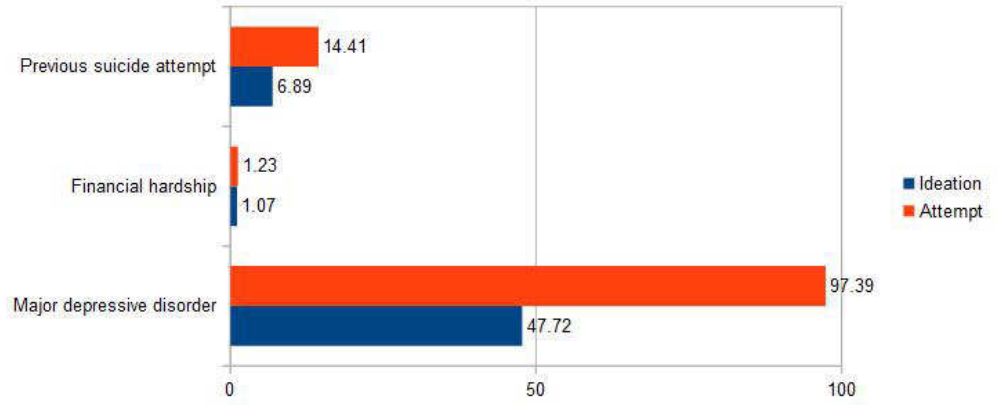
[6] This compares to other studies, which found 4.8% in 1978, 10.9% in 1984 (during an economic recession), and 2.4% in 2008 (pre-financial crisis) (Economou et al 2013).

[7] In a survey of over 2400 adults from the National Psychiatric Morbidity Survey in Britain, Gunnell et al (2004) found that 2.3% of respondents reported suicidal thoughts (1 in 38 women and 1 in 50 men). Such thoughts were highest in females (gender), 16-24 year-old (age group), not in stable relationship, unemployed, and low level of social support. One in 200 who thought about it attempted suicide.

[8] As compared to 0.7% in 1978, 2.6% in 1984, and 0.6% in 2008 (Economou et al 2013).

[9] The authors stated: "people with high educational attainment might face difficulty in finding a job or might be experiencing a mismatch between their educational level and their salary. Men and married people are the breadwinners in the Greek family and may feel incapable of providing their families with the essentials due to unemployment or job insecurity" (Economou et al 2013 p57).

a married individual were significant predictors of suicide attempts only (figure 1.2).



(Data from Economou et al 2013 tables 4 and 5 p56)

Figure 1.2 - Significant odds ratios for suicidal ideation and attempt.

1.2.3. Japan

In Japan, suicide rates in 2009 were 36.2 per 100 000 for men and 13.2 for women [10], which translates as 30 000 deaths per year (Nanri et al 2013). This is the highest among high-income countries, and the seventh major cause of death in Japan (Yoshioka et al 2014). This goes along with the worldwide increase of suicide to the tenth leading cause of death (Nanri et al 2013).

There is always interest in what modifiable factors might be involved in suicide. One environmental factor with limited research is diet. A few studies around the world have looked at the link between specific aspects of diet and suicide (eg: alcohol, coffee), but Nanri et al (2013) was the first study to focus on overall dietary patterns.

They made use of data from the Japan Public Health Centre-based (JPHC) Prospective Study, which followed two cohorts of adults over forty years old since 1990 and 1993 (n = 140 420) [11]. Nanri et al (2013) had the data of over 99 000 individuals up to December 2005. Dietary pattern was self-reported for 134 food and beverage items.

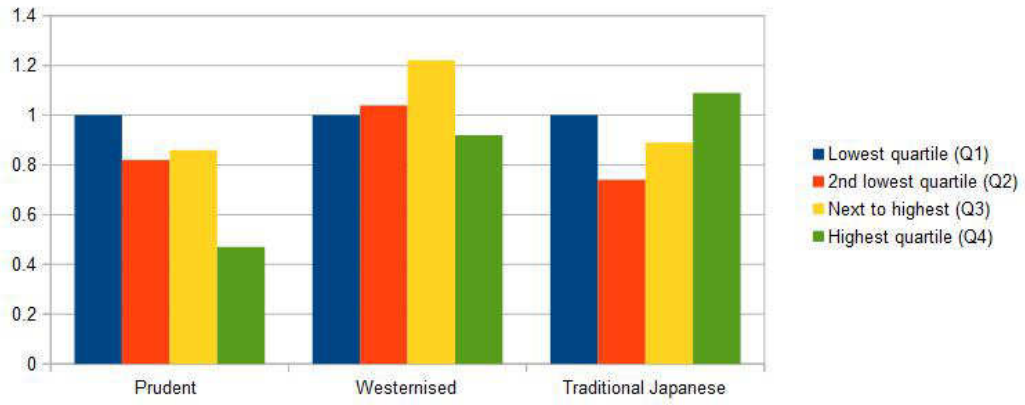
Three groups of dietary pattern were distinguished:

[10] This compares to an overall rate of 11 in the UK and Republic of Ireland in 2008 (Samaritans 2010).

[11] Measures were taken at baseline, then at 5-year and 10-year follow-up.

- Prudent - high vegetable, fruit, potato, and fish.
- Westernised - high processed meat, bread, diary products, and coffee.
- Traditional Japanese - high fish and seafood.

Two hundred and forty-nine of the study participants had committed suicide. Individuals with the "prudent" dietary pattern (highest quartile) were significantly less likely to die by suicide than the lowest quartile. Put another way, the risk was about half (figure 1.3). There was no significant association with suicide for the two other dietary patterns.



(Data from Nanri et al 2013 table 2 p425)

Figure 1.3 - Adjusted hazard ratios for suicide based on dietary pattern.

Some studies have found links between depression and the westernised dietary pattern, but other studies have not. Depression is, of course, a major factor in suicide.

Previous research had suggested that the traditional Japanese dietary pattern would lead to a reduced suicide risk (Nanri et al 2013).

The "prudent" dietary pattern has been linked to depression in older adults (eg: women in France; Samieri et al 2008), and generally (eg: women in Australia; Jacka et al 2010;) (eg: men and women in Norway; Jacka et al 2011). The nutrients like folate, vitamin C, and carotene, which the foods in this dietary pattern are rich in, seem to be key. For example, folate is involved in serotonin metabolism (Nanri et al 2013).

Table 1.3 summarises the main strengths and weaknesses of the Nanri et al (2013) study.

STRENGTHS	WEAKNESSES
1. Large sample. 2. Validated (by JPHC researchers) measure of food frequency. 3. Accurate death registration and classification procedures in Japan. 4. Some variables controlled for in analysis (eg: smoking, general health, general stress). 5. Prospective study - dietary pattern reported before suicide. 6. Variety of study sites in Japan.	1. Only measures dietary pattern at one point in time. 2. Self-reports of what eaten, and not independent verification. 3. No details about suicides (eg: depressed or not). 4. No details of other variables that may have an influence (eg: family history of suicide; economic situation of individual/family). 5. Only adults 40 years and over at start of study. 6. Mostly rural Japanese participants.

Table 1.3 - Strengths and weaknesses of Nanri et al (2013).

Charcoal Burning

Based on World Health Organisation data, it can be seen that the preferred method of suicide in different countries does not change very much, with the exception of charcoal burning (which produces carbon monoxide poisoning in a confined space) (Ajdacic-Gross et al 2008). Sudden increases in the use of this method have been observed in Hong Kong and Taiwan since the late 1990s. For example, in 1998, in Hong Kong sixteen people died from this method and thirty-two in Taiwan. But this number had dramatically increased to 1346 in 2005 in Taiwan, and less dramatically, but still a major rise, to 276 in 2002 in Hong Kong (Yoshioka et al 2014). The ease of availability of charcoal seems to be important [12].

But is the use of charcoal burning instead of other methods of suicide ("means-substitution"), or is it used by individuals who would not have used more lethal methods [13]? If it is the former, there will be a decline in the other methods used as charcoal burning rises and no overall rise in suicide rate. However, the latter seems the case in Hong Kong and Taiwan as the rate of use of other methods has remained unchanged. In other words,

[12] Yip et al (2010) reported success in reducing charcoal burning suicide in Hong Kong in a controlled study where charcoal access was restricted.

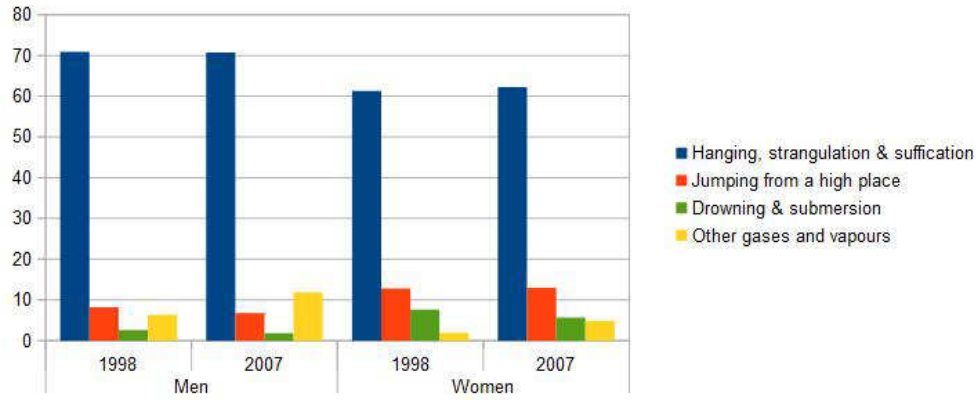
[13] The fatality rate for charcoal burning is estimated at 40-50% (ie: approximately half of suicide attempts survive) compared to 80-90% for shooting, 65-80% for drowning, and 70% for bridge jumping, for example. Medication overdose has a fatality rate of 1-5-4% (Yoshioka et al 2014).

an increase in overall suicides (Yoshioka et al 2014) [14].

There has been a similar increase in the charcoal burning suicide rate in Japan in the last decade, since a highly publicised case in February 2003 of a pact between a man and two women (Yoshioka et al 2014).

Yoshioka et al (2014) analysed the number of deaths from suicide of fifteen years old and above between 1998 and 2007 using the Vital Statistics of Japan. Officially, charcoal burning is not a separate category, but is included as "intentional self-poisoning by the exposure to other gases and vapours" [15]. This includes other sources of carbon monoxide like motor vehicle exhaust gas. Based on other studies the researchers estimated that 80% of deaths in this category were due to charcoal burning.

For both men and women in Japan during this period, hanging was by far the most common method of suicide (over 60% of cases). But charcoal burning has risen in popularity, particularly for men. In 1998, 1410 male suicides (6.3% of total suicides) were categorised as "other gases and vapours" compared to 2615 (11.9%) in 2007. For women, the figure rose from 181 (1.9%) to 433 (4.9%) in the same period (figure 1.4).



(Data from Yoshioka et al 2014 tables 1 and 2 p276)

Figure 1.4 - Percentage of suicides of leading methods used in Japan in 1998 and 2007 by gender.

Is this an overall increase in suicide for the period 2003-7 (known as the charcoal burning epidemic)? For adults aged 15-44 years old, there was an overall

[14] Hong Kong - 13.3 per 100 000 (1998) vs 16.4 (2002); Taiwan - 7.6 (1995) vs 19.3 (2006) (Yoshioka et al 2014).

[15] Category X67 in ICD-10 (where X60-X84 covers suicide death).

increase (ie: no decrease in other methods of suicide), but not for older adults (ie: other methods declined as use of charcoal burning increased). Overall, the rate of suicide was unchanged - 26.0 per 100 000 in 1998 and 25.3 in 2007 (Yoshioka et al 2014).

Yoshioka et al (2014) proposed three reasons for the increased use of charcoal burning in Japan by young adults:

i) Media reporting of cases, and the presentation of the method as a painless, non-violent but lethal one.

ii) Internet websites and chat rooms.

iii) High youth unemployment and poor employment prospects.

1.3. OCCUPATIONAL DIFFERENCES

The suicide rate varies between different occupations with certain groups having a significantly higher level than the general population. Past small-scale studies have pointed out that the risk is greater in occupations with access to the means to kill (eg: farmers and shotguns; medical professions and drugs) (eg: Skegg et al 2010), and in jobs with stressful working conditions (Milner et al 2013).

Milner et al (2013) combined thirty-four studies in a meta-analysis. Initially 1290 articles were produced with a computer database search using keywords like "suicide", "work", and "job". Exclusions included conceptual articles, qualitative studies, and those with incomplete data. This left quantitative studies written in English from 1950 until May 2012 [16].

Jobs were categorised using the International Standard Classification of Occupations (ISCO) (2008) into ten groupings based on skill level (table 1.4). Subsequently, military was excluded, and four levels of skill were distinguished (with 1 as lowest skilled occupations).

- 1 - managers
- 2 - professionals
- 3 - technicians
- 4 - clerks
- 5 - service and sales workers
- 6 - skilled agricultural and fishery workers

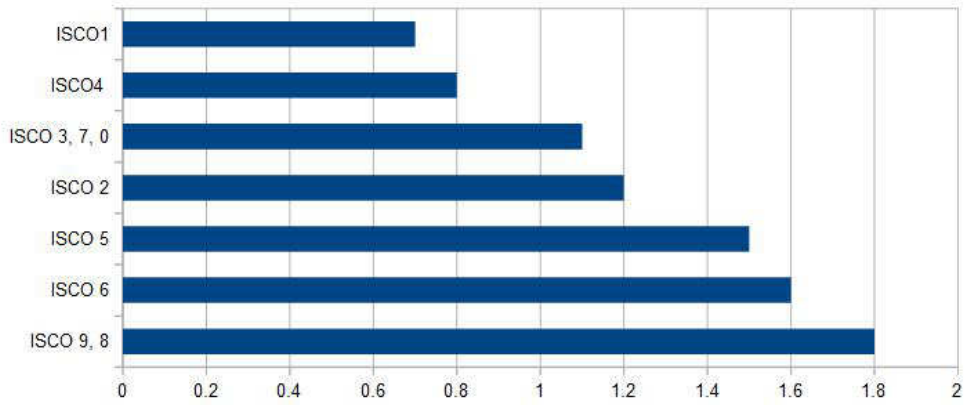
[16] This meta-analysis followed the PRISMA guidelines for transparent reporting of meta-analyses (http://www.prisma-statement.org/).

- 7 - craft and related trades
- 8 - plant and machine operators
- 9 - elementary occupations
- 0 - military

Table 1.4 - ISCO categories.

Most of the 34 studies were in North America and Europe (30 studies), and the remainder were high-income countries. The occupational groups covered by each study varied from one to fifty-three. The statistics used in the different studies were standardised into effect size as is the process in meta-analysis.

Using the ISCO categories, the highest risk of suicide was among category 9 (eg: labourers, cleaners) and category 8 (eg: ship deck crew, machine operators) jobs (figure 1.5). When the occupational categories were collapsed into four skill levels, there was a negative correlation - lower skilled/higher suicide etc. This was the same for male workers, but opposite for female workers (ie: higher skilled/higher suicide) (however there were few studies of female suicide).



(Data from Milner et al 2013 figure 2 p411).

Figure 1.5 - Risk of suicide based on occupation (where 1 = general population average).

Milner et al (2013) concluded that the "greater risk of suicide in lower skilled occupational groups may be symptomatic of wider social and economic disadvantages, including lower education, income and access to health services" (p413).

1.4. RELIGIOUSNESS

"Religiousness" has a relationship to suicide. For

example, individuals with no religious affiliation are more likely to attempt suicide in their lifetime than individuals with a strong religious affiliation (Kleiman and Liu 2014) [17]. But this finding relates to suicide attempts, and is based on retrospective interviews.

Hawton et al (2005) used the psychological autopsy method after death by suicide. This involves collecting information about the deceased from close friends and family. Individuals who had participated in religious activities were less likely to die from suicide than non-participants. But the sample was limited (Kleiman and Liu 2014).

Kleiman and Liu (2014) used data from the Third National Health and Nutrition Examination Survey (NHANES III) in the USA (National Center for Health Statistics 1994) to show that frequent religious service attendance is negatively correlated with suicide death. NHANES III is a national representative survey of 39 965 individuals interviewed in 1988-91 and 1991-4. The data on 20 014 over 18s were used in this study. "How often do you attend church or religious services (per year)" was the measure of religiousness, and twenty-four times was the cut-off for frequent (58% of sample).

Twenty-five individuals were found to have committed suicide by the end of 2006, and 5251 died from other causes (leaving 14 738 alive). Eight of the suicide cases (32%) were frequent religious service attendees compared to 55% of the others. After controlling for other variables, individuals who frequently attended religious services were 67% less likely to die from suicide than non-frequent attenders [18].

Table 1.5 summarises the main strengths and weaknesses of this study.

Religious service attendance is a component of religiousness, and there is a question of how this influences suicide. One answer is that religious organisation membership provides a supportive social network that reduces suicide. While it may be the religious prohibition against suicide that is relevant [19] (Kleiman and Liu 2014).

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[17] There are a few contradictory findings (eg: King et al 2013).

[18] Note that being male was the strongest association with suicide overall.

[19] For example, in the Qur'an, Surah 4.29 says: "Nor kill (or destroy) yourselves" (quoted in Cook 2014).

STRENGTHS	WEAKNESSES
1. A prospective, longitudinal study (over 12-18 years) (ie: measure service attendance before suicide). Only 2 of 141 previous studies on religion and suicide were prospective or longitudinal (Cook 2014). 2. Not dependent on the memory of friends and family. 3. Large nationally representative sample.	1. Very small number of suicides. But in line with suicide rate in USA (13.5 per 100 000 per year; Kleiman and Liu 2014). 2. Use of dichotomous variable - frequent vs infrequent attenders around 24 times per year. The authors said that having a cut-off of weekly (ie: 50 times per year) covered 10% of the sample, which was seen as too small. 3. No details of specific religion. Cook (2014) stated "that although religious service attendance is an objective measure widely employed in research of this kind, it is frustrating not to know more about the religious beliefs, behaviours, experiences and traditions of these participants" (p254).

Table 1.5 - Main strengths and weaknesses of Kleiman and Liu (2014).

1.5. LIFE EVENTS

Liu and Miller (2014) stated: "Although suicidal behaviour is multi-determined, reflecting a convergence of multiple intrapersonal and environmental influences, one risk factor that has received substantial empirical consideration over the past four decades is negative life events" (p182). They observed that research has tended to look at specific negative events, like childhood abuse, combat-related trauma, or debt (appendix 1C), rather than negative life events generally.

One problem for the researchers is the measurement of life events. The initial method was to count the number of events with a higher score being seen as more detrimental for mental health than a lower score (eg: Holmes and Rahe 1967; Social Readjustment Rating Scale). However, it is now accepted that the same life event will have different effects on different individuals depending on variables like unexpectedness, or the context of the event (eg: death of parent from suicide versus from natural causes).

The "contextual threat" approach (Brown and Harris 1978) explores the individual circumstances of the life event. For example, changing schools through the family moving location is different in its stress level and effect than expulsion (Liu and Miller 2014).

Liu and Miller (2014) found a positive correlation between negative life events and suicidal thoughts and behaviours, but not a negative correlation between positive life events and suicide [20], in a systematic review of 95 articles up to the end of 2010.

Some studies sub-divided life events into categories, and interpersonal stressors (eg: divorce) had a stronger relationship to suicide than financial stressors, for example. But there was "substantial inconsistency" between studies (Liu and Miller 2014).

Support for the association between negative life events and suicide was strongest for death by suicide, followed by attempts, and thoughts.

The studies included a number of different aspects of suicide:

- Suicidality - a general term to cover all aspects.
- Suicidal ideation/thoughts.
- Suicide plans.
- Suicide attempts.
- Death by suicide.

Other relevant variables included suicidal intent (ie: degree to which the individual did not want to be stopped), lethality of method used, and number of previous attempts.

Most of the studies used adolescent and adult samples, leaving an under-representation of research on pre-adolescents and older adults (Liu and Miller 2014).

Other relevant methodological issues included:

a) The use of self-report measures for life events.

b) What is included as a negative life event.

c) The period of the study (eg: recall for last year).

d) Measurement of suicidal ideation and behaviour.

e) Cross-sectional or longitudinal design.

f) Use of community or clinical samples.

1.6. APPENDIX 1A - NOSOCOMIAL SUICIDE

Individuals who are in psychiatric hospitals have a

[20] This is partly because the authors only found four studies looking specifically at this latter relationship.

much higher suicide rate than the general population (eg: over seventy times greater in Denmark; Madsen et al 2012). Wolfersdorf et al (1988) calculated an average rate of one suicide per 500 admissions (from studies between 1903 and 1987). Other studies placed the figure at a range of one suicide per 113 to 1300 admissions (Large et al 2014).

The association between being a psychiatric hospital inpatient and suicide is viewed by researchers as spurious rather than causal (Large et al 2014). In other words, the hospitalised individuals have "a range of significant psychological, social and medical problems that are known to be associated with an increased risk of suicide in the general population" (Large et al 2014 p118). This is exacerbated by "corralling such people together, coupled with an acknowledged inability to prevent some suicides even in the inpatient environment" (Large et al 2014).

However, Large et al (2014) argued that the experience and process of psychiatric hospitalisation contributes in some way to the suicides in hospital. They used the term "nosocomial suicides" (ie: "people who commit suicide as inpatients but would not have taken their own lives if they remained at home"). "The experience of being hospitalised can be frightening, demoralising and demeaning or induce feelings of abandonment, oppression and heightened vulnerability. Surely for some of these patients, the protective benefits are outweighed by the additional 'stress' of hospitalisation, adding to an already present suicide 'diathesis'" (Large et al 2014 p119). But Large et al (2014) could not put a figure on how many inpatient suicides were nosocomial suicides.

1.7. APPENDIX 1B - SELF-HARM VS SUICIDE ATTEMPT AMONG ADOLESCENTS

The rate of suicide attempt among non-clinical samples of adolescents varies between 5-10% around the world, but the level of deliberate self-harm or non-suicidal self-injury (NSSI) (ie: no suicidal intent) ranges between 15-30%, with about 3-7% of adolescents showing both behaviours (Liang et al 2014).

Both suicide attempt and NSSI are linked to depression, stress, and poor quality of relationships (Liang et al 2014). But there are differences - the most obvious being the intent to die. For example, Muehlenkamp and Gutierrez (2004) found that adolescents with a history of NSSI had more positive attitudes towards life than adolescents who had made a suicide attempt in the past.

Liang et al (2014) found differences between adolescents with a history of NSSI and suicide attempt,

and NSSI alone in a Chinese sample. Over 2200 adolescents with an average age of 14 years old in Dujiangyan (a medium-sized city in southwest China) [21] completed a series of questionnaire in late 2011. The questionnaires covered behaviours like self-harm, depression, impulsivity, and life stress. Based on the responses to the Self-Harm Questionnaire, the adolescents were divided into four groups for analysis - no self-harm or suicide attempt (NoSH) (75.9% of sample), self-harm only (NSSI) (20.9%), suicide attempt only (SA) (0.9%), and both self-harm and suicide attempt (NSSI+SA) (2.3%).

There were significantly more female adolescents in the SA and NSSI+SA groups because they were more likely to report a suicide attempt than males. There were significantly more younger students in the NSSI+SA group, and children of single-parent families reported more self-harm than from two-parent families. Otherwise, there were no differences based on family income or parents' education level.

The NSSI+SA group was more likely to be female, younger, have higher impulsivity scores, perform more health-risk behaviours, and have lower family cohesion than the NSSI group. There were no significant differences between NSSI+SA and the SA groups. The SA groups were, however, more likely to be female, from single-parent families, and have higher depression scores than the NSSI group.

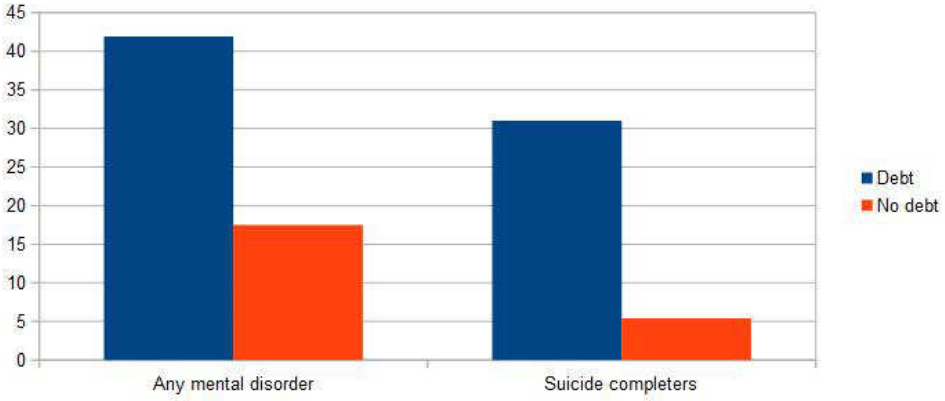
1.8. APPENDIX 1C - EFFECTS OF UNSECURED DEBT

Individuals with low socio-economic status (SES) have poorer mental and physical health including higher levels of deliberate self-harm and suicide than those with higher SES. Specific elements of low SES include unemployment, and financial difficulties, which account for the poor mental health (Richardson et al 2013).

In a literature review, Richardson et al (2013) found that unsecured debt (eg: credit cards) was linked to poor mental health. The researchers found sixty-five articles using search terms like "indebtedness", "debt" and "mental disorders". The majority of the studies took place in the UK and USA.

Overall, fifty-six studies found that being in debt (or financially struggling) and/or worrying about it was related to poorer mental and physical health. Seven studies found no effect, and two studies a positive relationship (ie: better health and indebtedness) (figure 1.6).

[21] This city experienced a major earthquake in 2008 which may have influenced the findings (Liang et al 2014).



(Data from Richardson et al 2013 table 1 p1153)

Figure 1.6 - Indebtedness and mental disorders and suicide completion (%).

Those in debt were over three times more likely to have a mental disorder, over twice as likely to be depressed, and between 5-8 times more likely to attempt or complete suicide than individuals not in debt.

The studies in the review used a variety of samples including:

- Students.
- Psychological autopsies after suicide.
- Nationally representative.
- Health service users.
- Debt management clients.
- Older adults.
- Parents.
- Farmers/rural.
- Military veterans post-deployment.
- Ethnic minorities.

Richardson et al (2013) summarised the methodological limitations and other differences between the studies:

i) Mostly cross-sectional design, which means that causality between debt and health could not be established. Longitudinal studies are better for that.

ii) Definition of debt - eg: credit care debt; "over-indebtedness" (based on mathematical formula); non-payment of utility bill leading to disconnection. Richardson et al (2013) admitted that "debt is defined very differently in the literature meaning it is hard to conclude whether health problems are related to any debt,

or only problematic debt or specific types of debt" (p1155).

iii) Often self-reports of physical and mental health.

iv) Controlling for potentially confounding variables or not (eg: SES, age, gender).

Richardson et al (2013) did not examine secured loans or mortgage debt.

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2. WHEN TO COMMIT SUICIDE

2.1. SUICIDE RATES VARY IN TIME

Suicide rates vary by season [22], day of the week [23], week in the month [24], and at public holidays [25]. In the latter case, suicide rates are significantly higher on the days after Christmas and Easter, for example, but significantly lower on Christmas Day and Easter Sunday (Barker et al 2014). Jessen et al (1999) found fewer suicide attempts than the average at hospital Emergency Departments before Christmas, but more than the average after Christmas.

Barker et al (2014) offered two theories for these fluctuations in suicide rates around public holidays:

a) The "broken promise effect" (Gabennesch 1988) - This is the idea that "certain days of the year promise more than they can deliver, leaving individuals feeling deflated afterwards and increasing the risk for suicide... Holiday periods, anticipated to be an enjoyable time, may coincide with extra life stressors, including family conflict, alcohol use and increased spending that may exacerbate loneliness in those who are not able to share the holiday time with their families" (Barker et al 2014 p122). This theory is supported by an increase in suicides after birthdays (eg: Ajdacic-Gross et al 2012; appendix 2B).

b) The thought of returning to work ("return to reality") (eg: Bradvik and Berglund 2003) - The increase in suicide after the holidays (and Mondays generally - beginning of the working week) is due to the prospect of returning to work after the time off. The exception is the increase in suicides around Saint Valentine's Day (14th February) (which is not a public holiday) (eg:

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[22] This was first noted by Zung and Green (1974).

[23] Higher on Mondays and declines as the week progresses (Barker et al 2014) (appendix 2A).

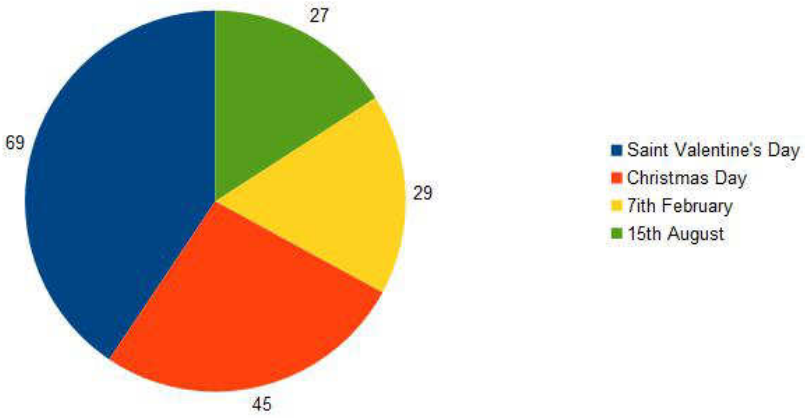
[24] More suicides at the beginning of the month (Phillips and Ryan 2000).

[25] Williams et al (2011) noted that "a 'death-dip' occurs in the month prior to a culturally important occasion, followed by a rise afterward, because individuals recognise the value placed on significant, ceremonial events that cement belonging to a given society – and feel they must participate in those events" (p139) - eg: Boor (1981) reported less suicides in September and October of years with US Presidential elections in November than non-election years. On the other hand, Gabriel (1992), for example, noted an "anniversary reaction" with suicides on the date of the death of a significant other or at the age they had reached when they died.

Davenport and Birtle 1990; table 2.1).

- The researchers used data from three accident and emergency units in Birmingham for 1983-8. The number of attempted suicides for Saint Valentine's Day was compared to 7th February and 15th August (control days), and Christmas Day. In total, there were 170 cases, 40% of them occurred on Saint Valentine's Day (figure 2.1). The effect was even greater for the 12-20 year-old age group (55%).

- Information about the individuals was not collected, so it was not possible "to confirm a causal association between disappointment in personal relationships and parasuicide" on Saint Valentine's Day.



(Data from Davenport and Birtle 1990 table p783)

Figure 2.1 - Number of suicides on each day.

Table 2.1 - Details of Davenport and Birtle (1990).

Barker et al (2014) investigated the fluctuations in suicide around Easter, Christmas, New Year, Saint Valentine's Day, and Anzac Day (25th April) [26] using data from the Queensland Suicide Register (QSR) in Australia between 1990 and 2009. The QSR records all suicides as "beyond reasonable doubt" (eg: suicide note found), "probable" (eg: history of suicide attempts), or "possible" (eg: death alone from gunshot). Just under ten and a half thousand cases were included.

The researchers calculated the average number of suicides on the public holidays, and for one week before and one week after them. Christmas Eve was found to have significantly more suicides (n = 45) than the average for the Christmas period (n = 30), and New Year's Day (n =

[26] "It commemorates the valour of soldiers from Australia and New Zealand in the Gallipoli campaign in the First World War; and by extension, the contribution of all Australians who have lost their lives in defence of their country, over the years" (Barker et al 2014).

50) than the average of that period (n = 28) [27]. There was no significant differences for the other holidays. However, there was a non-significant increase on the Tuesday after Easter Monday, which fits with the prospect of returning to work.

The increase on New Year's Day fits with the "broken promise effect". Barker et al (2014) gave a different reason for the increase on Christmas Eve: "the Christmas period is traditionally a time for celebration with family and friends, but for those without such an opportunity, the beginning of such a time may intensify feelings of isolation or the pain of broken relationships" (p125). This study is dependent on the accuracy of of the QSR (eg: recording the correct day of suicide during a public holiday period).

2.2. APPENDIX 2A - DAYS OF THE WEEK

Using data from Finland, the USA, and Israel in the 1960s and 1970s, suicide deaths were highest on Mondays [28] and lowest on Saturdays in the week (Massing and Angemeyer 1985). This peak is supported by data for England and Wales for 1993 to 2002 (Johnson et al 2005), and from Hokkaido, Japan 1979-94 (Nishi et al 2000) and Fukushima prefecture 1989-95 (Kunii et al 1997 quoted in Ohtsu et al 2009).

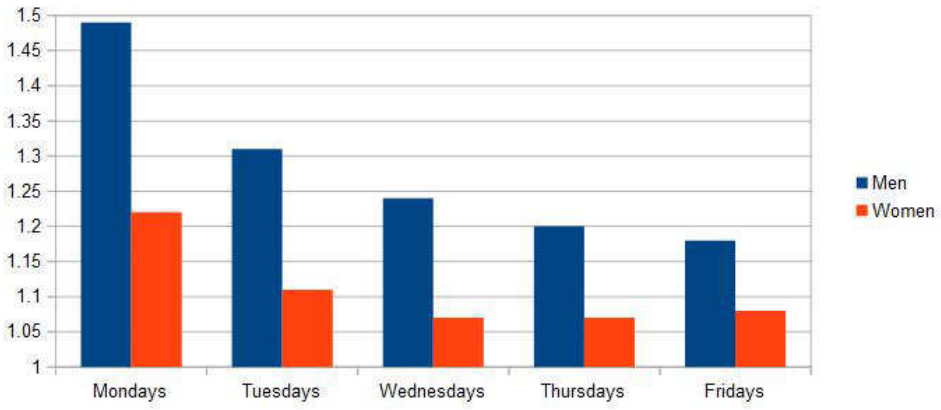
In the case of Japan, Ohtsu et al (2009) found the "Blue Monday" phenomenon existed for men only using 2003 data for the whole country. Saturdays and Sundays were used as the baseline. The number of suicides on Mondays were one and a half times greater for men (of all ages and working age). This is significantly higher than at the weekends. The other weekdays were higher than the weekend, but not significant for men, and there was no significant difference for any day for women (figure 2.2).

Greenberg and Schneider (1992) found a "Blue Thursday" peak for homicide and suicide deaths among young Black urban males in the USA. A random distribution of suicides across the week would give 14.3% per day, but there were 15.8% on Thursdays (which is not significantly more). Using data from 22 counties in the USA (eg: Alameda in Oakland, California) for 1979-85, the researchers found 1.26 times more suicides by Black males than White males on Thursdays.

The explanations offered for the increase in homicides and suicides included that Thursday was a day

[27] Christmas and New Year are during the summer in the southern hemisphere, and this may have an effect compared to the northern hemisphere.

[28] In Israel, Sunday is the first working day of the week, and the suicide rate was highest on this day.



(Data from Ohtsu et al 2009 tables 1 and 2 p233)

Figure 2.2 - Odds ratios for suicide on weekdays for all ages (where weekend = 1).

off for many (and was treated as a Saturday in terms of alcohol consumption and its consequences), and that before payday on Friday, individuals become anxious and stressed.

2.3. APPENDIX 2B - BIRTHDAYS

Phillips and Feldman (1973) argued that deaths, including suicides, are less frequent on birthdays as they are postponed until after ("death postponement hypothesis") [29], but the "anniversary reaction hypothesis" or "birthday blues" (Barraclough and Shepherd 1976) proposed an increase on the actual birthday [30].

Ajdacic-Gross et al (2012) found support for the latter in Swiss mortality data for 1969-2008. Significantly more individuals died on their birthdays (from all causes - natural and unnatural) than other days of the year (a 14% excess). Specifically for suicides, men were significantly more likely to die on their birthday (a 35% excess), but not women.

Williams et al (2011) analysed over 50 000 suicides or undetermined death of adults over fifteen years old in England and Wales between January 1997 and December 2006. Mean daily number of suicides was 137 with 174 on

[29] Reulbach et al (2007), for example, found no evidence using data from Bavaria, Germany 1998-2003.

[30] In fact, the research shows various increases - eg: three days up to birthday among 45-64 year-olds, within month after birthdays in over 75s, and the three months after (all ages) (Williams et al 2011). But how long before or after is associated with the birthday?

birthdays. This significantly higher ($p<0.01$), and the effect was greatest for males over 35 years old. There was also a general significant increase in the 8-30 days after the birthday.

Williams et al (2011) proposed an explanation for the "birthday blues" based on sociological and psychological factors (eg: reminder of getting older [31]), but Ajdacic-Gross et al (2012) placed more emphasis on the use of alcohol at celebrations and its association with suicide.

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[31] "Studies of the transition from youth to middle age and middle to old age may prompt reflection (particularly by males) on life goals unfulfilled with subsequent feelings of depressions... Similarly, in middle and older age, life events such as divorce, retirement from employment, and active contribution to society, failing physical health, bereavement and facing one's own mortality may all trigger later-life depression and suicide..." (Williams et al 2011 p139).

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3. DEPRESSION AND SELECTED PHYSICAL ILLNESSES

3.1. INTRODUCTION

Depression is common for individuals with physical illness (ie: illness causes depression), and it can hinder recovery (Williams et al 2014).

A prime example of this relationship is following a bone fracture (eg: hip: 9-47% depressed; Holmes and House 2000).

Williams et al (2014) found that older women with a fracture were more likely to be depressed than individuals without a fracture in an Australian study. Women aged at least 35 years old who had a bone fracture [32] between February 1994 and February 1995 in south-eastern Australia were recruited to the Geelong Osteoporosis Study (GOS). There were 296 such women who were matched to 590 women without a fracture. Participants were sent a questionnaire about depression at six-year follow-up [33]. After adjusting for variables like smoking and alcohol use, the odds of having depression was three times higher for women aged 65 years or older with a fracture, but no significant difference for younger women (figure 3.1).

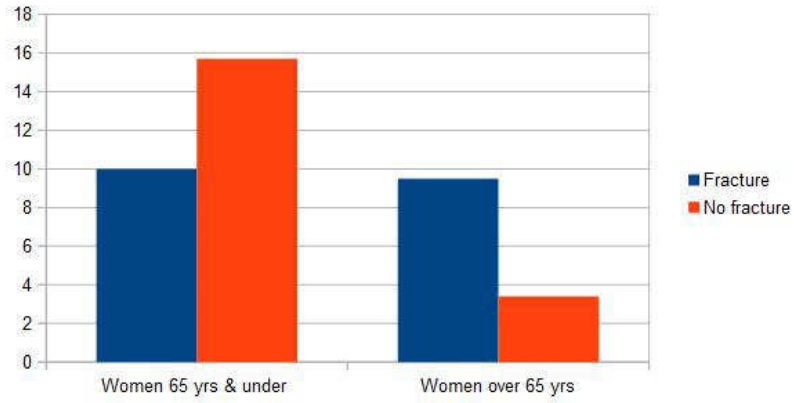
Williams et al (2014) offered a number of possible reasons why older women with a fracture were more likely to be depressed:

i) The fracture coincided with "the acknowledgement of 'getting older'...[and] It is plausible that stigma may be associated with a fracture in older age, and thus impact negatively on an older women's self identity" (Williams et al 2014).

ii) Lower levels of internal locus of control, self-esteem, and a sense of mastery compared to younger women.

[32] Most common fracture was to the wrist/forearm.

[33] The study did not collect data on depression pre-fracture nor details of life events during the follow-up period. Thus it only compared the relationship between the variables (fracture and depression) and two points in time.



(Data from Williams et al 2014 table 1)

Figure 3.1 - Percentage of women reporting depression in the previous year.

iii) Pre-fracture differences in emotional and cognitive states. Depression may precede a fracture (ie: depression causes injury), and play a part in the injury, through use of anti-depressants or lifestyle when depressed (Wu et al 2010).

iv) Less access to supportive social networks (appendix 3A).

3.2. CANCER

Depression and anxiety are common among patients with cancer. In the case of prostate cancer, three-quarters of sufferers live for ten years or more after diagnosis, so "it is possible that the onset of psychological distress within this population of men is not an acute threat that passes quickly but a chronic one with peaks and troughs of severity that occur at key stages of the cancer journey" (Watts et al 2014).

Watts et al (2014) performed a systematic review and meta-analysis of studies of prostate cancer, and clinical depression and anxiety, particularly related to treatment stage. Twenty-seven articles were found (up to June 2013) that met the inclusion criteria (eg: valid and reliable measure of depression and anxiety). The most studies were conducted in the USA, and all of them in Western countries, giving a total of 4494 participants (with a mean age of 66 years old) [34].

[34] There was little data on men with metastatic prostate cancer. This is where the cancer has spread to other parts of the body. Also the majority of the studies in the meta-analysis were cross-sectional, and

The mean rate of depression was 17.3% (pre-treatment - ie: after diagnosis), 14.7% (during treatment), and 18.4% (post-treatment), and 27%, 15.1%, and 18.5% respectively for anxiety. These figures compared to about 10% for depression and 5% for anxiety in the general population of older men (Watts et al 2014).

Other research has found that cancer sufferers with clinical depression and anxiety are less likely to adhere to their treatment, and can experience adverse reactions to the treatment (eg: poorer sexual functioning) (Watts et al 2014).

3.3. ALOPECIA

Hair loss which occurs at any age for men and women is alopecia. Alopecia areata is partial head hair loss [35], alopecia totalis is the loss of all head hair, and alopecia universalis refers to the loss of all head and body hair (Hunt and McHale 2007) [36].

Alopecia is not life-threatening, but the consequences are more psychological and social (eg: relationship problems; social phobia) (Hunt and McHale 2007). Gender is a key variable: "Put simply, in our culture a bald man is socially acceptable, a bald woman is not" (Hunt and McHale 2007 p363).

Individuals with alopecia areata are more likely to be depressed, anxious, and suicidal than controls (Aghaei et al 2014). The sufferers experience more depression and anxiety in the first episode of the condition, and this is reduced over time, but does not disappear entirely. Aghaei et al (2014) compared forty patients at the Dermatology Clinic of Jahrom University of Medical Sciences, Iran, with alopecia areata and age- and sex-matched healthy controls.

Grahovac et al (2010) explained the co-morbidity between depression and alopecia in a different way in their description of a case study of a middle-aged women in Croatia. Depression causes stress or is part of the stress than can trigger alopecia rather than depression as a consequence of alopecia.

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did not collect data on the participants' history of depression and anxiety. There were few comparison groups of healthy individuals.

[35] The "sudden onset loss of hair in a clear circular area" (Aghaei et al 2014).

[36] Alopecia is viewed as a skin disease (Aghaei et al 2014).

3.4. CHRONIC OBSTRUCTIVE PULMONARY DISEASE

Chronic obstructive pulmonary disease (COPD) is a respiratory illness that can be fatal. Rates of depression and anxiety among sufferers can be high (eg: 40% and 36% respectively; Yohannes et al 2000). In a meta-analysis, Zhang et al (2011) calculated a risk of depression of nearly three times greater than among healthy controls.

Often the depression can go undiagnosed (eg: two-thirds of COPD high depression individuals; Hanania et al 2011).

Not surprisingly, depression and anxiety with COPD leads to reduced health-related quality of life, as well as more severe COPD symptoms and poorer treatment adherence/outcomes (eg: more COPD hospitalisations and for longer) (von Leupoldt and Kenn 2013). For example, depressed male patients with COPD had a higher mortality rate than non-depressed COPD patients (Abrams et al 2011). But this study did not control for suicide (von Leupoldt and Kenn 2013) [37]. Among female COPD patients, anxiety was a stronger predictor of mortality (von Leupoldt and Kenn 2013).

What is the relationship between COPD and depression (von Leupoldt and Kenn 2013)?

1. COPD leads to depression - eg: due to the burden of the disease, limitations on normal life, and knowledge of future deterioration.

2. Depression increases the risk of COPD - eg: Schneider et al (2010) found a higher rate of pre-illness depression in a COPD group than in a control group (23.1% vs 16.8%).

3. A common underlying cause for depression and COPD - eg: smoking; inflammatory processes; catastrophic attribution of experiences/events.

3.5. DIABETES

There is a close relationship between depression and diabetes, which has been long recognised (since seventeenth century) (Lloyd et al 2012).

Anderson et al (2001), for example, calculated in their meta-analysis that individuals with diabetes were twice as likely to have depression than non-diabetics.

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[37] In a US study, Goodwin (2011) found 15% of COPD sufferers reported suicide attempt (compared to 6.6% of healthy controls), and 27.2% admitted to suicidal thoughts (compared to 19.6%).

The studies included in this meta-analysis had limitations (eg: no distinction between Type 1 and 2 diabetes) (Lloyd et al 2012).

Barnard et al (2006) reported a prevalence of 12% for clinical depression among Type 1 diabetics compared to 3.2% of controls (based on four controlled studies). A meta-analysis of ten controlled studies of Type 2 diabetes, calculated rates of 17.6% (diabetics) and 9.8% (controls) (Ali et al 2006). All the studies included were from the USA or Western Europe (Lloyd et al 2012).

There are ethnic differences in these countries (eg: higher co-morbidity of diabetes and depression in US Latinos and Native Americans) [38], and cultural differences (eg: higher rates of depression among sufferers of diabetes in Pakistan, Jordan, and Qatar) (Lloyd et al 2012).

So, depression is higher among individuals with diabetes than not, and higher than individuals with undiagnosed diabetes. "Because both people with impaired glucose metabolism and undiagnosed diabetes have higher blood glucose concentration than people with normal glucose metabolism, the conclusions from these studies seem to indicate that hyperglycaemia per se is not associated with an increased level of depressive symptoms" (Lloyd et al 2012 ppS23-S24). It would seem that "the psychological burden of knowing that one has diabetes, having to manage this chronic illness and to cope with its complications and any resulting functional impairment contributes to higher levels of depression" (Lloyd et al 2012 pS24). Notwithstanding these statements, Lloyd et al (2012) did not exclude the possibility of biological factors explaining the difference in depression between individuals with diagnosed and undiagnosed diabetes.

Many individuals with diabetes do not develop depression, so what are the risk factors for developing depression here? There are common risk factors for both diabetes and depression, like low birth weight, and obesity, while the perceived burden of diabetes (eg: longer duration; demanding regimen) is important in the subsequent development of depression (Lloyd et al 2012). Most of the studies in this area are cross-sectional (ie: comparing two groups at one point in time to see the differences between them) (Lloyd et al 2012).

A limited number of longitudinal studies have looked at the risk of major depressive disorder among diabetes sufferers. For example, Bruce et al (2006) found that diabetes diet, increased cholesterol, and difficulty in

[38] There is an over-representation of older men, and ethnic minority individuals according to the Sequenced Treatment Alternatives to Relieve Depression (STAR-D) study in the USA (Bryan et al 2008).

daily living were risk factors in older adults.

Over five years Katon et al (2009) observed that a previous history of major depressive disorder was important, as well as more severe diabetes symptoms, and having cardiovascular-related problems.

Depression is associated with the future risk of type 2 diabetes by one-third more than no depression (Petrak and Herpertz 2009) [39]. For example, the Nurses' Health Study followed over 55 000 women over ten years, and found a 42% increased risk of diabetes after depression. But this risk was reduced when body mass index (BMI) and physical activity level controlled for (Pan et al 2010). Anti-depressant use is also a risk factor for type 2 diabetes (Penckofer et al 2014).

The co-morbidity of depression with diabetes leads to reduced reported quality of life and subjective healthiness as well as compromised self-care (eg: not taking appropriate insulin injections) [40]. Thus, co-morbid individuals are more likely to die than individuals with diabetes only (Lloyd et al 2012).

For example, Egede et al (2005) followed over 10 000 individuals over eight years. They were divided into four groups - no depression/diabetes (comparison group), diabetes only, depression only, and depression/diabetes. Assuming the comparison group as a risk of 1, all cause mortality was 2.5 for the depression/diabetes group (ie: two and a half times greater), 1.88 (diabetes only), and 1.2 (depression only). But how much of this difference is due to changes in behaviour in depression or a biological effect of co-morbidity (Lloyd et al 2012)?

In terms of treatment of the depression, "moderate success" has been reported with anti-depressants [41], psychological treatments (eg: cognitive-behavioural therapy; CBT), or a combination of both (eg: Baumeister et al 2012).

For example, Karaiskos et al (2013) reported significant improvements in anxiety, depression, and self care over four months with agomelatine [42] (as compared to setraline [43]) with type 2 diabetics in Greece (figure 3.2). But this was an open-label study (ie: participants and researchers knew which drug given) with only forty

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[39] Range of increased risk: 20-60% (Penckofer et al 2014).

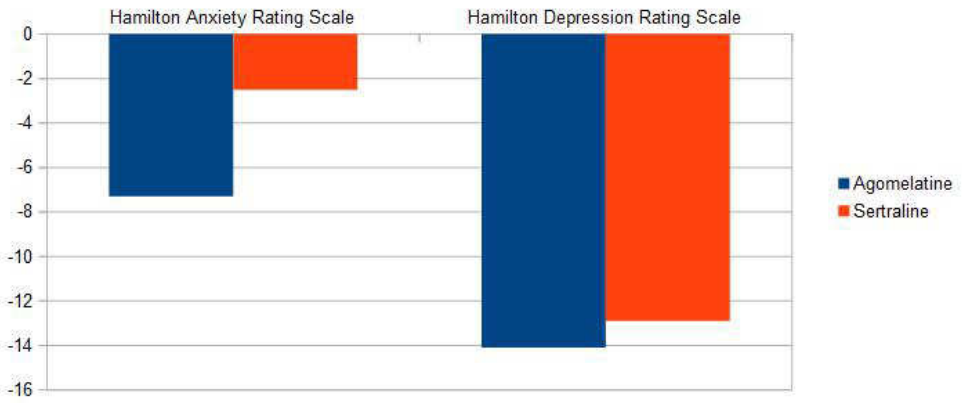
[40] Also micro- and macrovascular complications (ie: heart and blood vessels), and functional impairment (Petrak et al 2013).

[41] Randomised controlled trials have shown that different anti-depressants can be beneficial - eg: nortriptyline, fluoxetine, sertraline (Petrak and Herpertz 2009). But there are not necessarily improvements in diabetes self-care behaviour (Penckofer et al 2014).

[42] This is an anti-depressant that works on the melatonin and serotonin receptors in the brain.

[43] A selective serotonin reuptake inhibitor (SSRI).

participants. There was no placebo group.



(Data from Karaiskos et al 2013 table 1 p259)

Figure 3.2 - Mean change in scores on three measures between baseline and end of study.

In terms of psychological treatments, CBT, group counselling, and supportive psychotherapy reduce depression in randomised controlled trials of depression and diabetes (Petrak and Herpertz 2009). For example, Penckofer et al (2012) studied seventy depressed women with type 2 diabetes receiving either eight weeks of nurse-delivered, group CBT or usual care. At three months, 48% of the CBT group and 70% of the usual care group were still categorised as depressed, while at six months, this was 35% and 80% respectively.

Twelve-week CBT delivered by telephone and walking were found to reduce depression at one-year (58% recovered vs 38% with usual care) (Piette et al 2011).

Petrak and Herpertz (2009) found four randomised controlled trials showing significant improvements in depression with a combination of drugs and psychological treatments.

Collaborative care is more effective than usual care (Penckofer et al 2014). This involves health professionals like depression care manager nurses, who educate patients about depression and diabetes, while supporting and monitoring them.

3.6. APPENDIX 3A - SOCIAL NETWORKS

Social networks include all those individuals who provide some form of support for an individual. They vary in size (degree) and in overlapping (transitivity) (ie: how many individuals in the network know each other).

Fowler et al (2009) proposed that genes play a role in social network structures using data from 1110 twins in the National Longitudinal Study of Adolescent Health in the USA. What is inherited is the attractiveness of an individual (which relates to the size of the network), and the tendency to introduce new friends to existing friends (which is related to transitivity) [44]. Thus, Fowler et al (2009) called their theory, the "Attract and Introduce" model.

Warner et al (2012) included cafes "that exist as commercial enterprises in areas of high social deprivation, which have no formal agenda in terms of 'caring' for their customers, but which nonetheless serve as 'affective community spaces'" [45]. This is seen in particular in the idea of "the regular" at the cafe. "In essence, people care if regulars are there or not" (Warner et al 2012).

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[44] "There may be many reasons for genetic variation in the ability to attract or the desire to introduce friends. More friends may mean greater social support in some settings or greater conflict in others. Having denser social connections may improve group solidarity, but it might also insulate a group from beneficial influence or information from individuals outside the group. Although it is possible that variation in individual social network attributes is incidental to natural selection processes operatingon other traits, it is remarkable that network traits have significant heritability. [Also] social networks may serve the adaptive (or maladaptive) function of being a vehicle for the transmission of emotionalstates, material resources, or information (eg: about resource or partner availability) between individuals" (Fowler et al 2009 pp1722-1723).

[45] A term coined by Moallem (1999).

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4. VARIATIONS IN DEPRESSION AND ITS MEASUREMENT

4.1. VARIATIONS IN EXPERIENCE OF DEPRESSION

Social support generally is beneficial in relation to stress and depression, and so specifically is befriending. This is "a relationship between two or more individuals which is initiated, supported and monitored by an agency that has defined one or more parties as likely to benefit. Ideally the relationship is non-judgmental, mutual, and purposeful, and there is a commitment over time" (Dean and Goodlad 1998 quoted in Mead et al 2010). Befriending can be delivered by volunteers or paid workers, and provided face-to-face, or over the telephone or via the Internet (Mead et al 2010).

Mead et al (2010) found twenty-four studies published between 1980 and early 2008 which compared befriending to a control or alternative for individuals with depression and/or emotional distress. Compared to a no treatment control or usual care, befriending significantly reduced depression in the short-term (eg: 12 weeks) and long-term (eg: 12 months). Befriending was less effective than cognitive-behavioural therapy (CBT), though.

Not all individuals with depression respond to treatment in the same way. So, it is important to know the characteristics that differ between responders and non-responders.

For example, Gorwood et al (2010) reported a large French study with 8229 out-patients with depression. Responders and non-responders to anti-depressants after six weeks were distinguished. Non-responders had two characteristics - higher scores on the Standardised Assessment of Personality - Abbreviated Scale (SAPAS) [46] (Moran et al 2003) (ie: personality disorder) (mean score of 3.89 vs 3.67 out of 8; $p<0.001$), and more prior episodes of depression (mean: 1.00 past episode vs 0.87; $p<0.001$).

[46] Eg: "In general, do you having difficulty in making and keeping friends?"; "In general, do you trust other people?" (Moran et al 2003).

Gorwood et al (2010) offered two possible explanations for the findings:

a) Vulnerability hypothesis - personality disorder increases the risk of recurrence of depression.

b) "Scar" hypothesis - repeated episodes of depression have an effect on personality that reduces treatment response.

4.1.1. Low Self-Esteem

Low self-esteem [47] and depression are interlinked. Individuals with low self-esteem are more prone to depression than those with high self-esteem, while depression leads to low self-esteem. "However, the precise nature of this relation has been a topic of continuing debate" (Orth and Robins 2013).

The relationship between self-esteem and depression can be seen in different theoretical models (Orth and Robins 2013):

i) Vulnerability model - low self-esteem is a causal risk for depression.

ii) Scar model - low self-esteem is a consequence of (scar from) depression.

iii) Reciprocal relation model - a combination of the above models.

iv) Precursor model - a common cause (eg: stress) for both low self-esteem and depression.

v) Diathesis-stress model - low self-esteem and stress together lead to depression.

vi) Mediated vulnerability model - a variation on the vulnerability model that adds low self-esteem as leading to rumination, which leads to depression as well (ie: two routes from low self-esteem to depression).

vii) Moderated vulnerability model - another variation on the vulnerability model, where the instability of self-esteem in the short-term affects the relationship between low self-esteem and depression. In other words, not just the level of self-esteem but other aspects of it lead to depression.

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[47] Self esteem defined as "an individual's subjective evaluation of his or her worth as a person" (Orth and Robins 2013 p455).

Orth and Robins (2013) felt that evidence [48] supported the vulnerability model strongest, and then the scar model, but not the others. The vulnerability model has been supported with different samples and methods - gender, age, ethnicity, measures of depression, and time intervals.

4.1.2. Recurrent Depression

The lifetime risk of major depressive disorder (MDD) is calculated as about 7% for the general population (ie: approximately 1 in 14 chance), but the risk of recurrence after recovery from an episode of MDD is 80% (ie: 4 out of 5 chance) (Nixon et al 2014).

Nixon et al (2014) found differences in the brain in MDD-recovered individuals, which might account for the increased risk of recurrence. The Default Mode Network is implicated. This is a term that covers parts of the brain involved in the basic running of the brain (ie: when mind wandering and focused cognitive activities not being undertaken). Hyperconnectivity (ie: more neuronal connections) was found, and this would mean a "disproportionate allocation of resources from, 'external environment to internal experiences' (Beck 2008)" (Nixon et al 2014 p287). The upshot is greater rumination.

This study was based on functional magnetic resonance imaging of twenty individuals recovered from MDD and twenty healthy controls in central England.

4.2. MEASURING DEPRESSION

The Montgomery-Asberg Depression Rating Scale (MADRS) (Montgomery and Asberg 1979) was developed to measure the severity of depressive symptoms. It is completed by the clinician as they interview a patient. There are ten items (table 4.1) rated from 0-6 in each case. This gives a range of 0-60, with a higher score as more severe depressive symptoms.

- Apparent sadness
- Reported sadness
- Inner tension
- Reduced sleep
- Reduced appetite
- Concentration difficulties
- Lassitude [49]

[48] For example, a meta-analysis of 77 longitudinal studies with over 35 000 participants (Sowislo and Orth 2013).

[49] Fatigue or exhaustion.

- Inability to feel
- Pessimistic thoughts
- Suicidal thoughts

(Source: Quilty et al 2013)

Table 4.1 - Items of MADRS.

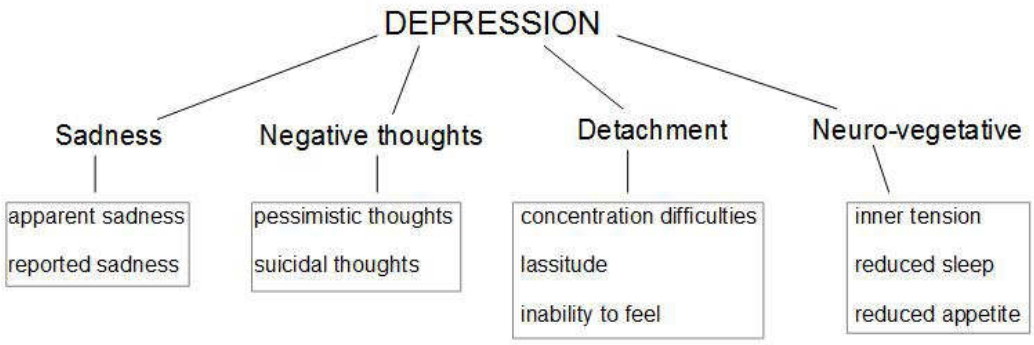
The success of the MADRS depends upon its reliability or consistency. In other words, differences in score, say, by the same person at two points in time will be a product of changes in depression not the poor design of the MADRS.

One issue related to MADRS is the underlying factors of depression that are measured. Some studies have found only a single factor (unifactorial structure) (eg: Uher et al 2008), while others argued for multiple factors (multi-factorial structure) [50]. A different number of factors have been proposed - two (eg: Rocca et al 2002), three (eg: Farner et al 2009), or four (eg: Williamson et al 2006). Quilty et al (2013) argued that the difference in number of factors was a product of differences in study design - eg: patients with different diagnoses (eg: unipolar depression or bipolar disorder) or the statistical method used to analyse the data (ie: type of factor analysis).

Quilty et al (2013) found support for the four factor structure in their study of 821 adult out-patients with moderate or severe depression in France. Participants completed the MADRS before treatment, and then 1, 3, and six months later. The overall mean score at baseline was 3.44, and 9.13 six months later, which showed clear evidence of treatment reducing the severity of symptoms.

As with Williamson et al (2006), Quilty et al (2013) found four underlying factors for the ten items of the MADRS - sadness, negative thoughts, detachment, and neuro-vegetative (figure 4.1). Quilty et al (2013) also established that the factor structure did not vary between male and female respondents.

[50] Establishing the underlying factors of a number of questions is done using factor analysis. Simplistically, this shows the answers to questions which correlate together (or not) (ie: underlying factors).



(Based on Quilty et al 2013 figure 2 p181)

Figure 4.1 - Four-factor structure of MADRS.

4.2.1. Measuring Depression Around the World

The Health, Alcohol and Psychosocial Factors in Eastern Europe (HAPIEE) study used the Centre for Epidemiological Studies Depression Scale (CES-D) with a cut-off point of sixteen. This is a commonly used measure and cut-off point. Adults aged 45-64 years old in urban populations were sampled from Novosibirsk (Russia), Krakow (Poland), and Karvina-Havirov (Czech Republic) in 1999-2000 (Bobak et al 2006). Rates of depression varied from 18.7% (men in Czech Republic) to 43.9% (women in Russia). Interestingly, education level increased the rate of depression in Russia, whereas the more educated were less depressed elsewhere. Depression was also greater among long-term unemployed (>3 months) individuals.

Most of the studies, and resources for treatment of depression and anxiety are in the developed world. Despite depression being classed as one of the leading causes of worldwide disability, fewer than 10% of individuals have access to treatment (Sweetland et al 2014). In 2010, the US National Institute of Mental Health launched the Grand Challenge in Global Mental Health initiative to rectify this shortcoming. One of its twenty-five priorities was to improve detection of depression (Sweetland et al 2014).

One of the deprived areas of the world in this respect is sub-Saharan Africa. Sweetland et al (2014) undertook a review of studies of screening instruments for depression in this area published between 1970 and 2011. Sixty-five studies were found from sixteen countries, most published since 2000 (n = 40). Seventeen studies came from South Africa. The Self-Reporting Questionnaire (SRQ) (Sartorius and Janca 1996) was the most common brief screening instrument for depression used followed by the Edinburgh Post-natal Depression

Scale (EPDS) (Cox et al 1987).

A number of problems emerged as instruments developed in the West, usually, were used in sub-Saharan Africa (Sweetland et al 2014).

i) Linguistic equivalence - "The actual term 'depression' itself is often absent from the languages of many cultures or rarely used... or it is construed differently" (Lloyd et al 2012 pS26).

A number of different languages are used in Africa, and even the terms related to depression do not automatically translate. For example, in South Africa, phrases like "the spirit is down" or "the heart is sore" are used, while in Eritrea, "mental oppression" and "thinking too much" are local idioms for depression (Sweetland et al 2014).

Lloyd et al (2012) even gave examples of different phrases for depression used between Sylheti speakers in UK and in Bangladesh.

Lloyd et al (2012) noted two theoretical approaches:

a) "Emic" - importing Western screening instruments into non-Western societies is not appropriate. The classification of mental disorders as in DSM and ICD may be "Western" and not applicable elsewhere (eg: Bhugra and Mastrogianni 2004).

b) "Etic" - "any screening tool is considered automatically valid in any setting" (Lloyd et al 2012 pS25).

ii) Conceptual equivalence - Even when the term "depression" is used, it may mean different things in different cultures. For example, in a Tanzanian study, physical (somatic) symptoms and social withdrawal were seen as more important symptoms than depressed mood ("a defining feature of Western criteria for depression"; Sweetland et al 2014).

iii) Differences in statistical technique - For example, different types of factor analysis were used to elicit underlying symptoms of depression.

iv) Technical equivalence - For example, differences in literacy levels may be a confounding variable with the Likert scale (even when the questionnaire is read aloud). When offered the response options of "a little" and "quite a bit", one Kenyan respondent said they meant the same thing (Sweetland et al 2014).

v) Criteria equivalence - One way to establish the validity of a screening instrument is to compare the scores with an already known group (ie: cases - those diagnosed with depression). In some countries, it is difficult to establish the causes, and this limits the use of such comparisons.

Sweetland et al (2014) stated: "Despite some variability in the salience, manifestation and expression of symptoms across cultures, there is also considerable support for an underlying universality in the experience of depression and anxiety in Africa. At the same time, it is clear that minor problems in translation, wording, connotation, and question structure can lead to a form of instrument bias that can reduce their cross-cultural relevance, with clinical implications regarding case detection by non-specialists and inaccurate assessment of symptom progression" (pp227-229).

4.2.2. Translating Western Measures

The Depression Anxiety Stress Scale (DASS-21) (Lovibond and Lovibond 1995) has twenty-one items/statements that cover self-reports of depression, anxiety and stress. There are seven items each for depression (DASS-D) (eg: "I felt that life was meaningless"; "I found it difficult to work up the initiative"), anxiety (DASS-A) (eg: "I felt scared without any good reason"; "I experienced trembling"), and stress (DASS-S) (eg: "I found myself getting agitated"; "I found it hard to wind down"). Each item is scored from 0 ("did not apply to me at all") to 3 ("applied to me very much"). Thus the range of total scores can vary from 0 to 64 (or 21 for each sub-scale), and a higher score signifies greater severity and frequency of the symptoms.

As with any questionnaire or scale, establishing the psychometric properties is important. This is seen as the scientific basis to such measures. The main psychometric properties are reliability/consistency and validity. For example, internal consistency is established by correlating the scores on individual items covering the same behaviour. The correlations are 0.81 depression, and for stress items, and 0.73 for anxiety items on the DAS-21 (Tonsing 2014).

Validity refers to whether the items/questions measure what they claim to measure. It is often established by correlating the scores on the new measure with those on a related older measure (which has psychometric properties).

Tonsing (2014) used the Satisfaction with Life Scale (SWLS) (Diener et al 1985) to establish construct

validity for the Nepali version of the DASS-21 [51]. The SWLS has five items about life satisfaction [52], which are each scored from 1 (strongly disagree) to 7 (strongly agree). A higher score (within overall range of 5-35) indicates higher life satisfaction. It was predicted by Tonsing (2014) that there should be a negative correlation between the two scales. Thus, individuals who report symptoms of depression, anxiety, and/or stress (higher DASS-21 scores) will have less life satisfaction (lower SWLS scores) or vice versa. If DASS-21 is measuring what it claims to measure (ie: psychological distress), then individuals should not be satisfied with their lives.

Significant negative correlations ($p<0.01$) were found: SWLS and DASS-D -0.27, SWLS and DASS-A -0.30, and SWLS and DASS-S -0.35.

Tonsing (2014) gave the Nepali versions of the DASS-21 and SWLS to 212 Nepalese adults in Hong Kong. Certain items on the DASS-21 were changed during translation to make sense - eg: "I felt I was rather touchy" became "I felt that I was rather easily upset". Thus the need to establish the psychometric properties of the Nepali version of the scale.

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[51] The psychometric properties of the DASS-21 has been established for the Turkish version, for example (Akin and Cetin 2007).

[52] Eg: "In most ways my life is close to my ideal"; "The conditions of my life are excellent"; "I am satisfied with life" (Source: http://www.ppc.sas.upenn.edu/lifesatisfactionscale.pdf; accessed 08/05/14).

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