Chapter 4

Generating the evidence to develop a holistic approach to weight management

This chapter details the results of the exploratory phase of the study. The concepts of energy intake, energy expenditure, weight control beliefs, physical, social and emotional well-being as shown in the conceptual framework were explored to identify their possible relevance for the intervention. The purpose of doing so was to act as a grounding for the holistic approach to weight management by allowing, not only the ‘parts of the whole’ to be scrutinised but also to try and ascertain how individuals respond ‘as a unified whole’. Therefore, there was a need to examine patterns in the data and identify relationships between the variables. Gathering qualitative data may provide further insights into how individuals responded. For these reasons, it was decided to analyse the data in the following manner.

Primary analysis of the data was undertaken using descriptive statistics. Spearman's bivariate correlation was used for secondary analysis to identify the relationships between the variables. Tertiary analysis, using one-way analysis of variance (ANOVA), Tukey's HSD test and Kruskal-Wallis tests, identified the differences between the following three groups; a) those who gained weight, b) those who were weight stable or reduced their body weight by up to 5% and c) those who reduced their body weight by over 5%. In addition, paired t-tests allowed examination of the extent of within-subject changes.
4.1 Sampling

As described in the previous chapter, individuals for this exploratory phase were recruited from an out-patient clinic specialising in obesity management. The following table 4.1 shows the breakdown of the numbers of individuals from initial approach to participation followed by more detailed information on the recruitment process.

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Approached</strong></td>
<td>25</td>
<td>77</td>
<td>102</td>
</tr>
<tr>
<td>Non-responders</td>
<td>2</td>
<td>9</td>
<td>-11</td>
</tr>
<tr>
<td>Refusals</td>
<td>2</td>
<td>5</td>
<td>-7</td>
</tr>
<tr>
<td><strong>Consented</strong></td>
<td>21</td>
<td>63</td>
<td>84</td>
</tr>
<tr>
<td>Changed appointments</td>
<td>0</td>
<td>12</td>
<td>-12</td>
</tr>
<tr>
<td>Did not attend</td>
<td>0</td>
<td>2</td>
<td>-2</td>
</tr>
<tr>
<td>Exclusions</td>
<td>2</td>
<td>4</td>
<td>-6</td>
</tr>
<tr>
<td><strong>Total recruited</strong></td>
<td>19</td>
<td>45</td>
<td>64</td>
</tr>
</tbody>
</table>

Table 4.1 Table of recruitment for males and females.

At the outset, 102 individuals were selected from a clinic list according to appointment times and invited to participate in the study. The reasons given for refusing were difficulty filling in forms (1 male and 1 female), and looking after sick relatives (2 women) with the remaining 3 giving no explanation.

The remaining 84 individuals agreed to participate. However, 12 (females) of these had their appointments changed by the clinic to outwith the recruitment time and therefore had to be excluded. A further 2 females, who did attend their appointments, also had to be excluded as one was being transported by ambulance and the other had a family crisis, therefore she had no time to participate in the study. In addition, 2 males and 4
females were excluded for a variety of reasons, 3 had reduced their BMI to <30, 1 had learning difficulties, 1 was undergoing psychiatric treatment and another was too ill to attend.

In summary, 84 (82%) consented to the study but the actual number eventually recruited was 64, for the reasons given above. The following results in percentage terms have been rounded up or down to the nearest 1%. Consequently, the cumulative percentage total may not always be exactly 100%.

4.2 General demographic information

An audit of the clinic population from which the individuals were selected provided parameters of gender, BMI range, and mean weight by which to judge the representativeness of this study sample. The 64 individuals in this sample consisted of 19 (30%) males and 45 (70%) females reflecting the clinic gender ratio of 28% to 72% respectively. All individuals were over 18 years of age with a BMI ranging from 33.3 to 59.9 for males and 30.4 to 60.5 for females, with 35 individuals (55%) of this sample (14 males, 21 females) being classified as having Class III obesity. The BMI category for males and females is shown in Figure 4.1.
The mean BMI was 42.4, which was in line with the general clinic population mean of 40.6. In addition, the mean weight of 116kg for the clinic population compared favourably with the 110kg in the sample. The weight range was 62.3kg to 185.7kg. These results suggest that the sample was representative of the clinic population.

The majority of women in this study were younger than the men, with 29 (64%) females being in the under 50 age group, 6 (13%) of whom were under 30 years of age. In comparison, there were no males under 30 years of age and, in fact, the majority of men, 13 (68%), were ≥50 years of age. The following Figure 4.2 provides an overall picture of the age ranges by gender.

Figure 4.1 Clustered bar chart showing the percentage of males and females in each BMI category.
The office of population census and surveys (1991) classification was used to identify social class by employment. There was high unemployment [9 (47%) males and 20 (44%) females] within the sample, most of whom, (7 (78%) males and 11 (55%) females), were in the morbidly obese category, having a BMI of ≥ 40kg/m².

Those who were employed were identified as belonging to all social class groups except social class I. Of the 35 (55%) individuals who were working, all but 3 (9%) belonged to social classes II and III with a greater proportion of working males [6 (60%)] being in class II while the majority of working females [15 (68%)] were in class III. Only 2 (20%) working males had manual jobs. One female in the under, 30 age group was under threat of losing her employment due to her obesity.

The majority of individuals, 37, [11 (58%) males and 26 (58%) females] were married, while all divorced or separated individuals (6) were female and there were 4 (21%) males and 8 (14%) females who had never married.
4.2.1 Perceived reasons for onset of weight problem

There was an apparent gender difference in the perceived reasons for the onset of weight gain. For females, the reasons tended to be hormonal with 12 (27%) identifying childbirth and 8 (18%) the menopause. For males 9 (47%), the reasons were more likely to be environmental, especially changing jobs. The majority of males [14 (74%)] stated that their weight gain began in adulthood while 25 (57%) females identified their obesity as starting in childhood or adolescence. Among these women, were 6 (13%) who had Polycystic Ovary Syndrome indicating a hormonal influence on obesity. Therefore, with regard to the development of obesity there is an apparent gender difference. Understanding these influences would seem to be important for both individuals and nurses when considering intervention.

4.2.2 Family history of weight problems

Another influence on obesity development is family history. The respondents perceptions of who in their family had weight problems is shown in Figure 4.3
Both men and women identified their mother as being overweight. This amounted to nearly half (44%) of the total study population while only 17%, that is, 11 (3 male and 8 female) individuals stated that their partner was overweight. It would appear that there is an argument in favour of family history influencing obesity in this population. However, it cannot be ascertained, within the confines of this study, whether this is due to genetics, lifestyle or a combination of both. Nonetheless, the conclusion drawn from these results is that there was a familial component to the development of obesity. Acknowledging family history and helping individuals think about how family life influences weight management may be important considerations for intervention.

4.3 Physical aspects of weight management

The next section describes the physical aspects of co-morbidities, symptoms and functional ability in this sample of 64 individuals.
4.3.1 Co-morbidities

The Royal College of Physicians (RCP) in their 1998 report recognized a range of co-morbidities associated with obesity and these were included in the questionnaire. So as not to miss any co-morbidities, an 'other' category was also included. The patients’ hospital notes were reviewed to obtain all relevant information for this particular question. The results show a range of common co-morbidities for males and females, with the exception of type II diabetes, are shown in Figure 4.4

![Figure 4.4 Pie charts of the prevalence of obesity related co-morbidities for males and females.](image)

Although type II diabetes is a common co-morbidity of obesity, the study did not include anyone with this diagnosis. The reason being, that anyone identified as having type II diabetes is transferred to the diabetic clinic for treatment and therefore is a limitation in terms of representativeness. Of the study population 22 (34%) were identified as having only one, co-morbidity. A total of 15 (23%) had two co-morbidities, 16 (25%) had three, 6 (9%) had four and 1(1%) had five. The remaining
four individuals had no co-morbidities but three of them were in the 30-39 age group and could therefore, be at risk of co-morbidities developing as they became older if their obesity was not addressed.

Hypertension was the most frequently documented co-morbidity for 7 (37%) males and 10 (22%) females, although in females, hypothyroidism (10, 22%), osteoarthritis (9, 20%) and asthma (9, 20%) were also widespread. However, the most frequent co-morbidity identified in females was depression with 13 (29%) having been diagnosed with this condition by clinicians. These results highlight not only the range of co-morbidities in relation to obesity but also that individuals frequently have multiple co-morbid conditions.

4.3.2 Symptoms

A list of symptoms was compiled from knowledge of the various co-morbidities, possible side-effects of treatment, information gained through working with obese individuals and the conceptual framework. To identify their perceived frequency, individuals were asked to score symptoms on an ordinal scale of 1 to 10. For any given symptom the lowest score "1" indicated that it occurred very rarely while the highest score "10" indicated that it occurred most of the time. Should a symptom not be perceived as a problem by the individual there was also a 'not applicable' box to capture this information rather than having it be assumed to be missing data. In addition, there were two 'other' categories to allow individuals to insert symptoms not listed. Bivariate analysis of the variables was undertaken using Spearman's two tailed test of significance to explore the associations between weight and symptoms over time.
The scores for the listed symptoms were collapsed from ordinal scales of 1 to 10, into nominal data to produce three categories: a score of ≤ 3 being classified as low severity, scores 4-7 being classified as moderate severity, and scores ≥ 8 being classified as high severity. Symptoms were often related to the co-morbidities of obesity. Sleep was problematic for 59 individuals with 30 of those (8 males and 22 females) saying it was a problem of high severity. Body pain was another common problem for 52 individuals, 29 (8 males and 21 females) of whom, from all age ranges, identified it as being severe. Skin problems were also highlighted as an issue for 45 individuals with 15 of those (4 males and 11 females) indicating that it was severe. Correlations between some symptoms were statistically significant as shown in Table 4.2.

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Correlation coefficient</th>
<th>Significance (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleep / hunger</td>
<td>.270</td>
<td>.049</td>
</tr>
<tr>
<td>Sleep / heartburn</td>
<td>.373</td>
<td>.023</td>
</tr>
<tr>
<td>Sleep / cravings</td>
<td>.402</td>
<td>.002</td>
</tr>
<tr>
<td>Sleep / body pain</td>
<td>.529</td>
<td>.000</td>
</tr>
<tr>
<td>Body pain / breathlessness</td>
<td>.322</td>
<td>.027</td>
</tr>
<tr>
<td>Body pain / heartburn</td>
<td>.372</td>
<td>.025</td>
</tr>
<tr>
<td>Body pain / abdominal bloating</td>
<td>.346</td>
<td>.022</td>
</tr>
<tr>
<td>Body pain / sweating</td>
<td>.391</td>
<td>.006</td>
</tr>
</tbody>
</table>

Table 4.2 Table of Spearman’s rho correlations of symptoms with sleep, body pain and skin problems.
Sleep problems were related to hunger (p = 0.049), heartburn (p = 0.023), cravings (p = 0.002), and most significantly, body pain (p<0.001). In addition to sleep, body pain was significantly correlated with shortness of breath (p = 0.027), heartburn (p = 0.025), abdominal bloating (p = 0.022) (which was more problematic for women) and sweating (p = 0.006).

Furthermore, those who had severe skin problems were more likely to have negative feelings (p = 0.004), in particular loneliness (p = 0.007) and anger (p = 0.029). Therefore identifying and addressing skin problems are an important aspect of care.

The array of symptoms, severity and interrelationships appear numerous but practical experience and local clinic audits suggest they may reflect reality. The difficulty is translating these possible symptoms into a succinct practical approach to intervention.

4.3.3 Functional ability

A five point Likert type scale was used to measure the degree of functional ability and coded for analysis where "1" indicated never having any difficulty and "5" indicating always having difficulty. Functional ability was reduced for 42(66%) individuals, who had varying degrees of difficulty walking and for 45(72%) for whom going up or down stairs, bending or stooping was problematic. The following activities created some difficulty for individuals; getting in and out of the bath (49%), carrying out household chores (56%), and dressing (34%). The extent to which functional ability was reduced was widespread in this group. If there was difficulty with one function it was more
likely that other functions also caused difficulty. Assessment of functional ability may
be another important area to incorporate in an intervention.

4.3.4 Leisure activity

The number of hours involved in leisure activities was categorised in the questionnaire
and coded on a scale of 1 to 7 prior to entry into the database, ie. a score of "1" being
none and a score of "7" being over 40 hours. The intensity of activities was divided into
low (eg watching TV, reading), medium (eg gardening, do-it-yourself), and high (eg
swimming, cycling).

Watching television was the most popular leisure pursuit with 23(36%) watching more
than 21 hours per week, and 7 (11%) more than 40 hours per week. At the other end of
the activity scale, 18 (28%) went swimming and these, like the 10 (16%) who cycled
tended to be younger. Those who were more active were more mobile (p = 0.031), less
bored (p = 0.006) and expressed less dissatisfaction with their bodies (p = 0.026).
These results suggest that activity and inactivity may both be relevant to a weight
management intervention.

Physical well-being appears to be an area to address in an intervention by including co-
morbidities, symptoms, functional ability and leisure activity.

4.4 Emotional aspects of weight management

Following on from the examination of the perception of physical aspects of obesity the
next section provides information on the perceived emotional aspects of body
satisfaction, feelings, anxiety and depression.
4.4.1 Body satisfaction

Body satisfaction was scored on a scale of 1 to 10 with "1" being very satisfied and "10" being very dissatisfied. All individuals had some degree of negative feelings about their body image, males less so than females. Qualitative data from the questionnaire provided additional perspectives on each topic and was further broken down into smaller themes identified in the data.

One female who scored 10 for all sections of this question as well as for shyness stated that she was: "Generally ashamed of my body's appearance". Comments by other individuals such as "my body is a mess", "sad with my body and myself" and "feel fat and therefore unattractive" gave further insights into how body image was associated with negative feelings (p = 0.003) in general. More specifically it was associated with feelings of guilt (p = 0.002) as explained in this quote. "Everything seems to jiggle and this upsets me then I turn to food for comfort. Then I feel guilty then I eat more to try to make myself feel better (vicious circle)". The overall conclusion is that negative feelings were generally associated with body dissatisfaction. This suggests that body image may be a pertinent factor to include in intervention.

4.4.2 Feelings

The qualitative data underlined the fact that feelings were particularly important to the individual and provided insight into the quantitative data. These feelings were scored on ordinal scales of 1 to 10 with "1" being very rarely, and "10" being most of the time. These ordinal scales of 1 to 10, were collapsed to produce nominal data in three categories: a score of $\leq 3$ being classified as low frequency, scores 4-7 being classified
as moderate frequency, and scores $\geq 8$ being classified as high frequency. The ordinal scales were also grouped to calculate mean scores for both negative and positive feelings.

Some individuals [10 (53%) males and 27 (60%) females] scored $\geq 8$, suggesting that they felt loved. Low levels of pride, indicated by a score of $\leq 3$, were reported by 8 (42%) males and 21 (47%) females. There were high levels of guilt experienced by 2 (11%) males and 19 (42%) females. There were 21 individuals (33%) who had high levels of anger, including 4 out of the 6 in the < 30 age group who were all women. There was a correlation between guilt and anger ($p = 0.001$) and the qualitative data gave insights into the relationship between them as indicated in the following comment "Generally I am a very positive individual but I have high expectations which I often don't meet hence the guilt/anger". Guilt was also correlated with shyness ($p = 0.002$) and appeared to be connected to the weight of individuals as typified in these two written remarks. "Very shy when meeting people for the first time because of my weight" and "I'm far less out-going because of my weight. I tended to be a bit extrovert before I was so heavy".

It seems that when people are lonely they are also bored ($p = 0.002$) and the comment "Have hated my body since about the age of 11/12 yrs when weight started to increase. I try to hide myself if at all possible." could be interrupted as one reason since boredom is associated with a high BMI, body dissatisfaction and inactivity. Loneliness, as shown in the following negative correlation, can still be an issue even if one feels loved ($-p = 0.039$) as expressed in the following quote "though I have a loving and supportive husband I often feel lonely". 
When given the option of identifying other feelings, participants documented frustration in the comments section. This was correlated with anger (p = 0.003) and could be due to functional problems as indicated in the following quote: "The very process of dressing every morning causes frustration and anger". The outcome of frustration can have negative effects on weight management. "It is a vicious circle. Frustration at not losing makes me want to eat which equals more frustration." It can come from different sources. Caring responsibilities can create difficulties as in this case where "Mother has been ill - hospital etc - quite frustrating - she doesn't make an easy patient" but can lessen with a change of circumstance in a different scenario, for example, a "Change of job (+boss) is removing most frustrations from my day". It may be that incorporating the means to identify life situations in an intervention would aid weight management.

Although the myriad of negative feelings, individuals expressed positive feelings like pride and confidence (p = 0.004) which were also significantly correlated and appeared to be linked to losing weight as exemplified in the comment: "Mostly feel very proud of my weight loss over the years". It appears that there are intense feelings, particularly negative ones, associated with obesity and therefore it was thought relevant to examine levels of anxiety and depression.

### 4.4.3 Anxiety and depression

Anxiety and depression was rated using the Hospital and Anxiety Depression Scale (HADS). The HAD scores were divided into 0-7, 8-10, \geq 11 for each category of anxiety and depression as suggested by Zigmond and Snaith (1983) and coded for analysis purposes. A score of 0-7 indicated a 'probable absence' scores of 8-10
'possible presence' and > 11 'probable presence'. The scores for anxiety and depression are shown in Figure 4.5

Males displayed less anxiety than females, with 10 (53%) males scoring between 8 and 10 compared with 21 (47%) females who scored 11 or more. Most of these men were in the 50-60 age group whereas the 40-49 year old females were more likely to have high anxiety levels. This same female age group also demonstrated high depression levels with 11 (24%) females scoring 11 or more and a further 8 (18%) females scoring between 8 and 10. Depression, as identified by the HAD scores, was significantly correlated with negative feelings (p = 0.002) and even more so with mobility problems (p<0.001).

Emotional well-being appears applicable to weight management and perhaps should be incorporated into intervention.
4.5 Social aspects of weight management

The perception of social support was an important aspect for individuals trying to manage their weight. Therefore, this study examined the support individuals perceived themselves to have from their everyday contacts, particularly family and friends.

4.5.1 Social support

Social support was scored on a scale of 1 to 10, with "1" being very unsupportive and "10" being very supportive. For the purpose of analysis, each variable on the scale was grouped with "< 3" being very unsupportive and "≥ 8" very supportive. Furthermore, these variables were grouped together to give mean scores for support from family, friends, colleagues, health professionals and others in the community to try and gauge the strength of social support from different people.

Of the 42 individuals who had a partner, 24 (57%) viewed them as being very supportive as reflected in some of the comments: "My husband has always been very supportive" and "I am very lucky in the respect that those closest to me ie husband and children are extremely supportive". However, sometimes there was a perception of mixed support from the same person: "Find partner will one day cook protein only meal then the next encourage me to fall by the wayside" and "I feel my husband can be supportive sometimes and others negative". Others felt that partners hardly supported them at all in their efforts: "my husband is not good at helping me". Sometimes, partners may not want the individual to change or feel that they are giving support but it was viewed negatively in these instances where my "Husband 'likes me the way I am" or says "You wouldn't be you if you were thin". This would suggest that partners may influence how individuals manage their weight.
Of the 42 individuals who had children, 20 (47%) perceived them to be supportive, however, 6 (14%) felt that their children were very unsupportive by giving them a score of 1 but made no comment. Of the 33 individuals who identified parents, 17 (41%) accredited them with being supportive. One female viewed her mother as not providing the support she was looking for as she wrote: "Sometimes I feel my mum is checking up on what I eat by asking him (husband) questions and I feel a bit betrayed by this at times". It may also be helpful to identify other family members and how their actions are perceived.

As well as the perception of support from the family, friends may be influential. 6 (11%) individuals, 5 of whom were females, indicated that close friends were very unsupportive whereas 22 (39%) individuals stated that friends were very supportive. Acquaintances, however, were far less supportive with 11 [(24%) 2 males and 9 females] giving a score of ≤ 3. One subject gave an example of how difficult socializing can be. "Some friends tend to buy me drink when they know I'm on a diet, one leads to another then your resolve goes!" Social interaction may be an important aspect for consideration in an intervention.

In the workplace, more than half (6) of the 10 employed males, found colleagues to be unsupportive. Conversely, females, including all those <30 years of age, felt they had more support as 15 of the 24 working females identified colleagues as being supportive.

Perceived support from health professionals for weight management varied but was mostly positive "Specialist doctor and dietitian have encouraged me to get on the program again" and "I have had great support from my dietitian, my own doctor and Dr X". One individual seemed to reflect the teamwork approach aimed for at the clinic.
to encourage individuals to participate in their care. “By losing weight and looking better makes you feel good, and with the support of the doctors and nurse it gives you the encouragement to try harder”.

Although there were no written negative comments, possibly due to the study taking place at the clinic and patients not wanting to appear critical, there were some indicators of dissatisfaction with the support provided by health professionals. Even perceived positive support can sometimes produce negative feelings. "The doctors and dietitians have been very supportive but I feel as if I have let them and myself down for putting weight back on”.

General practitioners were seen by 13 individuals [(22%) 3 male and 10 females] as unsupportive but only 1 female identified specialist doctors in the same way. Most of the study population felt that dietitians were very supportive but 3 individuals felt that they were not, while 1 male and 6 female felt the same way about nurses. In fact, 5 individuals did not see nurses as being relevant to weight management. This seems to suggest that health professionals may need to be aware of their approach to individuals to ensure that they are perceived as being supportive.

The qualitative data highlighted that individuals often felt that lack of support was due to a lack of understanding. "I do not receive a lot of support from friends, family and/or colleagues because I do not believe that they understand just how much of an issue my weight is for me.” and "Lack of understanding by other people. They don’t realise the consequences of straying from the diet even by a little.” The perceived lack of understanding could have knock on effects as indicated in the following quote: "People
really don't understand the full implications of the diet and think that just a little will have no effect, do not realise the worry you feel about your weight." It may therefore be that health professionals could consider the need to convey empathic understanding.

Even when support was forthcoming there was sometimes an element of frustration and perhaps unrealistic expectations from others. "Generally support has been good, however, no-one quite appreciates my frustration or really believes the effort I make."

Another issue raised by individuals was the stigma they feel. For example, "I say 'isn't it hot in here', they say 'Well if you were not so heavy!'" and "everyone is not as fat as you are" (when the subject suggested that there should be a bigger space between chairs for an event) "Can be very hurtful."

Prejudice not only comes from the general public but also from health professionals.

"Working in healthcare you are judged by your size. Once labeled as obese you can never rid yourself of it. Too many health professionals still equate overweight with overeating and laziness."

This suggests that negative feelings were engendered by stigma and prejudice and that people suffering from obesity may feel stigmatised.

### 4.6 Beliefs about weight management

On a 5 point Likert scale, ranging from strongly agree to strongly disagree, 45 individuals (71%) held the belief that they were the only ones who could control their weight and that it was not totally outwith their control 39 (65%). One subject
emphasized this when she wrote: "I believe each individual can control their weight problem with the correct help and indeed their own positive mental attitude.” Taking control is not always easy though even for 41 (65%) individuals who believed that if they gained weight it was their own fault as indicated by this quote: "I know that I am the one who makes the difference in my weight but I still find it very hard to discipline myself to try to lose some weight.” The achievement of weight loss was not viewed by 51 individuals (81%) as being just good luck. However, one seemed ambivalent about it. "I can't help thinking that the harder I try to control my weight the more difficult it becomes."

Those who believed that they were the only ones who could control their weight were also more likely to believe that if they gained weight it was their own fault (p<0.001). When there is weight gain they seem to blame themselves. "I know that I am accountable for my weight but I feel that I have no control over food. I often eat when I'm not hungry so I deserve to be fat.” Weight control, however, is not consistent. One subject explained how he viewed it. "My success in managing my weight comes and goes. My logical brain tells me 'I am in control' but my emotional brain tells me 'your body is sabotaging your efforts'.” Others believed that they had limited control due to co-morbidities. "As my weight gain is related to my thyroid problems I feel my control is limited - this isn't really understood.”

The overwhelming majority [53 (91%)] of individuals, believed that the support of others was important in helping them with their weight management, and no one indicated their disagreement with this. This was highlighted by the fact that the comments in the support section of the questionnaire attracted the highest response rate.
One subject explained how support helped her: "Encouragement to give me confidence is important" and another believed that factors other than food were important. "I believe weight control goes way beyond just food intake. Adrenalin, stress, relaxation, lifestyle, contentment etc." This may suggest that a broad based approach including addressing beliefs should be incorporated in a weight management intervention.

4.7 Expectations of weight change

Females had lower expectations of weight loss than males with 15 expecting to stay the same or gain weight while 4 males anticipated that they would stay the same but not gain weight. The < 40 age group were more optimistic of weight loss than their elders.

The low expectations of individuals can be explained by attribution theory. One individual whose weight loss was minimal wrote "This is due to a 'lack' of reduction in weight over the last 9 months". It could be interpreted that the lack of weight loss and a stable attribution would explain why the individual did not expect to lose weight. For the individual who wrote "Probably a weight loss of less than 1lb per week is more realistic" attributions may have been less stable allowing her to adjust her expectations to set a more achievable target. Another female who expressed a sense of depression recognized how unrealistic she had been in her expectations "I certainly would like to lose a lot of weight:- I have taken about 20 years to put on about 6 stone and unrealistically I want it off in six weeks! (not possible I know!) not even in 6 months therefore I get depressed about the whole sorry mess I'm in! However, another individual indicated that she needed help to change her situation as she appeared to have a persistent feelings of helplessness. "I need to do something or get help to break out of
my current cycle of feelings - I just don't know what!” It would therefore appear relevant to address weight loss expectations during intervention.

All the results so far have given a general description of the total sample at visit one. To illustrate the complexity of weight management APPENDIX 17 highlighted the main areas covered so far and APPENDIX 18 and APPENDIX 19 further illuminated the intricacies in the form of significant correlations produced from examining positive and negative feelings. The following section explores these areas further by looking at them in light of weight change.

4.8 Weight change

To explore further the relationship between physical, emotional and social aspects on weight, differences between those who lost weight and those who gained weight were examined.

4.8.1 Categorization of weight change groups

In moving to this stage of the analysis, individuals were subdivided into three groups to permit comparisons between the groups, but firstly, the individuals for each group had to be identified. Of the 64 individuals recruited, one patient withdrew after visit 1 and another moved away from the area leaving a total of 62 individuals in the study. Of the remaining 62 individuals, only 32 [(52%) 7 male and 25 female] completed all three visits. In order to access a larger data set visit 2 was not taken into account. This left 48 individuals [77% (15 male and 33 female)] who had completed both visits 1 and 3. The following results apply to those who completed only visits 1 and 3, that is 48
people, and where percentages are given they refer to this group and not the total sample.

Over the six month period, 16 out of 48 (33%) individuals gained weight, 23 (48%) were either weight stable or lost up to 5% of their body weight, and 9 (19%) lost more that 5% of their body weight, including 3 (5%) who lost more than 10% of their body weight. The decision to group the individuals in this way was in recognition of how the literature relates to weight loss changes and benefits.

The use of descriptive statistics, Spearman's correlations, paired t-tests and ANOVA analysis were used to determine changes over the study period and explore the differences within and between groups.

4.8.2 Demographic aspects of weight change groups

The demographic details of the groups generally did not differ with weight and BMI ranges, mean starting weights, marital status and family history being fairly evenly distributed between the groups.

4.8.3 Group allocation

The individuals were allocated to one of three groups according to their change in weight as shown in Figure 4.6
Figure 4.6 Clumped bar chart showing the numbers of individuals allocated to the groups of weight gain, 0-5% body weight loss and >5% body weight loss by gender.

These results show that 48 (33%) gained weight, 23 (48%) were either weight stable (1 male and 1 female) or lost up to 5% of their body weight and 9 (19%) lost >5%. The decision to include those who were weight stable in the 0-5% group rather than the weight gain group was because weight stability can be viewed as a success. In addition, these individuals may have previously lost weight and been aiming for stability but this was unknown. The severity of obesity was spread over the three groups although in those who lost most weight (>5%) all men were in the class III category with only a third of women in this same category.

There was an indication that the number of visits attended differed between the groups suggesting that those who attended more frequently achieved greater success for weight loss. Half of those who gained weight were in the class III obesity category but only one of these attended all three visits. On the other hand, except for one, those who lost >5% of their body weight had attended all three visits.
The majority of weight gainers (69%) were under 50 years of age and included 3 females under the age of thirty while for 0-5% and >5% weight losers there were 57% and 46% respectively, in the under 50 age group.

4.9 Physical aspects of weight change

Firstly, the differences between the groups in co-morbidity levels are determined and compared briefly. For the sake of clarity the other changes are reported separately for each group before going on to make comparisons and finally all the results are brought together to provide a comprehensive overview.

4.9.1 Co-morbidities of weight change

The difference between the genders in the types of co-morbidities in the total population was reflected in the groups. However, in the weight gain group, osteoarthritis was common to both genders (2 males and 4 females) but was not diagnosed in anyone who lost >5% body weight. Stress incontinence was identified in both weight loss groups but not in the weight gain group. The only co-morbidity monitored in this study was hypertension, which was identified in all three groups. Weight loss demonstrated a significant improvement particularly in systolic blood pressure (t(22)=2.615;p<0.01) in the 0-5% group and (t(8)=2.441;p<0.05) the >5% weight loss group.

4.9.2 Symptoms and functional ability in the weight gain group

The symptoms highlighted by those who gained weight as problematic with scores of 8 or more, were poor sleep (2 males and 7 females), breathlessness (3 males and 5 females) and body pain (2 males and 6 females). These symptoms were also correlated to each other with poor sleep being associated with breathlessness (p = 0.056) but more
significantly with body pain (p = 0.004) and body pain being significantly correlated with breathlessness (p = 0.021). It appears that body pain was the greatest problem for sleep disturbance in this group.

In addition, skin problems, although having a mode of 1, indicating that there were few problems for most, produced difficulties for 3 individuals who scored 8 or more. Those who had skin problems often had diarrhoea (p = 0.005). This would suggest that when individuals were receiving Xenical treatment, they had difficulties adhering to the diet and this resulted in a high fat intake, which caused the known side effect of diarrhoea. The hygiene difficulties of coping with diarrhoea could cause skin problems. Sweating was also associated with skin problems (p = 0.006) and suggests that the cause for this should be explored with patients particularly in relation to skin fold areas. These issues will be carried forward and compared in each group.

**4.9.3 Symptoms and functional ability in the 0-5% weight loss group**

Examination of the variables of poor sleep, breathlessness and body pain already highlighted provided further information. In the weight loss, as in the weight gain group, poor sleep was associated with breathlessness (p = 0.043). However, poor sleep, breathlessness and body pain were mostly less of a problem than for weight gainers with modes of 4, 2 and 8 respectively. It may be that in those who had 0-5% weight loss, body pain (p = 0.060) was less likely to disturb their sleep as osteoarthritis was less prevalent. Furthermore, in spite of the existence of asthma, breathlessness had significantly reduced (t(18)=3.102;p<.005) suggesting that weight loss itself provided relief.
Unlike the weight gainers, this group revealed a very significant reduction in skin problems ($t(13) = 5.236; p < 0.001$) although 2 individuals still scored 8 or more at visit 3. They also had significantly reduced bladder problems ($t(10) = 1.876; p < 0.05$) which were correlated with skin problems ($p = 0.018$). This link was supported by the fact that stress incontinence was identified in this group, but not in the weight gainers, suggesting that skin problems may have been the result of urinary incontinence.

### 4.9.4 Symptoms and functional ability in the >5% weight loss group

Those who lost most weight, that is >5%, had significant reductions in body pain ($t(6) = 2.563; p < 0.05$). It appears that their pain was related to abdominal bloating ($p = 0.012$) which also showed significant reductions ($t(6) = 3.267; p < 0.01$). Therefore, this reduction in abdominal bloating was associated with weight loss. Sleep disturbance, to varying degrees, was demonstrated by the modes of 10 and 3, and was associated with bladder problems ($p = 0.047$) reflecting the diagnosis of stress incontinence. This may indicate that for some, weight loss improved their stress incontinence, and as a consequence their sleep also improved. Since the severity of skin problems greatly diminished over the course of the study ($t(5) = 5.861; p < 0.001$) it could be argued that like those in the 0-5% weight loss group, stress incontinence was associated with skin problems.

However, constipation ($p = 0.028$) was also related to sleep disturbance. As bloating is known to be related to constipation that may have been the reason for the significant correlation with body pain ($p = 0.012$). In addition, constipation could have been related to the Protein Sparing Modified Fast (PSMF), a dietary intervention, which was the treatment prescribed for seven out of the nine individuals in this group.
Nonetheless, as there were significant reductions in both body pain \((t(6)=2.563;p<0.05)\) and abdominal bloating \((t(6)=3.267;p<0.01)\) it may be that either these were resolved by treatment for the constipation or the weight loss itself provided an improvement. Although there are some differences between the co-morbidities and symptoms in each group they all have poor sleep, breathlessness and body pain in common. These commonalities were associated with the ability to carry out everyday functions as seen in Table 4.3

<table>
<thead>
<tr>
<th>Functional difficulties</th>
<th>Poor sleep</th>
<th>Breathlessness</th>
<th>Body Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weight gain</td>
<td>0-5% weight loss</td>
<td>&gt;5% weight loss</td>
</tr>
<tr>
<td>Walking</td>
<td>0.030*</td>
<td>0.022*</td>
<td>-</td>
</tr>
<tr>
<td>Bending</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Stairs</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bathing</td>
<td>0.013*</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dressing</td>
<td>-</td>
<td>0.040*</td>
<td>-</td>
</tr>
<tr>
<td>Chores</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* = \(p<0.05\) \quad ** = \(p<0.01\)

Table 4.3 Table of significant correlations between mobility problems, poor sleep, breathlessness and body pain in weight change.

In general, weight change was associated with functional ability. In addition to poor sleep, breathlessness and body pain, bloating, hunger and craving had been identified as discussed above. In common with those who gained weight, those who lost 0-5% of their body weight also had a reduction in hunger \((t(18)=2.525;p<0.05)\) and cravings, suggesting that they may have reacted differently. Whatever the complex reasons for the symptoms it does appear that each one improves with weight loss as shown in Figure 4.7
In fact, breathlessness showed a significant difference between the weight gain group and those who lost >5% of their body weight ($X^2(2)= 6.491; p<0.05$). This was regardless of a diagnosis of asthma in these groups. The symptoms highlighted in the above graph could be a useful guide to exploring problem areas for patients so that appropriate treatment can be implemented and, by addressing them, provide incentive for weight loss.

In summary, there was a strong association between co-morbidities, symptoms and functional ability. There were gender differences with males diagnosed more often with a cardiovascular risk factor. Females, on the other hand, were predominately diagnosed with asthma and exclusively with stress incontinence or depression. Regardless of gender it appears that those who gained weight were more likely to have been diagnosed with osteoarthritis. Allied to their high levels of pain, their ability to be sufficiently physical active to impact on their weight may be limited. With weight gain, symptoms...
and functional ability worsened, while weight loss was associated with improvement. Despite that it is difficult to identify what is cause and effect but does perhaps demonstrate the importance of helping individuals and nurses look at the whole picture.

4.9.5 **Physical activity changes in the weight gain group**

Activity levels were divided into low, medium and high intensity. While two females in the 40-60 age group watched over 40 hours of TV a week, generally the weight gainers reduced their lower intensity activities of TV watching and using the computer but increased their reading. They also reduced the higher intensity activities of swimming, cycling and going to the gym but at the same time they increased their walking and gardening. This indicates that the intensity and diversity of activity is a factor in weight change. While the only statistically significant change was an increase in walking ($t(15)=-3.313;p<0.01$) paradoxically they were still the group who walked least.

4.9.6 **Physical activity changes in the 0-5% weight loss group**

The 0-5% weight loss group had also generally reduced their lower intensity activities like TV watching ($t(23)=1.775;p=0.045$) and reading but they increased their higher activities such as walking and cycling. There was also small increases in the levels of moderate activity but all were non-significant except for gardening ($t(23)=-1.702;p=0.052$). On the other hand, two retired people (1 male and 1 female) watched more than 40 hours television per week.

4.9.7 **Physical activity changes in the >5% weight loss group**

As in the other groups, TV watching was generally reduced but two females who were in the 40-49 age group, watched more than 40 hours of television a week. The higher
intensity activities of swimming, going to the gym and dancing (p = 0.033) were increased in this group and less time was spent on reading. Those who went to the gym were also more likely to go swimming (p = 0.030) but only two swam and three went to the gym.

4.9.8 Group differences in physical activity levels

The changes in activity levels for each group are presented in Figure 4.8

Figure 4.8 Clustered bar chart showing changes in different physical activities for each group between visits 1 and 3.

There was a general reduction in TV watching and an increase in walking by all groups. Despite this similarity, and the fact that two people in each group watched more than 40 hours of TV a week, weight change differed in these individuals. Weight losers increased their higher intensity activities of cycling and going to the gym. On the other hand weight gainers reduced their high intensity activity of swimming. This suggests that weight change is influenced by changes in activity levels. That is to say, higher levels of activity resulted in weight loss or perhaps it was the weight loss which enabled greater activity.
Those who gained weight had the highest levels of low activity while those who lost most weight undertook high intensity activities more often than the others. It appears that those who lost 0-5% of their body weight were the ones who most often undertook medium activity levels. Consequently, it seems that the higher intensity activities are most beneficial to weight loss.

Therefore, these results suggest that it may be important to explore all activity changes and encourage involvement in higher intensity activities in those who are physically able to do so. However, making changes may not always be easy to implement due to social influences.

4.10 Social aspects of weight change

This section follows the same reporting pattern as physical and emotional aspects of weight management, that is, examining perceived support separately for each group before going on to make comparisons between the groups.

4.10.1 Perceived levels of social support in the weight gain group

Weight gainers perceived themselves to have the lowest levels of support and, in spite of a marginal increase in spouse/partner support (t(8)=-0.447;p>0.668), the mean value at visit 1 was only 6.50 (SD2.33) compared to 8.53 (SD1.36) and 7.75 (3.30) for those who had 0-5% and >5% body weight loss respectively. It appeared that they had more support from friends (mean 6.67, SD1.97) initially but this diminished slightly (t(11)=1.205;p>0.253). These figures indicated that they felt only minimal support was forthcoming, particularly from family (p = 0.052) and friends (p = 0.080) which
affected their confidence levels (mean 4.75, SD 2.59). This lack of confidence may have
influenced the belief that their weight was totally outwith their control.

The support of others, however, was important to them and seemed to impinge on levels
of body dissatisfaction. Consequently, body dissatisfaction increased (t(14)=-
2.256; p<0.05) as friends were seen as being just a little less supportive
(t(12)=1.205; p 0.253).

In addition, only one female indicated that she felt supported by colleagues while the
remaining four (1 male and 3 females) who worked with others felt that they received
no support, in fact, quite the reverse. However, as colleagues appeared to encourage
them to be active by walking more (p = 0.005) this perceived negative support might
have been misconstrued. Even support from professionals in managing their symptoms
such as heartburn (p = -0.012) and hunger (p = -0.004) was not forthcoming although
constipation (p = 0.019) was addressed. It seemed that this lack of support was linked
to the confidence they had in their ability to lose weight, and yet they still felt a need of
support from others.

4.10.2 Perceived levels of social support in the 0-5% weight loss group

Perceived support was higher in this group than for those who gained weight.
Irrespective of a significant decrease in spouse/partner support (t(14)=3.005; p<0.001)
and marginal fluctuations in all other areas, support levels remained high from friends
and family but less so from colleagues and community. Family support was associated
with watching TV (p = 0.040) and reading (p = 0.049) perhaps indicating the general
low activity levels within the family. Support from family and friends was also
achieved by having contact through speaking to them (p = 0.001) and during visits to the house (p = 0.031). The higher level of confidence in this group may have encouraged 7(88%) males and 14(93%) females to either disagree or strongly disagree with the belief that weight was inherited so nothing could be done about it.

4.10.3 Perceived levels of social support in the >5% weight loss group

This same belief about inherited weight was even more strongly associated in this group with the support of friends (p = 0.026) and professionals (p = 0.026). Friends appeared to give practical support as the more support they had the more likely they were to go to the gym (p = 0.025). This group perceived themselves as having the highest levels of support, which increased in all areas, in particular friends (t(6)=-2.739 p<0.05) but with the exception of professional support, that support decreased slightly but was still high. Professional support in addressing symptoms in this group was perceived to be greater, particularly for cravings (p = -0.060) and body pain (p = -0.055).

Changes in perceived support between visits 1 and 3 are shown for each group in Figure 4.9
Figure 4.9 Clustered bar chart of mean differences in perceived support scores between visits 1 and 3 for each group.

Although the bar chart reflects the changes in the perception of support for each group it does not convey the significant difference between weight gainers and those who lost 0-5% of their body weight in the support they perceived themselves to have from friends (F(2.38)=3.302; p<0.05). Therefore, the levels of perceived support for each of these groups are also shown by mean rank scores in Figure 4.10.
Figure 4.10 Line chart of mean rank scores for family, friends, colleagues, professionals and community support for each group at visit 3.

It appears that weight change and levels of support are linked and therefore it seems rational to include social support in the intervention.

4.11 Emotional aspects of weight change

Emotional aspects of weight change were determined by examining negative and positive feelings as well as anxiety and depression levels. As in the previous section, looking at physical aspects of weight management, emotional aspects are initially reported separately for each group before going on to making comparisons between the groups.

4.11.1 Negative and positive feelings in the weight gain group

Those who gained weight, watched more TV if they felt less loved (p = 0.016) and especially if they were dissatisfied with their bust (p = 0.001). This dissatisfaction was also associated with depression (p = 0.010) with the outcome that they had less contact
with family and friends either by speaking to them (p = 0.033), going out (p = 0.000) or having them visit the house (p = 0.003) therefore perhaps becoming isolated. It may be that isolation was associated with loneliness which appeared to be associated with boredom (p<0.001) and shyness (p<0.001). It may not be surprising then that shyness (t(15)=-2.263;p<0.05) increased significantly along with smaller increases in guilt and anger. Anger though, with a mode of 6, was less troublesome than guilt (9), and boredom (9). Boredom appeared to affect activity levels as the greater the boredom the less likely the participation in cycling (p = 0.030) or going to the gym (p = 0.029) and to a lesser extent walking (p = 0.087). The only positive feeling, most often having a high score, was a perception of being loved with a mode of 8.

4.11.2 Negative and positive feelings in the 0-5% weight loss group

The levels of perceived negative feelings of guilt, anger and loneliness all decreased but shyness and boredom increased, however, none were statistically significant. Boredom was correlated with loneliness (p = 0.025) and guilt (p = 0.015) which was reduced by a feeling of pride (p = 0.041). Albeit, the negative feelings were less troublesome for this group, than those for the weight gainers with the following modes: guilt (6), and anger (3) and loneliness (1 and 2). Boredom varied with 5 individuals having a mode of 1 and 4 individuals having a mode of 9. More of this group had higher levels of positive feelings than the weight gainers with the following modes: being loved (10), confidence (7) and pride (4). This was in spite of the perception of 'being loved' having significantly decreased at visit three (t(22)=3.119;p0.005). Regardless of this, they still had the highest mean scores of all the groups for each of these variables and those who felt loved were more likely to be confident (p = 0.024) and do handcrafts (p = 0.006) and less likely to watch as much television (p = 0.016).
4.11.3 **Negative and positive feelings in the >5% weight loss group**

The levels of perceived negative feelings all decreased except for boredom, which demonstrated no change. Boredom was correlated with both loneliness (p = 0.068) and guilt (p = 0.074) but to a lesser degree than for those who lost 0-5% of their body weight. With the exception of anger (mode = 8), which was statistically significantly correlated with guilt (p = 0.010), negative feelings were generally less troublesome for this group with the following modes: guilt (1,6,10), loneliness (2) and shyness (1,2). Boredom again varied with 2 individuals having a mode of 1, and 2 individuals having a mode of 9, which was negatively correlated with being loved (p = 0.026). More of this group had higher levels of positive feelings than the weight gainers with the following modes: being loved (6,8,10), confidence (8) and pride (5,8). Emotions would therefore appear to be an important aspect of weight management.

4.11.4 **Group differences in negative and positive feelings**

There were differences between the groups in the intensity of feelings. Weight gainers had higher levels of negative feelings and lower levels of positive feelings than those who lost weight. Although, when comparing differences between the groups, there were no demonstrable statistically significant changes but there were differences between the groups, which would appear to have clinical significance. The changes in feelings for each group are displayed in Figure 4.11
4.11.5 Anxiety and depression levels in the weight gain group

The high level of negative feelings were reflected in the prevalence of anxiety and depression with one male (25%) and nine females (75%) having anxiety scores of ≥ 11, while one male (25%) and 4 females (33%) scored ≥ 11 for depression. Both anxiety (t(14)=-1.484; p=0.162) and depression (t(14)=-1.646; p=0.124) levels in this group increased over the duration of the study.

4.11.6 Anxiety and Depression levels in the 0-5% weight loss group

The probability, for this group, of having anxiety and depression, identified by scores of ≥ 11, was not as high as the weight gainers. Two males (25%) and six females (40%) had these scores for anxiety while for depression it was 4 females (27%) but no males. Those who were anxious were also more likely to be depressed (p = 0.005) and both anxiety (t(22)=0.183; p=0.857) and depression (t(22)=0.447; p=0.660) levels showed a reduction.
4.11.7 Anxiety and depression levels in the >5% weight loss group

Identification of anxiety and depression levels of ≥ 11 for this group was generally lower than the other two groups. Anxiety, at that level, was identified in one male (33%) and two females (33%) while for depression it was one female (17%) but no males.

4.11.8 Group differences in anxiety and depression levels

However, while both weight loss groups showed a reduction [anxiety (t(8)=1.441; p=0.193); depression (t(8)=1.809; p=0.113)] which was not significant, anxiety (mean 8.75, SD 3.68) at visit three was marginally higher than the 0-5% weight loss group (mean 8.50, SD 3.50) but neither of these groups had as high a mean as the weight gainers (10.71, SD 2.70). Depression means on the other hand, at visit three, were weight gain (8.86, SD 2.60), 0-5% weight loss (6.45, SD 2.86) and >5% weight loss (3.38, SD 4.10). The anxiety and depression differences between the groups during visits 1 and 3 are shown in Figure 4.12

![Clustered bar chart of mean differences in anxiety and depression scores between visits 1 and 3 for each group.](image)
From exploration of these results it would seem reasonable to include emotional aspects of weight management in the intervention.

4.12 Summary

This objectives of the exploratory phase were to ascertain the relationship between mood, social interaction, functional ability and weight management in obese individuals who were not identified as having an eating disorder. However, the results need to be viewed with some degree of caution and seen in the light of the exploratory nature of this phase.

The exploratory phase of the study facilitated in depth information to be collated for analysis to inform the intervention phase. Initial results indicate relationships between the above variables and that weight gain or loss resulted in changes within these variables. In particular, energy intake, energy expenditure, weight control beliefs, physical, emotional and social aspects of weight change were highlighted suggesting that to incorporate these elements a more holistic approach to intervention is required.

Co-morbidities were numerous and indicated that there was a gender difference with males being more likely to have cardiovascular risk factors, whereas females more frequently suffered from depression, asthma, stress incontinence and hormonal imbalances. Symptoms were problematic with sleep disturbance, body pain, breathlessness, hunger and cravings most often identified, particularly for those who gained weight. In addition, weight gainers had greater functional disability and were less active. Differences in physical aspects of weight management were shown between the groups where symptom severity increased and activity levels decreased in those
with weight gain and the converse was true for those who lost weight. It would appear that identifying symptoms, levels of functional ability and activity in addition to co-morbidities, should be included in assessment.

Anxiety and depression were related to negative emotions and displayed the highest starting levels in weight gainers and worsened over time. Those who lost weight on the other hand, had lower levels of anxiety and depression, which decreased during the study. They also had reduced negative emotions and increased levels of positive emotions. Emotional issues, usually missing from other approaches to weight management would seem pertinent to intervention.

Social support levels in weight gainers were low and decreased over time while those who lost weight felt they had more support and this increased over time. Physical, emotional and social aspects of everyday life impacted on the ability of people suffering from obesity to manage their weight.

The results of this study suggest that by taking a participatory holistic approach to management, nurses could work with individuals to enhance their quality of life and improve their health status. The following diagram (Figure 4.16) illustrates not only the complexity of obesity management, but the possible changes achieved by weight loss. A spider’s web was utilized to provide a pictorial symbol of the interplay, strength and fragility of the links between various aspects of weight management. The next chapter describes how this evidence informed the intervention for use in primary care.
Figure 4.13 Changes between groups