Objective and Subjective Measures of Happiness

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October 2024

Chapter 3

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Abstract

Happiness is usually measured by simply asking people about how happy they are (or, have been in the recent past). The most usual way of doing so is to ask a "happiness question": 'Taking all things together, would you say that you are (i) very happy; (ii) quite happy; (iii) not very happy; (iv) not at all happy?' This subjective measure of happiness, based on a self-assessment of one's emotional well-being, could, however, be complemented by other, more objective, measures of whether people were happy or unhappy. This chapter does so in respect of two indicators: tranquilliser usage among men and women in Belfast, Northern Ireland; and the propensity to self-harm among persons in the state of Queensland, Australia.

3.1 Introduction

There is a growing feeling among economists that public policy should emphasise making people happy rather than making them rich, because making people materially better off does not necessarily make them happier – or, at least, not by enough to justify the outlay of resources in raising income.[1] But how to measure happiness? As the previous chapter made clear, happiness is usually measured by simply asking people how happy they are (or have been in the recent past). The most common way of doing so is to ask a "happiness question". For example, the World Values Survey (WVS) asks: "Taking all things together, would you say that you are (i) very happy; (ii) quite happy; (iii) not very happy; (iv) not at all happy?".[2]

This subjective measure of happiness, based on a self-assessment of one's emotional well-being, could, however, be complemented by other, more objective, measures of whether people were happy or unhappy, in much the same way that a subjective assessment of one's heath could be complemented by other objective measures like grip strength, lung capacity, and the degree of dependence in "activities of daily living" (Cramm *et al*., 2015). This chapter considers two objective measures of well-being. The first is the use of tranquillisers and the second is the incidence of self-harm.

Because nationwide surveys do not include questions about objective manifestations of well-being, data on such measures are not readily available. Nonetheless, it is possible to use data from specialised surveys, relating to specific locations in particular periods, to examine objective indicators of happiness. This chapter focuses on a survey for West Belfast, Northern Ireland, which relates to tranquilliser use, and a survey for Queensland, Australia, which relates to self-harm.

[1] Blanchflower and Oswald (2000); Clark (1996, 1999, 2001); Clark and Oswald (1994); Easterlin (1974, 1995, 2001); Frank (1985, 1997, 1999); Frey and Stuzer (2002); Hirsch (1976); Layard (2002, 2003); Oswald (1997); Scitovsky (1976).
[2] The General Social Survey (GSS) in the USA and the Eurobarometer in Europe ask near-identical questions.

3.2 Tranquilliser Usage

This chapter presents evidence on tranquilliser usage by women in Northern Ireland based on a survey of 2,706 households in West Belfast, carried out in 2000, under the aegis of the West Belfast Health and Advocacy Project. The municipal wards which constitute West Belfast are some of the poorest in the city and West Belfast is the most deprived area in Belfast. On the Robson *et al*. (1994) index of deprivation, 92 of the 113 most deprived enumeration districts in Belfast were in West Belfast (Health Action Zone, 2001). This general level of deprivation finds an echo in indicators of health status: 83 per cent of wards in West Belfast in 2001 had a standard mortality rate (SMR) of more than 100,[3] and over half the West Belfast wards were in the highest SMR quintile; the SMR associated with specific diseases (heart and cancer) was also higher in West Belfast than elsewhere in Northern Ireland. Equally, rates of long-term illness in West Belfast were 30 per cent higher than the Northern Ireland average (Health Action Zone, 2001).

<Figure 3.1>

The survey asked several questions about the self-reported health status of persons in West Belfast and the ailments from which they suffered. As shown in Figure 3.1, of the 1,740 women who answered this question, 29.8 per cent regarded their health as “good”, 53.6 per cent said their health was “fairly good”, and 16.6 per cent felt their health was “not good”. Of the 1,191 men who answered this question, 31.1 per cent regarded their health as “good”, 52.1 per cent said their health was “fairly good”, and 16.8 per cent felt their health was “not good”.

Among the questions asked of respondents to this survey was whether they used tranquillisers and anti-depressants (hereafter abbreviated to simply “tranquillisers”): (i) not at all; (ii) occasionally; (iii) regularly, meaning every day or at least twice a week. As shown in Figure 3.2, of the 1,648 women who answered this question, 81.7 per cent never used tranquillisers, 4.9 per cent used them occasionally, and 13.5 per cent used them regularly. The numbers for women in West Belfast taking tranquillisers regularly (13.5 per cent) resonates with the finding that roughly 12.5 per cent of adults and adolescents in the USA take tranquillisers regularly (Aviv, 2019). By contrast, again as Figure 3.2

[3] A SMR above 100 indicates a higher mortality rate than the regional average.

shows, of the 1,160 men who answered this question, 88.4 per cent never used tranquillisers, 2.8 per cent used them occasionally, and 8.9 per cent used them regularly.

<Figure 3.2>

Using data from surveys of the same population over a six-year period, Graham and Vidal-Zeballos (1998) showed that women were more likely than men to use tranquillisers with an average ratio of 3:2. In terms of age, persons aged 34 or older were much more likely to use tranquillisers than younger persons, while for sleeping pills usage peaked for those aged 65 and older. A more recent study showed that for benzodiazepines – a class of drugs which reduce depression and anxiety – women were prescribed the drug more than twice as often as men. This was underpinned by advertisements, which began to appear in medical journals in the 1950s, which portrayed women as needing the drug for everything from dealing with menopause to handling everyday problems like caring for rowdy children and managing a demanding career (Fauber and Fiore, 2014).

These findings raise the question of the determinants of tranquilliser usage. Bell (1984) conducted an analysis of over the counter (OTC) purchases in the US state of Illinois of three broad categories of medicines: sedatives, tranquillisers, and stimulants. His main findings were that women had a much greater probability of OTC purchases of tranquillisers than men but that men had a higher probability of using stimulants than women. Wells *et al.* (1985), in a study of six US sites drawn from the Rand Health Insurance Program, found that physical health, age, and gender had significant effects on the probability of tranquilliser use and, in comparison to these, the effects of socio-economic factors were much more muted.

In the spirit of these studies, this chapter examines the factors which determined tranquilliser use by women and men in West Belfast. For N persons in the sample, indexed $i=1,2…N$, the dependent variable for study was the variable Y_i (defined separately over the women and men in the sample) and took the values Y_i =1 if person i did not take tranquillisers at all; Y_i =2 if person i took tranquillisers sometimes; and Y_i =3 if person i took tranquillisers regularly.

If one of these three outcomes is taken as the "base" outcome – here it was the first, or "no tranquilliser use" outcome – the *multinomial logit* (ML) represents, for each individual ($i=1…N$), the

logarithm of the odds ratio of outcomes 2 and 3 to the base outcome as a linear function of *K* determining variables (indexed, *k=1…K*) with X_{ik} representing the value of variable *k* for individual *i:*

$$\log\left(\frac{p_{ij}}{p_{i1}}\right) = \sum_{k=1}^{K} \beta_{jk} X_{ik} = Z_{ij},\ j = 2,3 \tag{3.1}$$

where: $p_{ij} = \Pr(Y_i = j),\ j = 2,3,\ \sum_{j=1}^{N} p_{ij} = 1$ and the β_{jk} are the coefficients associated with j^{th} outcome for the k^{th} determining variable with, by definition, $\beta_{Jk} = 0\ (k = 1...K)$. The assumption was that these coefficients did not vary across the individuals in the sample.

In order to obtain the underlying probabilities p_{ij}, the estimated coefficients need to be employed in solving the equation (derived from equation (3.1)):

$$\Pr(Y_i = j) = p_{ij} = \frac{\exp(Z_{ij})}{[1 + \sum_{s=1}^{J} Z_{is}]} = \frac{\exp\left(\sum_{k=1}^{K} \beta_{jk} X_{ik}\right)}{1 + \exp\left(\sum_{s=1}^{J}\sum_{k=1}^{K} \beta_{sk} X_{ik}\right)} \tag{3.2}$$

Consequently, as suggested by Long and Freese (2014), the results from estimating equation (3.1) are presented in Tables 3.2, 3.3, and 3.4 below in the form of the *predicted probabilities* from the estimated logit coefficients of the equation using equation (3.2). These probabilities were computed using the method of "recycled proportions" which was discussed in section 2.5 of the previous chapter.

3.3 Factors Affecting Tranquilliser Usage

The next step in the estimation process was to identify the variables that influenced the likelihood of taking tranquillisers. The first of these variables was self-reported health status (good, fairly good, not good) because the literature suggests that there is an overlap between physical and mental health. Sowers *et al.* (2009), employing a global perspective, argued that mental and physical health are closely related and that each is crucial to individuals' overall well-being, while Naylor *et al.* (2012) showed that in the UK in 2011, around 30 per cent of all people with a long-term physical condition also had a mental health problem, most commonly depression or anxiety.

The second co-variate was age. Graham and Vidal-Zeballos (1998) showed, as mentioned earlier, that persons aged 34 years or above were more likely to use tranquillisers than those younger, while the use of sedatives peaked for those aged 65 years or more. There is also evidence of the beneficial effects of exercise on anxiety (Petruzello, 2012); the third co-variate used in the estimating equation was therefore whether the respondent had exercised in the past four weeks. Wilson *et al.* (2021) have drawn attention to the role of social isolation and strained inter-personal relationships in leading to the excessive use of tranquillisers. To capture this, two more co-variates were introduced: (i) whether the respondent had a social life in terms of going out/meeting people; and (ii) the marital status of the respondent. Lastly, there was the possibility that the labour market status of the respondent could affect their use of tranquillisers (Becker *et al.* 2013) and this was also included as a co-variate.

The results for estimating the multinomial logit equation for tranquilliser use by women are shown in Table 3.1 for the outcome "uses tranquillisers regularly" – that is, outcome (iii), as described above. The second column of Table 3.1, under the head Probability, shows the probability of taking tranquillisers regularly against the various covariate outcomes shown in the first column. These probabilities were computed using the method of "recycled predictions", as described in the previous chapter. Thus, the probability of 8.2 per cent of women in good health using tranquillisers regularly was computed by assuming that the 967 women in the sample *ceteris paribus* were in good health, while the probability of 31 per cent of women in poor health using tranquillisers regularly was computed by assuming that the 967 women in the sample *ceteris paribus* were in poor health.

Since the only factor that changed between the two calculations was the self-perceived health status of the women (good versus poor), the difference in the two probabilities (22.8 percentage points) can be ascribed entirely to the change in women's health status. This difference, computed as the difference between the probabilities of the outcome being considered (poor health) and the reference outcome (good health), denoted by [R], is termed the marginal probability and is shown in the third column. The ** shown against this value means that this difference is significantly different from zero.

<Table 3.1>

Table 3.1 shows that the probability of using tranquillisers regularly was nearly four times higher for women in poor health than for women whose health was good. In terms of income, the probability of regular tranquilliser usage for women in high-income households (17.3 per cent) was significantly greater than that for women in low-income households (11.0 per cent). Tranquillisers and sedatives can be used both legally, as prescribed medicine, and illicitly without a doctor's prescription and it is likely that the income effect reflects this latter form of acquiring one's medicine.

Exercising regularly had a significantly favourable effect on tranquilliser usage. As Table 3.1 shows, the probability of regular tranquilliser usage for women who did not exercise at least once in the past four weeks was, at 18.4 per cent, considerably higher than3:2 that for women who did exercise at least once in the past four weeks (11.9 per cent). Similarly, Table 3.1 shows that having a social life reduced the probability of women using tranquillisers regularly, ranging from 10 per cent for women with a social life to 16 per cent for those without. In terms of family status, women who were single parents had the highest probability of using tranquillisers regularly (20.2 per cent) with married women having the lowest probability (12.2 per cent). Lastly, of the identified categories of employment status, women who were in full-time employment were least likely (6.7 per cent), and women who were unemployed were most likely (20.8 per cent), to use tranquillisers regularly.

3.4 Gender Differences in Tranquilliser Usage

A frequent observation in the literature on tranquilliser use, discussed earlier, is that the incidence of usage is greater among women than men. Graham and Vidal-Zeballos (1998) showed that across surveys and within all age groups, females were more likely to use tranquillisers and/or sleeping pills than males, with an average ratio overall of a little higher than 3:2. This section tests this finding for West Belfast in the context of a model in which the tranquilliser equation is estimated on data *pooled* across women and men. Within this pooled dataset, the variable G was used to define the respondents' gender: for N respondents, indexed $i=1…N$, $G_i=1$ if respondent i was male and $G_i=2$ if respondent i was female.

Following this, every component of the vector of determining variables, **x,** in the tranquilliser equation, was allowed to interact with the gender variable, G:

$$Y_i = f(\mathbf{x} \times G_i) \tag{3.3}$$

If, for example, health status is a component of the vector **x** then, in equation (3.3), the effect of a particular health status on tranquilliser use would be contingent on the respondent's gender: the same health status could affect usage differently depending on whether the respondent was a man or a woman. Within the context of this "interaction" model, it is possible to test whether inter-gender differences in the effect of a particular variable category (say, health status) on tranquilliser use was significantly different from zero.

<Table 3.2>

Table 3.2 shows the differences between men and women in their respective probabilities of using tranquillisers regularly. For all men and all women, the respective probabilities are 8.1 and 14 per cent and the difference between the two, 5.9 percentage points, divided by its standard error, 1.4, yields a z-value of 4.2 which suggests that the difference is significantly different from zero.

Furthermore, for nearly every co-variate category, the probability of regular tranquilliser use by men was significantly lower than that for women. For example, men and women in poor health had significantly different predicted probabilities of using tranquillisers regularly of, respectively, 16.6 and 28.3 per cent. Again, for both men and women, the probability of using tranquillisers regularly rose with household income but, at every income level, this probability was lower for men than for women.

Similarly, the probability of using tranquillisers regularly was lower for those who exercised than for those who did not, but here again, the probability for men was lower than that for women, both for those who did (6.9 versus 11 per cent) and did not (9.2 versus 17.1 per cent) exercise. While, among the different categories of marital status, married persons had the lowest probability of taking tranquillisers, this probability was lower for married men than for married women (5.1 versus 11.6 per cent). Lastly, among the different categories of labour market status, while unemployed persons had the highest probability of taking tranquillisers, this probability was lower for unemployed men than for unemployed women (11.6 versus 20.8 per cent).

3.5 Injuries Due to Self-Harm

Another indicator of personal unhappiness is self-harm (hereafter, SH). This occurs when people hurt themselves – cutting, burning, scratching, or practising any other form of behaviour that results in pain or injury – as a way of dealing with very difficult feelings, painful memories, or overwhelming situations and experiences.[4] The intention in hurting oneself may have included death and hence instances of attempted suicide and self-mutilation are both included in the concept of "self-harm".

From an analysis of more than 40 countries, Patterson (2022) estimated that about 17 per cent of persons would self-harm over their lifetime, with the average age of the first incident of SH being 13 years, and cutting being the method of SH used by 45 per cent of self-harming persons. Because of the stigma and shame surrounding SH, Patterson (2022) observed that actual rates of SH were, however, likely to be underestimated by reported figures. Although (non-suicidal) SH is not a diagnosable mental health condition, the American Psychiatric Association lists it as one of the areas for further study. Existing research suggests that risk factors included: having friends who self-harmed; experiencing stressful life conditions; isolation; and drug and alcohol addiction.

The National Institute for Health and Care Excellence (NICE, 2020) found that rates of SH in the United Kingdom, among those aged 16–74, had been steadily increasing: from 2.4 per cent in 2000 to 3.8 per cent in 2007, and to 6.4 per cent in 2014. Moreover, 25.7 per cent of women aged 16–24 reported having self-harmed compared to 9.7 per cent of men in the same age bracket. Earlier studies confirm that SH has been a major health problem in the UK for nearly three decades (Hawton and James, 2005; Hawton *et al.*, 1997). In a study of 6,000 school children aged 15 and 16, researchers at the universities of Bath and Oxford found that 7 per cent had harmed themselves in the previous year: more than half cut their skin, with girls being more likely to harm themselves.[5]

In Australia, which is the subject of the analysis in this section, in 2020–21, 8.8 per cent of Australians aged 16-85 had self-harmed in their lifetime, with females more likely to have self-harmed (11.4 per cent) than men (6.2 per cent), and with almost one in four females aged 16–34

[4] https://www.mind.org.uk/information-support/types-of-mental-health-problems/self-harm/about-self-harm/ (accessed 12 November 2022).
[5] The *Economist*, 26 October 2006. https://www.economist.com/britain/2006/10/26/silent-scourge (accessed 24 December 2022).

having self-harmed in their lifetime. Ambulance attendances for SH (including attempted suicide) was highest in Queensland (150.1 per 100,000 population) and lowest in Tasmania (115.1 per 100,000); in every state, rates of SH were considerably higher for women than for men.[6] Twenty years previously, in 2001–02, there were 22,530 cases of hospitalisation for SH in Australia, which equated to 116.0 cases per 100,000 population: again, compared to males, females were more likely to be admitted to hospital for SH. Most cases of SH in this period involved self-poisoning (Heuvel, 2006).

In addition to the gender dimension to SH – about which, as the above discussion indicates, much is known – there is also the issue of race and ethnicity in SH, about which less is known. Within an ethnically heterogeneous population, are some ethnic groups more likely to self-harm than others? A similar question arises with respect to labour markets: do people with different labour market status (students, unemployed, employed) have differing risks of SH? Lastly, there is the question of the severity of injuries caused by SH: are SH injuries comparable in terms of severity to injuries caused by external agents such as parents, spouses, and strangers?

Against this background, this chapter uses a novel set of data from Australia to examine the issue of SH. These are data from the Queensland Injuries Surveillance Unit (QISU), which records details of injuries presenting at the emergency departments of participating hospitals in the Australian state of Queensland (hereafter simply "injuries"). The data were obtained from the participating hospital emergency departments using procedures based upon those developed by the US National Electronic Injury Surveillance System (NEISS) and similar to those used by the Victorian Injury Surveillance Unit at Monash University. The data items currently collected relate to: (i) Age, sex, postcode; (ii) Country of birth, language; (iii) Time and date of injury event; (iv) Injury text description; (v) Cause of injury; (vi) Intent of incident (unintentional, assault, etc.); (vii) Place of injury (for example, bedroom in boarding house); (viii) Activity leading to injury (for example, playing football); (ix) Nature of injury and body location or ICD-10 code; (x) Mechanism and major injury factor (for example, electric saw); (xi) Triage category (indication of severity); (xii) Admission status.

[6] Figures from Australian Institute of Health and Welfare https://www.aihw.gov.au/suicide-self-harm-monitoring/data/suicide-self-harm-monitoring-data (accessed 25 December 2022).

The QISU recorded 84,583 injuries between 1 January 2003 and 31 December 2005 of which 48 per cent (40,656 injuries) occurred in the home and only 9 per cent (7,951 injuries) occurred in the workplace.[7] Yet, the vast bulk of the literature which analyses personal injuries is concerned with injuries which occur in the workplace (or in the course of performing one's work). There is very little analysis of injuries which occur in the home, even though such injuries comprise a large proportion of the total. The purpose of this chapter is to provide a partial remedy for this neglect by analysing, using the injuries recorded on the QISU database between 1 January 2003 and 31 December 2005, injuries which were the result of SH, and which occurred mainly – though not exclusively – in the home.

The following sections examine the nature of injuries resulting from SH and compare them to injuries from external causes by asking: who were the people most vulnerable to SH, and was there a gender or ethnic or employment status risk to SH? If so, what was the size of the risks emanating from these sources? Were SH injuries more (or less) severe than injuries from external forms of assault?

In answering these questions, this study differs from other studies of SH – which have appeared mainly in medical journals[8] – in three important respects. First, the sample of SH injuries is larger than used by most studies. Second, it identifies groups who were most at risk from SH and, most importantly, *quantifies* the size of this risk. Third, it compares SH injuries with injuries from other forms of assault, both in terms of the type of persons who were likely to self-harm and in terms of the gravity of their injuries.

3.6 The Nature of Injuries Due to Self-Harm

The QISU reported the *intention* underlying an injury: 93 per cent of the total number of injuries was accidental; 4 per cent was the result of assault; 2 per cent was due to "other intentions"; and 1 per cent was the result of SH. In total, over the three-year period 2003–05, the QISU identified 784 cases where the injury was due to SH. Table 3.3 sets out the salient features of injuries due to three intentions: SH; assault; and accidents.

[7] Ten per cent of all injuries occurred at school or other public institutions; 13 per cent occurred in recreation or sports areas; 8 per cent occurred in the street; and 12 per cent occurred at "other places".
[8] See *inter alia* Fortune (2006); Hawton and James (2005); Sinclair and Green (2005); Whitlock *et al.* (2006).

<Table 3.3>

Injuries resulting from SH are mainly – though not exclusively – to women. As Table 3.3 shows, nearly two out of three injuries from self-harm were to women. By contrast, 68 per cent of injuries resulting from assault, and 62 per cent of accidental injuries, were to men. The average age of the injured parties in cases of SH was 25 years, compared to 28 years for assault injuries and 18 years for accidental injuries.

Table 3.3 also shows that while 50 per cent of assault injuries, and 23 per cent of accidental injuries, were to the "head" (head, face, excluding eyes, or neck) only 3 per cent of SH injuries were so located: the vast bulk of SH injuries were to systemic locations (66 per cent) and to the upper limbs (26 per cent). Indeed, the main modes for inflicting injuries on oneself were drugs and medicinal substances (56 per cent) and cutting and piercing (31 per cent). There was a marked difference between men and women in their modes of SH injury: 61 per cent of women who harmed themselves, compared to 48 per cent of men, did so through drugs and medicinal substances; 11 per cent of men harming themselves, compared to only 2 per cent of women, did so through collision with an object (usually, a wall or floor).

Sixty-nine per cent of SH injuries were sustained in the home (70 per cent for women and 67 per cent for men) compared to 34 per cent of assault injuries and 49 per cent of accidental injuries. Only 4 per cent of SH injuries resulted in a superficial wound (compared to 24 per cent of assault injuries and 13 per cent of accidental injuries). This is reflected in the fact that 74 per cent of SH injuries were regarded, by the relevant emergency department, as requiring "very urgent" attention (compared to 22 per cent of assault injuries and 30 per cent of accidental injuries).

After presentation of the injury to the relevant emergency department, 49 per cent of persons with SH injuries were admitted to hospital and 47 per cent were discharged. By comparison, only 11 per cent of assault injuries and 13 per cent of accidental injuries were admitted to hospital and 76 per cent of assault injuries and 83 per cent of accidental injuries were discharged.[9]

[9] In addition, 12 per cent of those with assault injuries left the emergency department, *against medical advice*, compared to 5 per cent of those with self-harm injuries and 4 per cent of those with accidental injuries.

The above facts provide compelling reasons why, in terms of health policy, one should take SH seriously. SH represents an assault by oneself on oneself and is, therefore, different from assaults in which the perpetrator and victim are different persons. In the latter form of assault, victims may take steps to protect themselves – by, for example, running away or locking themselves in a room – to reduce the impact of the assault. Furthermore, assault by external agencies may be opportunistic or carried out in a rage and may, therefore, cease when either the opportunity disappears, or the anger subsides. By contrast, in SH, the assailant and the victim are the same person operating in tandem. Although SH is carried out in response to an inner *angst* – and perhaps even to alleviate it – it is often carried out more deliberately and with greater preparation. For all these reasons, one could expect that the injuries from SH would be more serious and, consequently, more demanding in terms of medical resources.

3.7 Model Estimation and Predicted Probabilities

The econometric analysis asked two questions. First, what was the relative strength of the different factors influencing the probability of a person being injured through SH and did these probabilities vary systematically by gender? Second, *after controlling for other factors*, were SH injuries more (or less) severe than injuries from assault and accidental injuries?

In order to answer the first question, a logit model was estimated for respondents above 9 years of age, in which the dependent variable, y, took the value 1 if an injury to person i ($i=1,\ldots N$) in the QISU data was the result of self-harm and the value 0 if it was the result of some other cause. The conditioning variables used in the logit model are listed below. These were all categorical variables, and, for reasons of collinearity, all the categories could not be included in the equation. So, for each variable, one category had to be excluded from the equation and treated as the "reference" category.

1. Gender. The reference category was male.
2. Ethnicity: White; Aboriginal or Torres Strait Islander (ATSI); "other" ethnicity. The reference category was "other" ethnicity.
3. Age: 10–15; 16–21; 22–30; 31–65; 65+. The reference category was 65 or older.
4. Australian born. The reference category was foreign born.

5. Employment: student; employed; unemployed; home duties; "other" employment. The reference category was "other" employment.

Interaction effects were used to model whether the effect of one conditioning variable varied according to values of another variable. In the context of this study, a natural question to ask is whether the effects of some of the conditioning variables on the decision to self-harm varied according to the persons' gender, since 64 per cent of SH injuries were presented by females. To answer this question, a general model, in which the conditioning variables were allowed to interact with gender (*GEN=1,* if female, *0* if male), was estimated. By virtue of this characteristic, this model is referred to in the chapter as the *gender interaction model* (GIM).[10]

The GIM was estimated for 48,139 persons presenting injuries at emergency departments of Queensland hospitals: these were the number of injuries which had *non-missing values* associated with *all* the conditioning variables. The coefficient estimates were employed to make predictions about the probability of SH under various scenarios relating to the values of the conditioning variables. Following the methodology detailed in section 2.5 of chapter 2, under the rubric of "recycled proportions", the interpretation of the results is based upon these predicted probabilities. These are shown in Table 3.4 for the estimated logit model with *GEN* as the interaction variable.

<Table 3.4>

The upper and lower panels of column 2 in Table 3.4 show, with respect to the various categories, the probabilities of SH for men and women. For example, column 2 of Table 3.4 shows the predicted probabilities of presenting with SH injuries as 1.6 per cent for an ATSI male (upper panel) and 2.9 per cent for an ASTI female (lower panel). This probability was obtained by setting *ATSI=1* for all the 48,139 observations over which the equation was estimated (that is, treating all 48,139 persons presenting with injuries at emergency departments of Queensland hospitals as ATSI) but leaving the values of the other variables for each person unchanged (that is, as observed in the sample). Applying the logit estimates – *which included the estimates for the interaction terms with GEN* – to these revised values yielded estimated probabilities of SH for each of the 48,139 persons.

[10] Owning to a paucity of observations on SH, an equation incorporating the interaction of both gender and ATSI could not be estimated.

The average of these predicted probabilities of SH was 1.6 per cent for men (all of whom were assumed to ASTI) and 2.9 per cent for woman (all of whom were assumed to ASTI). A similar methodology was used to compute the predicted probabilities of SH for the two other ethnic groups – White and "other" ethnicity.

Similarly, column 2 of Table 3.4 shows, for persons aged 16–21 years, the predicted probabilities of presenting with SH injuries as 1.3 per cent for a male (upper panel) and 6.0 per cent for a female (lower panel). This probability was obtained by assuming that *all* the 48,139 persons over which the equation was estimated were aged 16–21 years but leaving the values of the other variables for each person unchanged (that is, as observed in the sample). Applying the logit estimates to these revised values yielded estimated probabilities of SH for each of the 48,139 persons. The average of these predicted probabilities of SH was 1.3 per cent for men (all of whom were assumed to be 16–21 years) and 6.0 per cent for woman (all of whom were assumed to be 16–21 years). A similar methodology was used to compute the predicted probabilities of SH for the other age groups and, indeed, to compute the predicted probabilities of SH for the employment and country of birth categories.

Column 3 of Table 3.4 shows the marginal probabilities of SH for the different categories of persons, with men in the upper panel and women in the lower panel. These probabilities are the *difference*, in their respective probabilities of SH, between persons in a particular category (White, ASTI for the ethnic group) and persons in the *reference* category for that group ("other" ethnicities for the ethnic group). For example, as column 3 of Table 3.4 shows, the marginal probability of SH for ASTI men was 0.011 = 0.016-0.006 and for ASTI women it was 0.021 = 0.029-0.007.

Dividing the marginal probability of column 3 by its standard error, shown in column 4, yields the z value in column 5. The z value associated with the marginal probability indicates whether it is significantly different from zero. For White and ASTI men and women, the marginal probabilities of SH were significantly different from zero meaning that, compared to men and women of "other" ethnicities, the probability of SH was significantly higher for their White and ASTI counterparts.

Similarly, compared to men and women in "other employment", the probability of SH was significantly greater for students and the unemployed, both male and female. However, for women,

the probability of SH for those on "'home duties" was significantly lower than for those in "other employment". The vulnerability to SH of students and the unemployed bears some discussion. It could be that life as a student is stressful both in terms of "coming of age" as a person and learning to cope with emotional and sexual relationships, and in terms of classwork with regard to tests and examinations. The effect of unemployment could be the result of a loss of self-worth after a prolonged period of joblessness.

With respect to age, compared to women aged 65 or more, the probability of SH for women in the age groups 16–21, 22–30, and 31–65 was significantly higher. For men, however, the marginal age effect was significant only for the 31–65 age group: compared to men aged 65 or more, the probability of SH for men in the age group 31–65 was significantly higher. Lastly, in terms of the country of birth, the likelihood of SH was significantly higher for Australian-born, compared to foreign-born, men and women: 3.3 per cent for Australian-born women versus 1.5 per cent for foreign-born women.

<Table 3.5>

The results shown in Table 3.4 were concerned with differences in the probability of SH between the categories in the various groups (for example, between the ATSI and the reference category of the "other ethnicity" in the ethnic group) *separately* for men and for women. In contrast, the results shown in Table 3.5 evaluate differences in the probability of SH *between* men and women for the *same* category. More specifically, the results show test outcomes for the null hypothesis that, *for a particular category*, the probability of SH was the same for men and as it was for women.

The results in Table 3.5 show that, for virtually every category, the probability of presenting at emergency departments of Queensland hospitals with an SH injury was significantly greater for women than for men. The overall likelihood of an SH injury was 3.1 per cent for women and 0.9 per cent for men. In terms of ethnicity, the likelihood of an SH injury was greater for White women than for White men (3.4 per cent versus 0.9 per cent) and greater for ATSI women than for ATSI men (2.9 per cent versus 1.6 per cent). In terms of employment, female students and unemployed had significantly greater likelihoods of presenting with SH injuries than male students and unemployed. In

respect of age, women in every age group, except the 65+ group, had significantly greater likelihoods of presenting with SH injuries than men in the corresponding age groups.

3.8 Ordered Logit Model of the Severity of Injuries by Different Types of Assault

The next question addressed in this chapter is whether, *after controlling for other factors*, injuries resulting from SH were more (or less) severe than injuries from assault and accidental injuries? This study defined the severity of an injury in terms of its triage assessment and categorisation by the emergency department to which the injury was presented. The categories used in this chapter were: "very urgent" (QISU triage categories: resuscitation; emergency; urgent); "urgent" (QISU: semi-urgent); and "not urgent" (QISU: non urgent). Table 3.6 shows the estimation results from estimating an ordered logit model in which the dependent variable took the values: 3, if the injury needed very urgent treatment; 2, if the injury was urgent; 1, if the injury was not urgent.

<Table 3.6>

Column 2 of Table 3.6 shows that, for women, the probability of an SH injury being viewed as "very urgent" was 77 per cent in contrast to a corresponding likelihood of 27 per cent for accidents, 21 per cent for parental assaults, 33 per cent for domestic assaults, and 27 per cent for other assaults. Column 5 shows that, for men, the probability of an SH injury being viewed as "very urgent" was 73 per cent in contrast to a corresponding likelihood of 28 per cent for accidents, 25 per cent for parental assaults, 25 per cent for domestic assaults, and 29 per cent for other assaults. The marginal probabilities of injuries being viewed as "very urgent", using the probability of SH injuries as the reference point (column 3 for women and column 6 for men), were all significantly different from zero (women: z values in column 4; men: z values in column 7) meaning that, compared to the probability of an SH injury being viewed as "very urgent", the probabilities of injuries due to accidents, parental assaults, domestic assaults, or other assaults being viewed as "very urgent" were significantly lower.

At the other end of the urgency scale, Table 3.6 shows that, for women, the probability of an SH injury being viewed as "not urgent" was 2 per cent in contrast to a corresponding likelihood of 15 per cent for accidents, 20 per cent for parental assaults, 12 per cent for domestic assaults, and 15 per

cent for other assaults. For men, the probability of an SH injury being viewed as “not urgent” was 2 per cent in contrast to a corresponding likelihood of 15 per cent for accidents, 17 per cent for parental assaults, 16 per cent for domestic assaults, and 14 per cent for other assaults. The marginal probabilities of injuries being viewed as “not urgent”, using the probability of SH injuries as the reference point, were all significantly different from zero meaning that, compared to the probability of an SH injury being viewed as “not urgent”, the probabilities of injuries due to accidents, parental assaults, domestic assaults, or other assaults, being viewed as “not urgent” were significantly higher.

3.9 Conclusions

This chapter examined two aspects of well-being which were not subjective: the use of tranquillisers in West Belfast in Northern Ireland, and the propensity to self-harm in the state of Queensland in Australia. The first part of the chapter showed that that the tranquilliser usage by men and women depended upon factors which were psychological, physical, economic, and social. The most prominent was gender. Following this,particularly those which was the state of health of persons: for example, women in poor health were four times more likely to use tranquillisers regularly than women in good health. Taking exercise and having a social life also dampened the use of tranquillisers. Prominent among the social factors was marital status: being a single parent was the least favourable status for being free of tranquilliser usage and being married was the most favourable. Among economic factors, the labour market status of women strongly affected their likelihood of using tranquillisers: the most favourable status was full-time employment, and the least favourable status was unemployment.

The methodology used, and the results obtained, have implications for the welfare of women in other parts of the world particularly those which have been affected by civil wars and civil strife. The study of women’s welfare in such areas is often neglected and needs to be studied. It is likely that such studies will show the commonality (and complexity) of factors that contribute to the well-being of women.

The second part of chapter dealt with SH injuries in the state of Queensland in Australia and compared such injuries to assault injuries and accidental injuries. The main finding was that SH

injuries were disproportionately concentrated among women and the young and were much more likely to be viewed by hospitals as requiring very urgent treatment than other types of injuries. The findings show that four factors significantly increased the probability of SH injuries: (i) gender: SH injuries were disproportionately concentrated among women; (ii) ethnicity: ASTI men and women had a higher probability of presenting (at emergency departments of Queensland hospitals) with SH injuries than non-ASTI men and women; (iii) age: young persons were more likely to present with SH injuries; (iv) labour market status: students and unemployed persons were more likely to present with SH than employed persons.

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Table 3.1: Predicted Probabilities of Regular Use of Tranquillisers: Women in West Belfast[+]

	Probability	Marginal Probability	Standard Error	z value
Health Status				
Good [R]	0.082			
Fairly good	0.126	0.043**	0.022	1.9
Poor	0.310	0.228**	0.043	5.3
Age Band				
18-25 years	0.111	-0.073*	0.048	-1.5
26-45 years	0.142	-0.043	0.032	-1.3
46-65 years [R]	0.185			
65+ years	0.149	-0.035	0.048	-0.7
Income				
Low Income [R]	0.110			
Medium Income	0.155	0.045*	0.027	1.7
High Income	0.173	0.063**	0.028	2.2
Exercise				
Exercised in past 4 weeks [R]	0.119			
Did not exercise in past 4 weeks	0.184	0.065**	0.024	2.8
Social Life				
Has social life	0.100			
Does not have social life	0.160	0.060**	0.028	2.1
Marital Status				
Single, no children	0.165	0.044	0.038	1.2
Married [R]	0.122			
Divorced	0.184	0.063**	0.034	1.9
Widowed	0.198	0.077*	0.044	1.8
Single Parent	0.202	0.080*	0.051	1.6
Labour Market Status				
Full-time employment [R]	0.067			
Part-time employment	0.134	0.067*	0.041	1.6
Unemployed	0.208	0.141**	0.036	3.9
Home maker	0.153	0.086**	0.032	2.7
Retired	0.134	0.066*	0.043	1.5
Other	0.224	0.157**	0.055	2.9

** Significant at 5 per cent level of significance * Significant at 15 per cent level of significance
[+] Multinomial Logit Estimates based on a total of 967 women in West Belfast, aged 18 and over.
[R] denotes reference category.

Source: Own calculations from West Belfast Project data

Table 3.2: Gender Differences in Tranquilliser Use in West Belfast

	Predicted Probability of Using Tranquillisers Regularly				
	Men	**Women**	**Difference**	**Standard Error**	**z-value**
All Persons	0.081	0.140	-0.059**	0.014	-4.2
Health Status					
Good	0.046	0.074	-0.027	0.022	-1.2
Fairly good	0.049	0.113	-0.064**	0.018	-3.5
Poor	0.166	0.283	-0.117**	0.045	-2.6
Age Band					
18–25 years	0.000	0.101	-0.101**	0.036	-2.8
26–45 years	0.064	0.129	-0.065**	0.023	-2.8
46–65 years	0.077	0.168	-0.091**	0.027	-3.4
65+ years	0.150	0.136	0.014	0.067	0.2
Income					
Low Income	0.063	0.101	-0.039	0.026	-1.5
Medium Income	0.083	0.143	-0.060**	0.023	-2.6
High Income	0.089	0.159	-0.070**	0.023	-3.0
Exercise					
Exercised in past 4 weeks	0.069	0.110	-0.041**	0.019	-2.2
Did not exercise in past 4 weeks	0.092	0.171	-0.079**	0.023	-3.5
Social Life					
Has social life	0.091	0.147	-0.056**	0.016	-3.6
Does not have social life	0.030	0.092	-0.061**	0.029	-2.2
Marital Status					
Single, no children	0.134	0.157	-0.024	0.046	-0.5
Married	0.051	0.116	-0.066**	0.016	-4.1
Divorced	0.184	0.175	0.009	0.055	0.2
Widowed	0.090	0.189	-0.099**	0.053	-1.9
Single Parent	0.000	0.192	-0.192**	0.047	-4.1
Labour Market Status					
Full-time employment	0.082	0.065	0.017	0.034	0.5
Part-time employment	0.000	0.130	-0.130**	0.035	-3.8
Unemployed	0.116	0.201	-0.085**	0.045	-1.9
Home maker	0.000	0.148	-0.148**	0.026	-5.8
Retired	0.057	0.129	-0.072**	0.038	-1.9
Other	0.189	0.218	-0.029	0.068	-0.4

+ Multinomial Logit Estimates based on a pooled sample of 967 women and 641 men West Belfast, aged 18 and over.
** Difference is significant at 5% level; * Difference is significant at 10% level

Source: Own calculations from West Belfast Project data

Table 3.3: Salient Features of Injuries Due to Different Intentions at Emergency Departments of Queensland Hospitals, 2003–2005

	Self-Harm	**Assault**	Accidents
Number of Cases	**784**	**2,884**	**78,639**
Gender			
Male (%)	36	68	62
Female (%)	64	32	37
Total (%)	100	100	100
Average Age (years)	25	28	18
Bodily Location of Injury			
Head (%)	3	49	23
Trunk (%)	2	6	4
Upper limbs (%)	26	15	34
Lower limbs (%)	2	3	21
Systemic location (%)	67	27	18
Total (%)	100	100	100
Place of Injury Occurrence			
Home (%)	69	34	49
School/public institution (%)	4	6	10
Recreation/sports area (%)	1	5	13
Street (%)	3	14	8
Workplace (%)	2	15	9
Other Place (%)	21	26	11
Total (%)	100	100	100
Nature of Injury			
Superficial (%)	4	24	13
Open Wound (%)	27	28	23
Fracture/dislocation (%)	2	18	33
Foreign body (%)	1	0	7
Other injury (%)	66	30	24
Total (%)	100	100	100
Ethnicity of Injured Person			
White (%)	85	65	88
ATSI (%)	11	28	4
Other (%)	4	7	8
Total (%)	100	100	100
Triage Category			
Very urgent (%)	74	22	30
Fairly urgent (%)	23	63	59
Not urgent (%)	3	15	11
Total (%)	100	100	100

Source: QISU data

Table 3.4: Intra-Gender Predicted and Marginal Probabilities of Self-Harm[+]

	Men			
Ethnicity	Probability	Marginal Probability	SE	z value
White	0.009	0.003	0.001	2.14**
Aboriginal and Torres Strait Islander (ATSI)	0.016	0.011	0.003	3.47**
Other ethnicity [R]	0.006			
Employment				
Student	0.018	0.013	0.004	3.41**
Employed	0.003	-0.003	0.002	-1.63
Unemployed	0.018	0.012	0.003	4.88**
Home Duties	0.010	0.004	0.010	0.42
Other Employment [R]	0.006			
Age in Years				
10–15	0.003	-0.007	0.004	-1.61
16–21	0.013	0.004	0.004	0.87
22–30	0.015	0.006	0.004	1.30
31–65	0.018	0.009	0.004	1.98**
65+ [Reference]	0.010			
Country of Birth				
Australian Born	0.009	0.003	0.001	2.23**
Foreign Born [Reference]	0.006			
	Women			
Ethnicity	Probability	Marginal Probability	SE	z value
White	0.034	0.026	0.003	9.61**
Aboriginal and Torres Strait Islander (ATSI)	0.029	0.021	0.005	4.14**
Other ethnicity [R]	0.007			
Employment				
Student	0.055	0.036	0.007	5.44**
Employed	0.015	-0.003	0.008	-0.40
Unemployed	0.052	0.033	0.007	5.00**
Home Duties	0.012	-0.007	0.003	-2.25**
Other Employment [R]	0.019			
Age in Years				
10–15	0.018	0.007	0.005	1.47
16–21	0.060	0.050	0.007	7.53**
22–30	0.052	0.041	0.008	5.35**
31–65	0.038	0.027	0.006	4.63**
65+ [Reference]	0.011			
Country of Birth				
Australian Born	0.033	0.019	0.003	5.90**
Foreign Born [R]	0.015			

[+]Total of 48,139 injuries at Emergency Departments of Queensland hospitals on persons > 10 years of age
[R] denotes reference category
** Significant at 5% level
Source: Own calculations from QISU data

Table 3.5: Inter-Gender Differences in the Predicted Probabilities of Self-Harm [+]

	Probability (Women)	Probability (Men)	SE of Difference	z value for H_0: Pr(Women) = Pr(Men)
Overall	0.031	0.009	0.002	13.81**
Ethnicity				
White	0.034	0.009	0.002	13.91**
Aboriginal and Torres Strait Islander (ATSI)	0.029	0.016	0.006	2.25**
Other Ethnicity	0.007	0.006	0.003	0.70
Employment				
Student	0.055	0.018	0.007	5.33**
Employed	0.015	0.003	0.008	1.58
Unemployed	0.052	0.018	0.007	4.86**
Home Duties	0.012	0.010	0.010	0.22
Other Employment	0.019	0.006	0.002	7.24**
Age in Years				
10–15	0.018	0.003	0.002	8.27**
16–21	0.060	0.013	0.005	8.67**
22–30	0.052	0.015	0.008	4.79**
31–65	0.038	0.018	0.006	3.39**
65+	0.011	0.010	0.006	0.20
Country of Birth				
Australian Born	0.033	0.009	0.002	13.59**
Foreign Born	0.015	0.006	0.003	2.79**

[+]Total of 48,139 injuries at Emergency Departments of Queensland hospitals on persons > 10 years of age

** Significant at 5% level

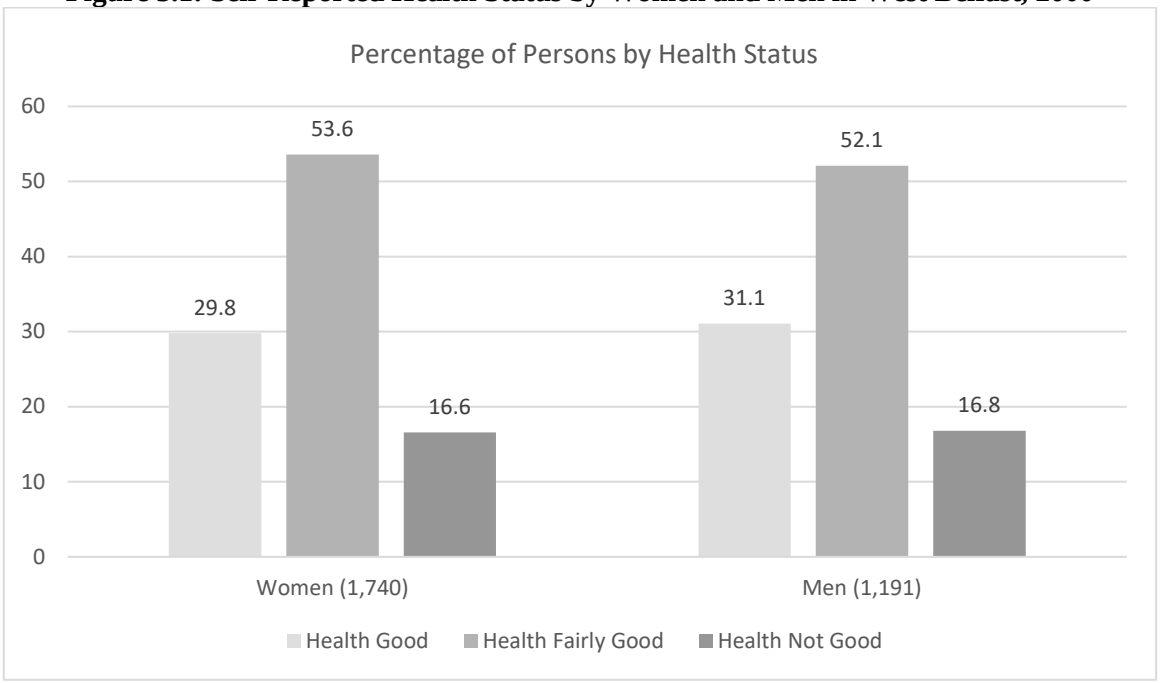
Source: Own calculations from QISU data

Table 3.6: Probabilities and Marginal Probabilities of Urgency of Different Injury Types, By Gender[+]

	Women			Men		
Degree of Urgency	Prob	MProb	Z value	Prob	MProb	Z value
Not Urgent						
Accident	0.150	0.131	42.11	0.145	0.122	33.04**
Self-Harm [Reference]	0.019			0.024		
Parental assault	0.202	0.183	2.40	0.165	0.141	1.50
Domestic Assault	0.120	0.100	7.36	0.164	0.140	4.16**
Other Assault	0.149	0.129	12.21	0.142	0.118	17.98**
Semi-Urgent						
Accident	0.580	0.364	0.017	0.580	0.364	21.41**
Self-Harm [Reference]	0.216			0.216		
Parental assault	0.593	0.376	0.017	0.593	0.376	22.15**
Domestic Assault	0.556	0.340	0.022	0.556	0.340	15.31**
Other Assault	0.579	0.363	0.018	0.579	0.363	20.26**
Very Urgent						
Accident	0.270	-0.495	-25.87	0.279	-0.445	-16.92**
Self-Harm [Reference]	0.765			0.725		
Parental assault	0.205	-0.560	-7.06	0.251	-0.474	-3.65**
Domestic Assault	0.325	-0.440	-13.10	0.252	-0.473	-8.96**
Other Assault	0.273	-0.492	-19.84	0.285	-0.440	-15.83**

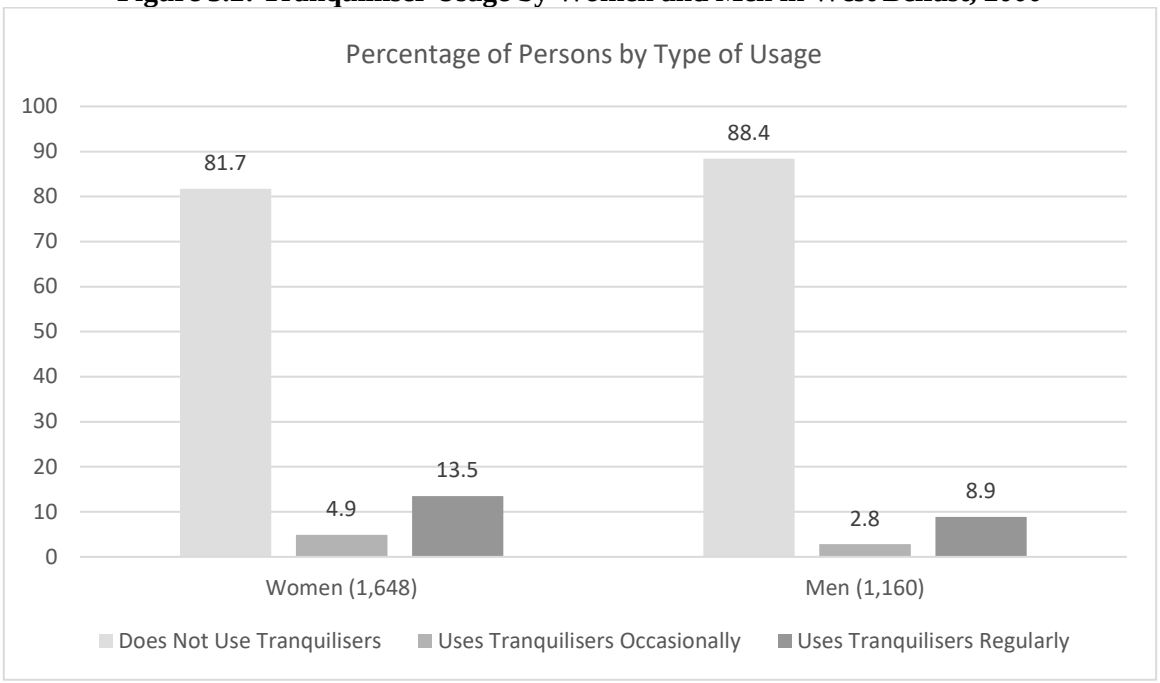
[+]Ordered logit model with 47,530 observations on persons > 10 years of age.
** Significant at 5% level
Source: Own calculations from QISU data

Figure 3.1: Self-Reported Health Status by Women and Men in West Belfast, 2000



Source: West Belfast Health and Advocacy Project

Figure 3.2: Tranquilliser Usage by Women and Men in West Belfast, 2000



Source: West Belfast Health and Advocacy Project