

**OVERWEIGHT & OBESITY AND RISKY SEXUAL BEHAVIOR  
AMONG CANADIAN ADOLESCENTS**

by

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## *Abstract*

In Canada, the prevalence of adolescent overweight and obesity has increased significantly and currently accounts for about 20% of the adolescent population in the 12 to 17 year old age group. Adolescents with a higher weight status experience a host of physical, social and psychological challenges and have been shown to have an increased likelihood of engaging in various high-risk behaviors. However, the relationship between adolescent overweight and obesity and risky sexual behavior has received scant attention in the literature. Studies have shown that there is a significant association between obesity and lower levels of self-esteem as well as body image satisfaction. In turn, a number of studies have demonstrated that lower levels of self-esteem and body image satisfaction are predictors of risky sexual behavior. Accordingly, the aim of this study was to unveil any direct associations between adolescent overweight and obesity and risky sexual behavior, and explore the possibility of body image satisfaction and self-esteem as psychological pathways. Data from the 2009/2010 cycle of the Canadian Community Health Survey (CCHS) were used, where a total of 8 168 participants between the ages of 15 to 19 were included. The results of this study showed that obese female adolescents were less likely to have ever had sex, both in the 15 to 17 year old age group as well as the 18 to 19 year old age group. In the 15 to 17 year old age group, overweight females were more likely to be diagnosed with a sexually transmitted infection (STI) and in the 18 to 19 year old age group, obese females were less likely to have used a condom the last time they had sex and less likely to have used birth control in the past 12 months. Overweight and obese adolescents had significantly lower levels of

body image satisfaction in both age groups, while obese adolescents experienced lower levels of self-esteem in the 15 to 17 year old age group. Implications for intervention and prevention strategies are discussed and recommendations for future studies provided.

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## Chapter 1

### *Introduction*

#### *1.1 Statement of the Problem*

Adolescence is a developmental period marked by an increase in risk-taking behaviors. Many of these behaviors stem from sexual development, a core component of lifespan development which is most significant during adolescence (Scott & Walsh, 2014). Adolescents experience increased levels of sexual arousal, which spur them to explore and experiment with different elements of sexuality (Schulenberg & Maggs, 2002). Sexuality includes the attitudes towards and/or involvement in the physical expression of sexual feelings (Gillen et al., 2006). The decisions that adolescents make regarding their sexual activity is a major determinant of sexual and reproductive health (Boyce et al., 2006). Risky sexual behavior can result in unwanted pregnancy and sexually transmitted infections (STIs), incurring physical, mental, social and economic costs (DiClemente et al., 2009). In an effort to minimize these associated costs, it is important to identify groups of adolescents that may be more at risk. Given that overweight and obese adolescents have been shown to be at an increased likelihood of engaging in high-risk behaviors (Patrick et al., 2004; Sanchez et al., 2007; Strauss, 2000), it is conceivable that this group of adolescents may be more likely to engage in risky sexual behavior, although this particular risk behavior has received scant attention in the literature.

In Canada, 30% of 15 to 17 year olds and 68% of 18 to 19 year olds<sup>1</sup> have reported ever having sex in the 2009/2010 cycle of the Canadian Community Health Survey (Rotermann, 2012). Although the prevalence of adolescent sexual activity has remained relatively stable in Canada since 1996/1997, adolescents continue to engage in high-risk sexual behavior (Rotermann, 2012). Risky sexual behavior is defined as any sexual act that has a high probability of resulting in the acquisition of a sexually transmitted infection (STI), including HIV/AIDS, as well as unintended pregnancy (Abma et al., 2010; Centres for Disease Control and Prevention, 2014; Council of Ministers of Education Canada, 2002; Eaton et al., 2012; Gavin et al., 2009; Hall et al., 2004; Leslie, 2008; Pavlich et al., 2007; Rotermann, 2012, 2008). Examples of such acts include early onset of first sexual intercourse, unprotected sex, multiple sexual partners, one-night stands, alcohol and drug related sex, and unprotected oral and anal sex (Campbell, 2008; Halpern-Felsher et al., 2005; Jenness et al., 2011; Maticka-Tyndale et al., 2000; McKay, 2004; Rosengard et al., 2006; Rotermann, 2008, 2005; Santelli et al., 1998; Welsh et al., 2006).

As a result of risky sexual behavior, Canadian adolescents in the 15 to 19 year old age group represent 26% of all reported chlamydia cases, 21% of all reported gonorrhea cases, and 3% of all reported syphilis cases (Public Health Agency of Canada, 2014, 2012). In this age group, chlamydia is reported at a rate of 1109.1 per 100 000 adolescents, gonorrhea is reported at a rate of 106.7 per 100 000 adolescents and syphilis is reported at a rate of 2.6 per 100 000 adolescents, with all infection rates having

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<sup>1</sup> The CCHS applies different BMI classification systems to each of these age groups.

increased since 1995 (Public Health Agency of Canada, 2014, 2012). In addition to STI infection rates, teenage pregnancy rates also give an indication of sexual and reproductive health in young women (Gavin et al., 2009; Kearney & Levine, 2012). Between 1994 and 2006, Canada saw a decrease in teenage pregnancy rates from 47.1 per 1000 in 1994 to 27.9 per 1000 in 2006 (McKay, 2012). However, between 2006 and 2010 these figures leveled off, with the pregnancy rate in 2010 being 28.2 per 1000 (McKay, 2012). However, during this same period between 2006 and 2010, McKay (2012) noted that in certain parts of Canada, namely New Brunswick, Newfoundland, Nova Scotia and Manitoba, teenage pregnancy rates increased by 15.1% or more. This highlights the need for further investigation into risky sexual behavior in adolescents. Risky sexual behavior is considered a primary threat to adolescent health (Centres for Disease Control and Prevention, 2008), so it is important to identify vulnerable subpopulations in an effort to inform health care professionals and policy makers who can shape prevention and intervention strategies around their needs.

In Canada, the prevalence of child and adolescent overweight and obesity has increased since the late 1970s (Shields, 2006). Figures from 2013 show that 20.7% of Canadians in the 12 to 17 year old age group were classified as overweight or obese (Statistics Canada, 2014a). This figure represents a significant portion of the adolescent population, which continues to be a public health concern (Roberts et al., 2012). The literature has shown and continues to show that this subpopulation experiences a host of physical, social and psychological challenges due to their weight status. For example, overweight and obesity in adolescence has been associated with lower levels of body image satisfaction

(Friedman & Brownell, 1995) and lower levels of self-esteem (Franklin et al., 2006; French et al., 1995; Puhl et al., 2007; Strauss, 2000), which in turn, are associated with risky sexual behavior (Cooper et al., 1998; Eisenberg et al., 2005; Gillen et al., 2006; Littleton, 2005; Schooler et al., 2005; Shrier et al., 2001; Taylor-Seehafer & Rew, 2000; Wiederman et al., 1998; Yamamiya et al., 2006).

Accordingly, the aim of this study was to unveil any direct associations between adolescent overweight and obesity and risky sexual behavior, and to explore the possibility of body image satisfaction and self-esteem as psychological pathways. This idea has received limited attention in the literature, with the few studies that have been conducted producing fairly inconsistent results. To date, no such study has taken place in Canada. As such, this study will uniquely contribute to the literature by drawing on a nationally representative sample of the Canadian adolescent population, using a large sample size. Not only will this study focus on associations between weight status and risky sexual behavior, but also on the associations between weight status and body image satisfaction as well as self-esteem.

## Chapter 2

### *Literature Review*

#### *2.1 Risky Sexual Behavior*

A number of sexual behaviors are identified as being risky. The earlier the onset of sexual intercourse, the longer an adolescent is at risk of contracting a sexually transmitted infection or having an unintended pregnancy (Maticka-Tyndale et al., 2005). Early onset of sexual activity is associated with unprotected sex (Rotermann, 2005), more lifetime sexual partners and having multiple sexual partners (Santelli et al., 1998). Early onset of sexual activity is also associated with other risk behaviors including alcohol consumption and smoking (Galambos & Tilton-Weaver, 1998; Garriguet, 2005), depression (Hallfors et al., 2004), low self-esteem (Sabia & Rees, 2008) and decreased academic attainment (Sabia & Rees, 2009).

One of the most effective forms of decreasing the risk associated with sexual behavior is condom use, as this provides barrier protection that helps prevent unplanned pregnancies and the transmission of STIs (Rotermann, 2008). The male condom is a method of contraception that provides barrier protection to protect fluids such as semen, vaginal secretions and blood from moving from one person to the other during sexual intercourse (U.S. Food and Drug Administration, 2010). Correct and consistent use of male condoms significantly reduces the probability of STI transmission as well as unwanted pregnancies (Crosby et al., 2005; Greenberg et al., 2011; Holmes et al., 2004; US Food and Drug Administration, 2010). An increase in the number of sexual partners is associated with an

increase in the risk of contracting an STI as many teenagers do not use condoms correctly and consistently (McKay, 2004; Santelli et al., 1998). One-night stands are associated with higher risks of inconsistent condom use (Campbell, 2008). There is a significant relationship between alcohol use and casual sexual encounters (Welsh et al., 2006), and drug use is associated with risky sexual behaviors including inconsistent condom use and an increase in number of sexual partners (Rosengard et al., 2006). Most adolescents do not use barrier protection during oral sex, which can lead to the transmission of STIs (Halpern-Felsher et al., 2005). Additionally, anal intercourse is becoming more popular among adolescents and is often unprotected (Lescano et al., 2009; Mosher et al., 2005; Rotheram-Borus et al., 1999) which increases the risk of contracting an STI among young heterosexual females (Jenness et al., 2011).

## *2.2 Adolescent Sexual Practices*

The following data are based on the 2009/2010 Canadian Community Health Survey (CCHS) as reported by Rotermann (2012). In the 15 to 17 year old age group, 30% reported having sex at least once, 34.7% had multiple partners in the past year, and 79.9% used a condom during their most recent sexual intercourse. In the 18 to 19 year old age group, 68% reported having sex at least once, 39.4% had multiple partners in the past year, and 73.7% used a condom during their most recent sexual intercourse. In the 15 to 24 year old age group, 9% reported having had their first sexual intercourse before the age of 15 and 25.7% at the age of 15 or 16. Although condom use has increased for the 15 to 24 year old age group from 2003 to 2009/2010, there has been no significant change

in the prevalence of sexual activity, age of first sexual encounter and number of sexual partners (Rotermann, 2012).

During adolescence, sexual activity is usually explored in the context of a committed, romantic relationship (Shaffer & Furman, 2011), although as many as three fifths of adolescents have been sexually active with someone with whom they are not in a committed, romantic relationship (Manning et al., 2006). Many adolescents have multiple consecutive or concurrent sexual partners which places them at increased risk for STI transmission and unwanted pregnancy (Mah & Halperin, 2010; Fatusi & Wang, 2009), especially since many do not use condoms or know how to use them correctly (Crosby et al., 2005).

In an analysis of contraception use by sexually experienced adolescents in their *first* sexual encounter, 55% used contraception while 23% did not use contraception (Manlove et al., 2006). In an analysis of sexually experienced adolescents during their *last* sexual encounter, 60% used contraception while 20% did not use contraception (Manlove et al., 2006).

### *2.3 Reasons for Engaging in Risky Sexual Behavior*

The majority of older adolescents in Canada are sexually active, but many continue to expose themselves to risky sexual behavior. This may be due to an illusion of personal invulnerability where an adolescent may feel less at risk to the adverse consequences of

high-risk behavior (Romer, 2003; Whalen et. al., 1994). For example, Burger and Burns (1988) demonstrated that sexually active young women believed that they were less likely to become unintentionally pregnant than those around them. As a result of this cognitive bias, the more invulnerable the young women felt, the less likely they were to use effective methods of birth control. Unfortunately, this illusion of invulnerability is resistant to change and is likely to continue through to adulthood (Weinstein & Klein, 1995; Whalen et. al., 1994).

Although adolescents may be aware of the long-term consequences of unprotected sex, such as the acquisition of an STI or unplanned pregnancy, the expected immediate consequences of engaging in unprotected such, such as increased sensation and feelings of self-worth, are more at the center of the decisions made by adolescents (Hall et al., 2004). Additionally, the immediate consequence of a more gratifying sexual experience is a “sure thing” whereas the adverse long-term consequences are only a “risk” (Hall et al., 2004).

While it is possible to explore a whole host of social, biological, psychological, behavioral, familial and extrafamilial factors that have been established in the literature as motivators for engagement in risky sexual behavior (Kotchick et al., 2001; Metzler et al., 1994), it is beyond the scope of this thesis to pay special attention to each. However, attention will later be given to body image satisfaction and self-esteem as psychological pathways for risky sexual behavior.

## *2.4 STI Acquisition and Teen Pregnancy*

The three leading curable STIs reported by adolescents are chlamydia, gonorrhea and syphilis (Centres for Disease Control and Prevention, 2014), which have long-term adverse health related outcomes (Public Health Agency of Canada, 2010). In Canada, between 2001 and 2010, the infection rate of chlamydia increased by 72.0%, gonorrhea increased by 53.4%, and syphilis increased by 456.7% (Public Health Agency of Canada, 2012). Adolescents and young adults in the 15 to 24 year old age group represent 62.8% of all reported chlamydia cases and 48.7% of all reported gonorrhea cases (Public Health Agency of Canada, 2014). Rates of gonorrhea are most prevalent in females in the 15 to 19 year old age group (Public Health Agency of Canada, 2014). Trends in teenage pregnancy rates give an important indication of sexual and reproductive health in young women, as well as their overall well-being (Kearney & Levine, 2012; Gavin et al., 2009). They provide us with an indication of the changing levels of effective contraceptive use, which could be a result of a number of factors, including exposure to high-quality sexual health education, access to effective and affordable contraception, access to reproductive health services and, at the community level, a change in socio-cultural norms and values regarding teenage sexuality and pregnancy (McKay, 2012).

Compared to their male counterparts, females are more at risk for the associated adverse health consequences of risky sexual behavior. The Centres for Disease Control and Prevention (2014) and Landry and Turnbull (1997) point out that women are more susceptible to contracting STIs than men when engaging in sexual intercourse with an

infected partner without the use of a condom. STIs, besides HIV, have more life-threatening consequences for women such as irreversible fallopian tubal scarring, cervical cancer, ectopic pregnancy, pelvic inflammatory disease and infertility. Needless to say, women carry the full risk of becoming pregnant. The female adolescent population is particularly at risk considering that they are more likely than adult females to contract STIs since they have fewer protective antibodies and because their cervical immaturity facilitates the transmission of infections (Landry & Turnbull, 1997). Because STIs are more likely to be asymptomatic in females compared to males, the rates are likely to be underestimated in females as they are less likely to seek treatment (Allen & MacDonald, 2014).

### *2.5 Adolescent Obesity*

Obesity has been described as a global pandemic that has become a wide scale public health challenge (Popkin et al., 2012; Swinburn et al., 2011; World Health Organization, 2015). Body mass index (BMI) is a scale that is used to classify an individual as being overweight or obese. Body mass index is calculated by taking an individual's weight (in kilograms) and dividing it by the square of their height (in metres squared). The international BMI classification standard is used for individuals 18 years or older, who are classified as overweight with a BMI of  $25 \text{ kg/m}^2$  or above and obese with a BMI of  $30 \text{ kg/m}^2$  or above. For children up to the age of 18 years, different BMI cut-offs have been established based on age and gender, as defined by Cole et al. (2000) and presented in Appendix 3. The prevalence of overweight and obesity in children across the globe

increased by 47.1% between 1980 and 2013 (Ng et al., 2014). In developed countries, 16.9% of boys and 16.2% of girls were overweight or obese in 1980, but 23.8% of boys and 22.6% of girls were overweight or obese in 2013 (Ng et al., 2014). In developing countries, 8.1% of boys and 8.4% of girls were overweight or obese in 1980, but 12.9% of boys and 13.4% of girls were overweight or obese in 2013 (Ng et al., 2014). A universal health concern has emerged regarding the health risks associated with obesity (Ng et al., 2014). One possible health risk that has not received enough attention in the literature is that of risky sexual behavior.

In Canada, the prevalence of child and adolescent overweight and obesity has increased since the late 1970s (Shields, 2006). In 2013, a total of 421 350 (20.7%) of Canadian youth in the 12 to 17 year old age group were classified as overweight or obese using the Cole classification system (Cole et al., 2000) according to Statistics Canada (2014a). Interestingly, in this age group, 281 461 (26.2%) of males were classified as overweight or obese compared to 139 889 (14.5%) of females. Although the prevalence of adolescent overweight and obesity has not changed significantly over the last 10 years, it still remains a public health concern (Roberts et al., 2012). With a significant portion of the adolescent population in the overweight and obese category, it is becoming increasingly important to study the behaviors of this group.

## *2.6 Consequences of Adolescent Obesity*

It is well established in the literature that child and adolescent obesity is associated with serious physical, social and psychological consequences, as well as many high-risk behaviors. Physical consequences include increased risk for cardiovascular dysfunction (Freedman et al., 2007, 1999), type II diabetes (Fagot-Campagna et al., 2000), pulmonary complications (Figueroa-Munoz et al., 2001), hypertension (Sorof et al., 2004), hepatic complications (Strauss et al., 2000), renal complications (Adelman, R., 2001), musculoskeletal complications (Chan & Chen, 2009) and a lower health-related quality of life (Fontaine & Barofsky, 2001; Kolotkin et al., 2006, 2001; Kushner & Foster, 2000; Larsson et al., 2002; Pinhas-Hamiel et al., 2006; Puhl et al., 2007; Schwimmer et al., 2003; Swallen et al., 2005; Tsiros et al., 2009).

Social consequences include impaired peer relationships (Janssen et al., 2004; Ludwig, 2007), stigmatization and weight bias (Janssen et al., 2004; Latner & Stunkard, 2003; Puhl & Latner, 2007; Strauss & Pollack, 2003; Washington, 2011; Young-Hyman et al., 2006), social isolation (Strauss & Pollack, 2003; Zeller et al., 2008), peer victimization (Janssen et al., 2004; Pearce et al., 2002), increased likelihood of being victims of bullying (Farhat et al., 2010; Farrant et al., 2013; Jansen et al., 2004; Puhl et al., 2011), weight-related teasing (Eisenberg et al., 2003; Haines et al., 2008), withdrawal (Erermis et al., 2004) and stereotypes including poor health, poor hygiene, laziness and poor social and academic ability (Hill & Silver, 1995). Overweight and obese adolescents who are marginalized by their peers are at an elevated risk of adjustment problems in adulthood

(Bagwell et al., 2001). Furthermore, weight-related teasing in adolescence continues into young adulthood (Eisenberg et al., 2011).

Psychological consequences of obesity include feelings of loneliness, sadness and nervousness (Strauss, 2000), lower perceived competencies and self-worth (Vila et al., 2004), and diminished levels of psychological and emotional well-being (Eisenberg et al., 2003; Wardle & Cooke, 2005). Adolescent obesity is associated with depression and depressive symptoms (Dietz, 2004; Melnyk et al., 2006; Pabst et al., 2009; Zeller et al., 2009, 2006). Similarly, depression in adolescence is associated with a higher risk of becoming obese (Goodman & Whitaker, 2002; Marmorstein et al., 2014; Pine et al., 2001). Although the direction and the underlying mechanisms of the relationship are not clear (Erermis et al., 2004; Stunkard et al., 2003), they can co-occur (Farrant et al., 2013). Furthermore, adolescent obesity is a predictor of depression and depressive symptoms in adulthood (Anderson et al., 2007; Herva et al., 2006; Marmorstein et al., 2014), where the longer a child is overweight, the greater the risk for later depression (Mustillo et al., 2003). With ongoing weight loss, Dixon et al. (2003) found improvements in depression. Although both sexes are affected by obesity-related depression, it seems that female adolescents may be at a higher risk (Anderson et al., 2007; Onyike et al., 2003). Being overweight comes with discrimination in education, health care and employment (Averett & Korenman, 1996; Cawley, 2004; Puhl & Brownell, 2001;). For example, an increase in adolescent body weight is also associated with a decrease in academic performance (Sabia, 2007). The adverse psychological consequences of being overweight or obese are

more pronounced for girls (Young-Hyman et al., 2006) suggesting that there will be gender differences in risky sexual behaviors.

Overweight and obese adolescents have an increased likelihood of engaging in high-risk behaviors (Strauss, 2000) which can often co-occur (Patrick et al., 2004; Sanchez et al., 2007). Examples include smoking (Cawley et al., 2004; Farhat et al., 2010; Farrant et al., 2013; Lowry et al., 2002; Ratcliff et al., 2011; Strauss, 2000), alcohol use (Berg et al., 2005; Farhat et al., 2010; Pasch et al., 2008; Strauss, 2000), substance use and disorders (Berg et al., 2005; Farhat et al., 2010; Suris & Parera, 2005), fighting and aggression (Pasch et al., 2008; Zeller et al., 2008), perpetrators of bullying (Berg et al., 2005; Farhat et al., 2010; Griffiths et al., 2006; Janssen et al., 2004), carrying of weapons (Farhat et al., 2010), taking steroids without a doctor's prescription (Ratcliff et al., 2011), unhealthy weight control behaviors (Boutelle et al., 2002; Farrant et al., 2013; Fonseca et al., 2009; Neumark-Sztainer et al., 2002) and increased risk for attempted suicide (Eaton et al., 2005; Falkner et al., 2001; Kim & Leventhal, 2008; Swahn et al., 2009). The literature indicates that obese adolescents are more prone to negative outcomes and higher-risk behaviors than overweight adolescents (Berg et al., 2005; Farrant et al., 2013; Griffiths et al., 2006; Janssen et al., 2004).

### *2.7 Obesity, Body Image Satisfaction & Risky Sexual Behavior*

Body image satisfaction is an individual's internal assessment of their physical attributes in comparison to perceived cultural standards (Akers et al., 2009; van den Berg et al.,

2010). Body image dissatisfaction can be described as a discrepancy between an individual's idealized body image and perceived self-image, where the greater the discrepancy, the greater the body image dissatisfaction (Grogan, 2008; Teague et al., 2011). The idealized body image stems from the cultural context of an individual. Canada generally subscribes to a culture that promotes thinness, where individuals with higher BMIs tend to have lower levels of body image satisfaction due to an increased discrepancy between the idealized body image and perceived self-image (Yates et al., 2004). Body image concerns can begin in early adolescence (Eisenberg et al., 2004; Konstanski et al., 2003), although body image concerns have been reported in childhood as early as 8 years old (Grogan, 2008; Levine & Smolak, 1999). Many adolescent girls report body image dissatisfaction due to adiposity build up in the middle and lower body regions, including stomach, thighs, hips and buttocks (Levine and Smolak, 1999). Many adolescents are faced with pressures from society and the media to meet the ideal body image, which can lead to a number of adverse health consequences in the pursuit of often unrealistic and unattainable results.

In a meta-analysis, Friedman and Brownell (1995) showed a large effect size ( $d = 0.85$ ) for the correlation between obesity and poor body-image. Hill and Williams (1998) found an increase in body image dissatisfaction with an increase in BMI and Sarwer and Thompson (2002) found that there is an improvement in body image satisfaction with ongoing weight loss. Overweight and obese children and adolescents also experience dissatisfaction with body image (Schwimmer et al., 2003; Taylor et al., 2012;), with

obese girls experiencing a greater body image dissatisfaction than boys (Puhl & Latner, 2007).

Sexual activity and body image are closely connected. When individuals engage in sexual activity, their bodies are exposed for exploration and judgment (Gillen et al., 2006).

Women with lower levels of body image satisfaction feel less secure, confident and comfortable in sexual interactions and are more self-conscious and embarrassed about their bodies during sex (Ackard et al., 2000; Cash et al., 2004a, 2004b; Faith & Schare, 1993; Gillen et al., 2006; Trapnell et al., 1997; Wiederman, 2000). This self-consciousness in the presence of sexual partners is due to the comparisons between their bodies and the idealized body image. These women are more likely to be anxious about intimacy and concerned about being judged by their partners (Brennan & Shaver, 1995; Cash et al., 2004a, 2004b), and as a result, may have fewer sexual experiences compared to those with a positive body image (Ackard et al., 2002; Seal et al., 2009).

However, females who are dissatisfied with their bodies and choose to engage in sexual activity may be more likely to engage in risky sexual behavior as it provides a greater opportunity to receive positive feedback about their body (Gillen et al., 2006). Males are more likely to give positive feedback when a condom is not used as they view it as an obstruction to more pleasurable sex (Espinosa-Hernandez & Lefkowitz, 2009). Obese females may be less likely to refuse sexual advances and negotiate safe sexual practices (Michael, 2004), as this may prevent positive feedback that would boost their body esteem (Gillen et al., 2006; Villers, 2010). Additionally, higher BMIs are associated with

a diminished belief in a condom's ability to protect against STIs and unwanted pregnancy (Gillen et al., 2006), which makes obese females particularly vulnerable if they choose to engage in sexual activities.

Studies have consistently found that women with greater body image dissatisfaction are less likely to negotiate safe sexual practices and as a result, more likely to engage in risky sexual behavior including an increased number of sexual partners, inconsistent condom use and having sex after drinking alcohol or using drugs (Eisenberg et al., 2005; Gillen et al., 2006; Impett et al., 2006; Littleton, 2005; Schooler et al., 2005; Wiederman et al., 1998; Wingood et al., 2002; Yamamiya et al., 2006).

On the other hand, women in the normal weight category are more likely to have positive evaluations of their bodies and feel more secure, confident and comfortable in sexual situations. Self-reported measures as well as measures recorded in a clinical setting demonstrated that there is actually a significant relationship between high body esteem and high sexual desire and functioning (Seal et al., 2009; Weaver & Byers, 2006).

Because of this, normal weight women may be more likely to engage in sexual activities compared to women in the overweight or obese category. This idea was supported by a study conducted by Merianos et al. (2013), who found that university students with a high body satisfaction score were 1.842 times more likely to have had sex than students with a low level of body satisfaction. Studies of the general female population have also linked higher body image satisfaction with higher frequency of sexual behavior (Ackard et al., 2000).

Even though women with higher body image satisfaction may be engaged in more sexual activity, a positive body image may actually serve as a protective factor against risky sexual behavior. According to Gillen et al. (2006), women who are satisfied with their appearance may feel particularly efficacious in sexual situations and more likely to insist on condom use, a task that may be generally difficult for females given the fact that males are more likely to dissuade females from using condoms, rather than females dissuading males from using condoms (Carter et al., 1999). This idea is supported by Shearer et al. (2005) who suggest that higher levels of body image satisfaction in women may boost confidence to limit the number of sexual partners and negotiate safe sex practices.

These ideas are also supported in the existing research in the female adolescent population, where lower body image satisfaction is associated with risky sexual behavior. Wild et al. (2004) found that high school girls in South Africa with low body esteem were more likely to have multiple sexual partners. Wingood et al. (2002) found that female African-American adolescents with lower levels of body image satisfaction were more likely to engage in unprotected sex and less likely to negotiate condom use. Adolescent girls with lower levels of body image satisfaction may feel that they are less in control of their sexual relationships and could experience more fear of abandonment when negotiating condom use. Additionally, a low level of body image satisfaction is also a predictor of alcohol use in adolescents (Striegel-Moore & Huydic, 1993; Wild et al., 2004). Adolescent alcohol use before sexual activity is associated with risky sexual

behavior, including inconsistent condom use (Wingood & DiClemente, 1997), casual sex and sex with multiple partners (Santelli et al., 2001).

Very little attention has been given to overweight and obese adolescent males in identifying whether or how they differ from their normal weight peers in terms of body image satisfaction and risky sexual behavior. Research suggests that there may be little difference between overweight and obese adolescent males and normal weight adolescent males in terms of body image satisfaction and risky sexual behavior. Most research is unable to document any significant differences between these groups (Farrant et al., 2013; Leech et al., 2012; Ratcliff et al., 2011; Sabia & Rees, 2011). A possible explanation is that overweight and obese males exhibit less body image dissatisfaction compared to females (Forrest & Struhldreher, 2007; Harring et al., 2010), and as such, may be more likely to engage in similar sexual practices as their normal weight peers. The only piece of research that found a significant difference between male adolescent weight groups was conducted by Cawley et al. (2006) who found that overweight and obese adolescent males were less likely to become sexually active compared to normal weight adolescent males.

### *2.8 Obesity, Self-Esteem & Risky Sexual Behavior*

Adolescent obesity is also associated with low self-esteem, although the relationship seems to be stronger for girls than for boys (Franklin et al., 2006; French et al., 1995; Puhl et al., 2007; Schwimmer et al., 2003; Strauss, 2000). Low self-esteem is strongly

related to body image dissatisfaction (Grossbard et al., 2009; Schwartz & Brownell, 2004; van den Berg et al., 2010), which is reinforced by weight-related teasing and bullying among adolescents (Eisenberg et al., 2003; Goldfield et al., 2010; Janssen et al., 2004). The reverse relationship is also true in that poor body image is associated with lower self-esteem (Cohane & Pope, 2001; Mendelson et al., 2001).

Rosenberg (1989) defines self-esteem as the totality of the individual's thoughts and feelings with reference to himself as an object. In other words, it can be described as a level of overall satisfaction with oneself. Those who suffer from low self-esteem may engage in behaviors to try to boost their levels of self-esteem, with one such behavior being risky sex (Gulette & Lyons, 2006; Sterk et al., 2004). Female adolescents with low levels of self-esteem have diminished power in sexual relationships (Taylor-Seehafer & Rew, 2000). Because of this diminished power, adolescent girls may feel a lack of control and not be able to initiate conversations about safe sex practices and as a result are more likely to engage in risky sexual behavior (Shrier et al., 2001; Taylor-Seehafer & Rew, 2000; Tschann et al., 2002). The term used for this ability to negotiate is "sexual agency", where adolescent girls who are high in sexual agency will be able to make active decisions about safe sexual practices, whereas adolescent girls who are low in sexual agency are more likely to ignore their own needs in order to secure or maintain a relationship with a male partner (Tolman, 1999; Wingood et al., 2002).

A number of studies demonstrate that lower self-esteem is a predictor of risky sexual behavior in adolescence. Specifically, adolescents with low self-esteem are more likely to have early onset of sexual intercourse (Magnani et al., 2001), multiple sexual partners (Cooper et al., 1998), decreased condom use (Davies et al., 2003; Magnani et al., 2001), and higher rates of pregnancy (Corcoran et al., 2000). On the other hand, high self-esteem may be a protective factor against risky sexual behavior. For example, Berry et al. (2000) found that high self-esteem was a protective factor in preventing pregnancies in a sample of African women, and Dixon et al. (2000) found that in a program designed to increase levels of self-esteem in a sample of adolescent African-American females, there were reduced rates of risky sexual behavior. As with lower levels of body image satisfaction, most research regarding lowered self-esteem in adolescents demonstrates an increase in risky sexual behavior, but this seems to be limited to females. This is likely due to the relationship being stronger for girls than for boys (Franklin et al., 2006; French et al., 1995; Puhl et al., 2007; Schwimmer et al., 2003; Strauss, 2000).

### *2.9 Significance of the Study*

The rates of adolescent obesity and risky sexual behavior in Canada are far from ideal. Given their prevalence, there is a pressing need to study the relationship between these variables. Despite the physical, social and psychological consequences of adolescent obesity being well-established in the literature, there has been little research investigating the relationship between adolescent obesity and risky sexual behavior. What is known and well demonstrated is an association between obesity and body dissatisfaction

(Friedman & Brownell, 1995; Hill & Williams, 1998; Puhl & Latner, 2007; Sarwer & Thompson, 2002; Schwimmer et al., 2003; Taylor et al., 2012; Yates et al., 2004) and lowered self-esteem (Franklin et al., 2006; French et al., 1995; Puhl et al., 2007; Schwimmer et al., 2003; Strauss, 2000), which in turn, are associated with risky sexual behavior (Cooper et al., 1998; Corcoran et al., 2000; Davies et al., 2003; Eisenberg et al., 2005; Gillen et al., 2006; Impett et al., 2006; Littleton, 2005; Magnani et al., 2001; Schooler et al., 2005; Shrier et al., 2001; Taylor-Seehafer & Rew, 2000; Tschann et al., 2002; Wiederman et al., 1998; Wingood et al., 2002; Yamamiya et al., 2006). With the obvious gap in the literature, the aim of this study was to unveil any direct associations between adolescent overweight and obesity and risky sexual behavior and explore any findings in terms of self-esteem and body image satisfaction.

The findings of this research can be passed onto policy makers, particularly those of sex education programs in schools, school counsellors and psychologists, as well as health care professionals who can be made aware of high-risk groups of adolescents. If overweight and obese adolescents do have lower levels of body image satisfaction and self-esteem, which are associated with risky sexual behaviors, then these may be important avenues to consider in identifying ways to reduce risky sexual behavior.

## 2.10 Hypotheses

Gender differences are common throughout the literature on adolescent overweight and obesity. The adverse psychological consequences of overweight and obesity are far more pronounced for females than males (Cash et al., 2004a, 2004b; Young-Hyman et al., 2006), including depression (Anderson et al., 2007; Onyike et al., 2013), body image dissatisfaction (Puhl & Latner, 2007) and self-esteem (Franklin et al., 2006; French et al., 1995; Puhl et al., 2007; Schwimmer et al., 2003; Strauss, 2000). Body image dissatisfaction is more pronounced for girls since a greater emphasis is placed on body appearance in females (Demarest & Allen, 2000). Overall, the implications of obesity are more severe for females compared to males. Females face a stronger stigma associated with obesity (Puhl and Bronwell, 2001) and greater social consequences (Puhl & Heur, 2009), whereas males do not seem to suffer the same educational, economic and psychological consequences (Averett & Korenman, 1996; Cawley, 2004; Franklin et al., 2006; Onyike et al., 2003; Sabia, 2007). Taken with the findings that obese adolescents are more prone to negative outcomes and higher-risk behaviors than overweight adolescents (Berg et al., 2005; Farrant et al., 2013; Griffiths et al., 2006; Janssen et al., 2004), it is hypothesized that any associations will be strongest among adolescent girls with higher weight statuses:

*Prediction 1:* There will be a significant association between weight status (IV) and risky sexual behavior (DV), with the association being strongest for adolescent girls with a higher weight status.

*Prediction 2:* There will be a significant association between weight status (IV) and body image satisfaction (DV), with the association being strongest for adolescent girls with a higher weight status.

*Prediction 3:* There will be a significant association between weight status (IV) and self-esteem (DV), with the association being strongest for adolescent girls with a higher weight status.

## Chapter 3

### *Methods*

#### *3.1 Participants*

Data from a total of 8 168 participants were used in this study. These data were from participants aged 15 to 19 who participated in the 2009/2010 round of the CCHS. Participants in this age group who reported valid measures of height and weight and who had completed the sexual behavior module were included. Participants were excluded if they did not fall into this age group, and if they did not complete the sexual behavior module. In the 15 to 17 year old age group there were 5 081 adolescents, and in the 18 to 19 year old age group there were 3 087 adolescents. Table 1 contains information on the self-reported weight, height and derived BMI values for both age groups.

#### *3.2 Procedure*

This study used data from the 2009/2010 cycle of the Canadian Community Health Survey (CCHS), a cross-sectional survey designed to collect a wide range of information related to the health status of Canadians, factors determining their health status, and their use of health care services. The data were collected from persons aged 12 years and older, living in private dwellings in all provinces and territories across Canada. The survey was stratified by province/territory and urban vs rural regions within each province/territory in order to represent 98% of the Canadian population. Sampling techniques and data collection methods have been summarized in this thesis, but more information is available from Statistics Canada (2014b).

Data collection took place from January 2009 through to December 2010. The survey made use of three sampling frames to select samples of households: 49.5% of the household samples came from an area frame, 49.5% came from a list of telephone numbers and the remaining 1% came from a Random Digit Dialling (RDD) sampling frame. During the last two collection periods of 2010, 40.5% of the sample came from the area frame, 58.5% came from a list of telephone numbers and the remaining 1% came from the RDD sampling frame. This change was brought about in order to reduce collection costs.

Before each collection period, introductory letters were sent to the sample households to explain the purpose of the survey, its importance, and issues pertaining to its voluntary nature, confidentiality and the release and publication of the data. Data were collected using a computer assisted interviewing (CAI) technique. Sample units selected from the telephone list or RDD frame were interviewed from centralized call centres, using computer assisted telephone interviewing (CATI), supervised by a senior interviewer at the same call centre. Sample units selected from the area frame were interviewed by field interviewers, using computer assisted personal interviewing (CAPI), supervised from a distance by senior interviewers. About three quarters of the field interviews were conducted exclusively in person, while the remaining one quarter completed part of the interview by telephone.

The computer assisted interviewing (CAI) technique holds a number of advantages over other collection methods. It allows for custom interviews for every respondent based on their individual characteristics and survey responses. For example, questions that are not applicable to the respondent are skipped automatically, immediate feedback and prompts are given when an entry is invalid or out-of-range, and question text is adjusted to suit factors such as the age and sex of the respondent, the date of the interview and answers to previous questions.

CCHS documentation indicated that interviewers were trained to make all reasonable attempts to obtain interviews. If initial contact with each selected sample dwelling was at an inconvenient time, an appointment was made to call back at a more convenient time. If requests for appointments were unsuccessful over the telephone, interviewers were instructed to follow up with a personal visit. If the initial personal contact resulted in a non-response, telephone follow ups were conducted. Individuals who initially refused to participate in the survey were sent a letter from the nearest Statistics Canada Regional Office stressing the importance of the survey and household's collaboration. This was followed by a call or visit from a senior interviewer or project supervisor to highlight the importance of the survey and convince the respondent to participate.

When contact was successful, basic demographic information was asked of a knowledgeable household member, before a member of the household was selected for a more in-depth health content interview. Every effort was made to ensure that respondents completed the survey in privacy. For adolescents in the 12 to 15 year old age group,

interviewers had to obtain permission from a parent or guardian to complete the survey. In order to alleviate parental concerns and to ensure a completed interview, interviewers gave parents/guardians an official card explaining the purpose of collecting information from youth, listing the subjects to be covered in the survey and explaining the need to respect the child's right to privacy and confidentiality. If a parent/guardian requested to see the questions of the survey, personal interviewers were instructed to show the survey questions and telephone interviewers had the nearest regional office send a copy of the questionnaire. If privacy could not be obtained to interview the selected youth in person or over the phone, the interview was coded as a refusal. In the case of CAPI interviews, if privacy could not be obtained to interview the selected youth, the interviewer could propose to the parent/guardian that the interviewer read the questions out loud while the youth enter responses directly on the computer.

### *3.3 Instrument Description*

The content structure of the CCHS included 3 components, namely the common content component, the optional content component, and the rapid response component. The common content component was asked of all respondents in provinces and territories across Canada, while the optional content gave health regions across Canada a choice of content to ask participants in that region in order to address regional public health priorities, and finally the rapid response content was offered on a cost-recovery basis to organizations interested in obtaining national estimates on a specific or emerging topic

related to population health. The average length of a survey was estimated to be between 40 to 45 minutes.

### 3.4 Measures

*Gender*<sup>2</sup>. This variable formed part of the annual common content of the CCHS and was asked of all respondents in all provinces and territories across Canada. The sex of the respondents was collected as one of the dwelling and household (DHH) variables, given the variable code ‘DHH\_SEX’ and the variable label ‘Sex’. The interviewer recorded the sex of the respondent, and if necessary, asked the respondent if he or she was male or female. Sex was coded as: 1 = “Male” and 2 = “Female”.

*Age*. This variable formed part of the annual common content of the CCHS and was asked of all respondents in all provinces and territories across Canada. The age of the respondents was collected as one of the dwelling and household (DHH) variables, given the variable code ‘DHHGAGE’ and the variable label ‘Age – (G)’. Age was calculated by asking respondents to enter their date of birth. The day, month and year of their birth was entered separately, and respondents were then presented with a calculated age. They could either accept this calculated age, go back and make changes to their date of birth or manually enter in their age before moving on with the interview. Groupings and codings for age are available in Appendix 1.

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<sup>2</sup> CCHS uses the term ‘sex’ to differentiate between male and female respondents

*Height.* This variable formed part of the annual common content of the CCHS and was asked of all respondents in all provinces and territories across Canada. Height was given the variable code ‘HWTGHTM’ and variable label ‘Derived variable - Height (metres)/self-reported - (G)’. Respondents were asked how tall they were without shoes on. They could give an answer based on an exact value in feet and inches, or a corresponding category with a range in centimeters. Groupings and codings for height are available in Appendix 2.

*Weight.* This variable formed part of the annual common content of the CCHS and was asked of all respondents in all provinces and territories across Canada. Weight was given the variable code ‘HWTGWTK’ and variable label ‘Derived variable - Weight (kilograms)/self-reported - (G)’. Respondents were asked to report their weight, which they could give in pounds or kilograms. However, if weight was given in pounds, it was converted to kilograms and then recorded. If respondents did not know their weight or refused to answer, the responses were recorded as 999.99 = “Not Stated”.

*Body Mass Index (BMI).* Body mass index was derived from the self-reported height and weight values. Since these variables formed part of the annual common content of the CCHS, BMI was calculated for all respondents in all provinces and territories across Canada with valid self-reported height and weight values. However, before collecting data on self-reported height and weight, female respondents aged 15 years and older were asked if they were pregnant, in which case their information was not used in BMI calculations. Body mass index was given the variable code ‘HWTGBMI’

and variable label 'Derived variable - Body Mass Index (BMI)/self-report - (G)'. It was calculated for each respondent by taking their height, in metres, and dividing it by the square of their weight, in kilograms. Values were rounded to one decimal place and kept to a minimum of 14 and a maximum of 58.

*Weight Status.* Two different classification systems were used to identify the weight status of respondents according to their body mass index. The international standard classification system was used for respondents aged 18 years and older and the Cole classification system (Cole et al., 2000) was used for children aged 12 to 17. Both classification systems used the same derived body mass index variable, however different cut-off points were used to classify the weight status of the respondents. The weight status of respondents over 18 years of age was recorded with the variable code 'HWTGISW' and variable label 'Derived variable - BMI classification (18+)/self-reported - International standard - (G)'. This classification system used the same internationally recognized cut-off points for both males and females, regardless of age. Respondents were classified as "Underweight" if their BMI was less than 18.5, "Normal weight" if their BMI was between 18.5 and 25, "Overweight" if their BMI was between 25 and 30, and "Obese" if their BMI was greater than 30. The weight status of children between the ages of 12 and 17 was recorded with the variable code 'HWTDCOL' and variable label 'Derived variable - BMI classification (12 to 17)/self-reported - Cole system'. This classification system uses age and sex specific cut-off points (see Appendix 3), based on pooled international data from Brazil, Great Britain, Hong Kong, Netherlands, Singapore and the United States. This system links actual BMI values to the

widely internationally accepted adult BMI cut-off points. Children in this age group were either classified as “Overweight”, “Obese” or “Neither overweight nor obese”.

*Sexual Behavior.* Seven questions relating to sexual behavior formed part of the two year common content of the CCHS and were asked of all respondents in all provinces and territories across Canada for the 2009/2010 of the survey. Since this is the most recent CCHS database in which questions relating to sexual behaviors were asked of respondents in all provinces and territories across Canada, it was chosen for this study. Questions in this module were asked of respondents between the ages of 15 and 49, but for those who fell outside of this age range, responses were recorded as “Not applicable”. For each of the questions, respondents could refuse to answer the question, which was recorded as “Refusal”, indicate that they did not know the answer, which was recorded as “Don’t know”, or in the case of proxy interviews, responses were recorded as “Not stated”. Respondents were asked if: 1. they had ever had sexual intercourse (recorded as 1 = “Yes”, 2 = “No” in SXB\_1). Only if the response was a “Yes” were further questions asked. 2. they had sexual intercourse in the past 12 months (recorded as 1 = “Yes”, 2 = “No” in SXB\_3). 3. they were ever diagnosed with a sexually transmitted infection (recorded as 1 = “Yes”, 2 = “No” in SXB\_07). 4. they used a condom the last time they had sexual intercourse (recorded as 1 = “Yes” and 2 = “No” in SXB\_7A). The questions that followed enquired about the use of birth control. Respondents older than 24 years who had sexual intercourse with same-sex partners were not asked these questions. First, females were asked if 5. it was important for them to avoiding getting pregnant and males were asked if 6. it was important for them to avoid getting their partner pregnant. These

measures used a Likert scale (1 = “Strongly Agree”, 2 = “Agree”, 3 = “Neither Agree nor Disagree”, 4 = “Disagree”, 5 = “Strongly Disagree”) and were recorded in SXB\_09 for females and SXB\_10 for males. Next, respondents were asked if they or their partner usually used birth control in the past 12 months (recorded as 1 = “Yes” and 2 = “No” in SXB\_11). If respondents answered “Yes”, they were asked to select the type(s) of birth control they usually used in the past 12 months from a list. Respondents were then asked to select the type(s) of birth control they used the last time they had sex from a similar list. For the purposes of this study, the question of interest was 7. whether no form of birth control was used the last time they had sex (recorded as 1 = “Yes” and 2 = “No” in SXB\_13G).

*Body Image Satisfaction.* A measure of body image satisfaction was recorded in the satisfaction with life (SWL) module, however, this was only optional content. For the 2009/2010 CCHS collection period, only respondents in British Columbia were required to answer questions in this module. At the beginning of the module, they were informed that they were going to be asked about satisfaction with various aspects of their life which would be measured using a Likert scale (1 = “Strongly Agree”, 2 = “Agree”, 3 = “Neither Agree nor Disagree”, 4 = “Disagree”, 5 = “Strongly Disagree”). For the purposes of this study, focus was given to question 6 in which respondents were asked how satisfied they were with the way their body looked. Responses were recorded under the variable code ‘SWL\_06’ and the variable label ‘Satisfaction: way body looks’. Unfortunately, no measures of reliability and validity were documented for this specific measure.

*Self-Esteem.* This module was designed to assess the level of self-esteem (positive feeling) that a respondent had. Scores on this index were based on a subset of items from the Rosenberg (1965) self-esteem scale, which has high levels of reliability across samples ranging from .72 to .87 (Gray-Little et al., 1997) and a high level of internal consistency of .77 (Rosenberg, 1965). The six items on this scale were factored into one dimension in the factor analysis done by Pearlin and Schooler (1978). The self-esteem (SFE) module was only optional content, and for the 2009/2010 CCHS collection period, only respondents in British Columbia and Quebec were required to answer questions in this module. Respondents outside of these provinces had responses recorded as “Not applicable”. For each of the questions, respondents could refuse to answer the question, which was recorded as “Refusal”, indicate that they did not know the answer, which was recorded as “Don’t know”, or in the case of proxy interviews, responses were recorded as “Not stated”. At the beginning of the module, respondents were informed that a series of statements were going to be presented that people might use to describe themselves and would be asked to provide responses on a Likert scale (1 = “Strongly Agree, 2 = “Agree”, 3 = “Neither Agree nor Disagree”, 4 = “Disagree”, 5 = “Strongly Disagree”). The statements presented were as follows: “1. You feel that you have a number of good qualities”, “2. You feel that you’re a person of worth at least equal to others”, “3. You are able to do things as well as most other people”, “4. You take a positive attitude toward yourself”, “5. On the whole you are satisfied with yourself”, and “6. All in all, you’re inclined to feel you’re a failure.” Responses on statements 1 through 5 were inverted and rescaled to get scores from 4 to 0. Responses on statement 6 were rescaled to get scores

from 0 to 4. A summation of each of these scores gave an overall measure of self-esteem, ranging from 0 to 24, where higher scores indicated greater self-esteem.

### 3.5 Data Analyses

Data analyses were performed using SPSS (Statistical Package for the Social Sciences) software. Demographic and background variables, including BMI classifications, sexual behavior, body image satisfaction and self-esteem, were summarized in tables using frequencies, percentages, means, standard deviations and correlation coefficients. For the hypothesis testing, factorial ANOVAs were conducted to find any associations between weight status and body image satisfaction, as well as weight status and self-esteem, while one-way ANOVAs were used for the importance adolescents placed on avoiding pregnancy. Due to the limited number and dichotomous nature of most of the sexual behavior variables, regression analyses were not performed. Follow up tests were run by using Tukey's HSD where appropriate contrasts were entered into SPSS. Findings were reported with appropriate effect size measures, including  $\eta_p^2$ ,  $\eta^2$ , or Cohen's  $d$ . Independent samples  $t$ -tests were used to map any gender differences. Since most of the sexual behavior variables were categorical,  $\chi^2$  tests of independence were conducted, where findings were reported together with Cramer's  $V$  as an effect size measure. Standardized residuals were used to identify cells that showed higher levels of association, which formed the basis for follow up tests. Findings from the follow up tests were reported together with  $\phi$  as an effect size measure. Gender differences were identified by entering gender as a layer in the chi-square analyses. A Bonferroni

correction was applied to any unplanned comparisons. An alpha level of .05 was used for determining significance.

## Chapter 4

### *Results*

#### *4.1 Demographics and Background Characteristics*

Table 2 contains information on the weight status of adolescents, separated by gender for both age groups. Out of interest, the distribution of weight statuses across the provinces and territories in Canada is given in Table 3 for the 15 to 17 year old age group and Table 4 for the 18 to 19 year old age group. Also, sexual behaviors are summarized in Table 5 and attitudes towards avoiding pregnancy are summarized in Table 6. Body image satisfaction scores for adolescents in both age groups are summarized in Table 7 and self-esteem scores for adolescents in both age groups are summarized in Table 8. Finally, Table 9 contains the correlations between age, BMI, body image satisfaction and self-esteem.

#### *4.2 Hypothesis Testing*

*Null Hypothesis 1a:* For male adolescents in the 15 to 17 year old age group, there will be no significant difference, based on weight status, on the importance placed on avoiding getting a partner pregnant.

A one-way analysis of variance (ANOVA) was conducted to compare the mean scores of how important male adolescents felt it was to avoid getting their partner pregnant (1 = Strongly Agree to 5 = Strongly Disagree). There was no significant difference between adolescents who were classified as obese ( $M = 1.17$ ,  $SD = .54$ ),

overweight ( $M = 1.28$ ,  $SD = .71$ ) or neither overweight nor obese ( $M = 1.28$ ,  $SD = .66$ ),  $F(2, 667) = .54$ ,  $p = .582$ ,  $\eta^2 = .002$ . The null hypothesis was not rejected.

*Null Hypothesis 1b:* For male adolescents in the 18 to 19 year old age group, there will be no significant difference, based on weight status, on the importance placed on avoiding getting a partner pregnant.

A one-way analysis of variance (ANOVA) was conducted to compare the mean scores of how important male adolescents felt it was to avoid getting their partner pregnant (1 = Strongly Agree to 5 = Strongly Disagree). There was no significant difference between adolescents who were classified as obese ( $M = 1.47$ ,  $SD = .77$ ), overweight ( $M = 1.33$ ,  $SD = .71$ ) or normal weight ( $M = 1.30$ ,  $SD = .64$ ),  $F(2, 959) = 2.13$ ,  $p = .120$ ,  $\eta^2 = .004$ . The null hypothesis was not rejected.

*Null Hypothesis 2a:* For female adolescents in the 15 to 17 year old age group, there will be no significant difference, based on weight status, on the importance placed on avoiding getting pregnant.

A one-way analysis of variance (ANOVA) was conducted to compare the mean scores of how important female adolescents felt it was to avoid getting pregnant (1 = Strongly Agree to 5 = Strongly Disagree). There was a significant difference based on weight status  $F(2, 777) = 6.01$ ,  $p = .003$ ,  $\eta^2 = .02$ . Follow up tests indicated that obese adolescents ( $M = 1.26$ ,  $SD = .45$ ) did not differ from adolescents classified as neither overweight nor obese ( $M = 1.19$ ,  $SD = .44$ ),  $t(777) = .84$ ,  $p = .402$ ,  $d = .16$ . However, there was a significant difference between overweight adolescents ( $M = 1.35$ ,  $SD = .58$ )

and adolescents classified as neither overweight nor obese,  $t(777) = 3.44, p = .001, d = .31$ , indicating that overweight female adolescents did not feel as strongly about the importance of avoiding getting pregnant. There were no differences between overweight and obese female adolescents  $t(777) = .84, p = .402, d = .17$ . The null hypothesis was rejected.

*Null Hypothesis 2b:* For female adolescents in the 18 to 19 year old age group, there will be no significant difference, based on weight status, on the importance placed on avoiding getting pregnant.

A one-way analysis of variance (ANOVA) was conducted to compare the mean scores of how important female adolescents felt it was to avoid getting pregnant (1 = Strongly Agree to 5 = Strongly Disagree). There was a significant difference based on weight status  $F(2, 926) = 8.60, p < .001, \eta^2 = .02$ . Follow up tests indicated that there was a difference between obese adolescents ( $M = 1.59, SD = 1.08$ ) and normal weight adolescents ( $M = 1.25, SD = .57$ ), where obese adolescents did not feel as strongly about the importance of avoiding getting pregnant,  $t(926) = 3.83, p < .001, d = .40$ . Also, overweight adolescents ( $M = 1.36, SD = .80$ ) did not feel as strongly about the importance of avoiding getting pregnant compared to normal weight adolescents,  $t(926) = 2.02, p = .044, d = .16$ . Finally, there was also a significant difference between overweight and obese adolescents, where obese adolescents did not feel as strongly about the importance of avoiding getting pregnant compared to overweight adolescents,  $t(926) = 2.20, p = .028, d = .24$ . The null hypothesis was rejected.

*Null Hypothesis 3a:* There will be no significant difference in whether adolescents had ever had sexual intercourse, based on weight status, in the 15 to 17 year old age group.

A chi-square test of independence was conducted to test for any association between weight status and whether adolescents had ever had sexual intercourse. The test revealed that there was a significant association based on weight status,  $\chi^2(2, N = 4953) = 12.84, p = .002, V = .05$ . Follow up tests highlighted that obese adolescents were significantly less likely to have ever had sex, compared to those who were classified as neither overweight nor obese,  $\chi^2(1, N = 4103) = 9.16, p = .002, \phi = .05$ , and compared to those who were classified as overweight,  $\chi^2(1, N = 1149) = 12.85, p < .001, \phi = .11$ . Odds ratios revealed that obese adolescents in this age group were 1.51 times less likely to have ever had sex compared to those who were neither overweight nor obese, and 1.71 times less likely to have ever had sex compared to those who were overweight. Further tests searched for gender differences between weight status and ever having had sexual intercourse, which revealed no significant association for males,  $\chi^2(2, N = 2556) = 2.56, p = .277, V = .03$ , however there was a significant association for females,  $\chi^2(2, N = 2397) = 14.51, p = .001, V = .078$ . Follow up tests highlighted that obese female adolescents were significantly less likely to have ever had sex, compared to those females who were classified as neither overweight nor obese,  $\chi^2(1, N = 2074) = 7.84, p = .005, \phi = .06$ , and compared to those females who were classified as overweight,  $\chi^2(1, N = 436) = 13.87, p < .001, \phi = .18$ . Odds ratios revealed that obese female adolescents in this age group were 1.88 times less likely to have ever had sex compared to normal weight females, and 2.50

times less likely to have ever had sex compared to overweight females. The null hypothesis was rejected.

*Null Hypothesis 3b:* There will be no significant difference in whether adolescents had ever had sexual intercourse, based on weight status, in the 18 to 19 year old age group.

A chi-square test of independence was conducted to test for any association between weight status and whether adolescents had ever had sexual intercourse. The test revealed that there was a significant association based on weight status,  $\chi^2(2, N = 3012) = 10.75, p = .005, V = .06$ . Follow up tests highlighted that obese adolescents were significantly less likely to have ever had sex, compared to those of normal weight,  $\chi^2(1, N = 2438) = 9.23, p = .002, \phi = .06$ , however this association was not significant when compared to those who were overweight,  $\chi^2(1, N = 827) = 2.42, p = .120, \phi = .05$ . Odds ratios revealed that obese adolescents were 1.53 times less likely to have ever had sex compared to normal weight adolescents in this age group. Further tests searched for gender differences between weight status and ever having had sexual intercourse, which revealed no significant association for males,  $\chi^2(2, N = 1551) = 2.35, p = .308, V = .04$ , however there was a significant association for females,  $\chi^2(2, N = 1461) = 11.59, p = .003, V = .09$ . Follow up tests highlighted that obese female adolescents were significantly less likely to have ever had sex, compared to those females who were normal weight,  $\chi^2(1, N = 1214) = 8.47, p = .004, \phi = .08$ , however this association was not statistically significant when compared to overweight females,  $\chi^2(1, N = 361) = 1.21, p = .272, \phi = .06$ . Odds ratios revealed that obese female adolescents in this age group

were 1.79 times less likely to have ever had sex compared to normal weight females. The null hypothesis was rejected.

*Null Hypothesis 4a:* There will be no significant difference in whether adolescents had had sexual intercourse in the past 12 months, based on weight status, in the 15 to 17 year old age group.

A chi-square test of independence was conducted to test for any association between weight status and whether adolescents had had sexual intercourse in the past 12 months. The test revealed that there was no significant association based on weight status,  $\chi^2(2, N = 1670) = 2.42, p = .298, V = .04$ . Further tests for gender differences also revealed no significant association for both males,  $\chi^2(2, N = 806) = .98, p = .61, V = .04$ , and females,  $\chi^2(2, N = 864) = 1.60, p = .449, V = .04$ . The null hypothesis was not rejected.

*Null Hypothesis 4b:* There will be no significant difference in whether adolescents had had sexual intercourse in the past 12 months, based on weight status, in the 18 to 19 year old age group.

A chi-square test of independence was conducted to test for any association between weight status and whether adolescents had had sexual intercourse in the past 12 months. The test revealed that there was no significant association based on weight status,  $\chi^2(2, N = 2122) = 5.82, p = .054, V = .05$ . Further tests for gender differences also revealed no significant association for both males,  $\chi^2(2, N = 1118) = 3.20, p = .202, V =$

.05, and females,  $\chi^2(2, N = 1004) = 2.14, p = .343, V = .05$ . The null hypothesis was not rejected.

*Null Hypothesis 5a:* There will be no significant difference in whether adolescents used a condom the last time they had sexual intercourse, based on weight status, in the 15 to 17 year old age group.

A chi-square test of independence was conducted to test for any association between weight status and whether adolescents used a condom the last time they had sexual intercourse. The test revealed that there was no significant association based on weight status,  $\chi^2(2, N = 1496) = 2.79, p = .248, V = .04$ . Further tests for gender differences also revealed no significant association for both males,  $\chi^2(2, N = 703) = 1.59, p = .451, V = .05$ , as well as for females,  $\chi^2(2, N = 793) = 1.83, p = .401, V = .05$ . The null hypothesis was not rejected.

*Null Hypothesis 5b:* There will be no significant difference in whether adolescents used a condom the last time they had sexual intercourse, based on weight status, in the 18 to 19 year old age group.

A chi-square test of independence was conducted to test for any association between weight status and whether adolescents used a condom the last time they had sexual intercourse. The test revealed that there was a significant association based on weight status,  $\chi^2(2, N = 1865) = 7.23, p = .027, V = .06$ . Follow up tests highlighted that obese adolescents were significantly less likely to have used a condom the last time they had sexual intercourse compared to those who were normal weight,  $\chi^2(1, N = 1522) = 6.86, p = .009, \phi = .07$ , and compared to those who were classified as overweight,  $\chi^2(1, N$

= 469) = 5.91,  $p = .015$ ,  $\phi = .11$ . Odds ratios revealed that obese adolescents in this age group were 1.65 times less likely to have used a condom during their last sexual intercourse compared to those who were normal weight, and 1.70 times less likely to have used a condom during their last sexual intercourse compared to those who were overweight. Further tests searched for gender differences between weight status and using a condom during the last sexual intercourse. The test revealed that for males there was no significant association,  $\chi^2(2, N = 994) = 5.74, p = .057, V = .08$ . However, there was a significant association for females,  $\chi^2(2, N = 871) = 11.94, p = .003, V = .12$ . Follow up tests highlighted that obese female adolescents were significantly less likely to have used a condom during their last sexual intercourse, compared to normal weight females,  $\chi^2(1, N = 738) = 6.01, p = .014, \phi = .09$ , and compared to females who were overweight,  $\chi^2(1, N = 182) = 11.98, p = .001, \phi = .26$ . Odds ratios revealed that obese female adolescents in this age group were 2.05 times less likely to have used a condom during their last sexual intercourse compared to normal weight females, and were 3.30 times less likely than overweight females. The null hypothesis was rejected.

*Null Hypothesis 6a:* There will be no significant difference in whether adolescents reported usually using birth control in the past 12 months, based on weight status, in the 15 to 17 year old age group.

A chi-square test of independence was conducted to test for any association between weight status and whether adolescents reported usually using birth control in the past 12 months. The test revealed that there was no significant association based on weight status,  $\chi^2(2, N = 1467) = .29, p = .864, V = .01$ . Further tests for gender

differences also revealed no significant association for both males,  $\chi^2(2, N = 687) = 3.51$ ,  $p = .173$ ,  $V = .07$ , as well as for females,  $\chi^2(2, N = 780) = 4.53$ ,  $p = .104$ ,  $V = .08$ . The null hypothesis was not rejected.

*Null Hypothesis 6b:* There will be no significant difference in whether adolescents reported usually using birth control in the past 12 months, based on weight status, in the 18 to 19 year old age group.

A chi-square test of independence was conducted to test for any association between weight status and whether adolescents reported usually using birth control in the past 12 months. The test revealed that there was a significant association based on weight status,  $\chi^2(2, N = 1906) = 11.66$ ,  $p = .003$ ,  $V = .078$ . Follow up tests highlighted that overweight adolescents in this age group were significantly less likely to have reported usually using birth control in the past 12 months compared to those who were normal weight,  $\chi^2(1, N = 1772) = 11.66$ ,  $p = .001$ ,  $\phi = .08$ . Odds ratios revealed that overweight adolescents in this age group were 1.70 times less likely to have reported usually using birth control in the past 12 months. Further tests for gender differences showed a significant association for males,  $\chi^2(2, N = 997) = 7.55$ ,  $p = .023$ ,  $V = .089$ , as well as for females,  $\chi^2(2, N = 929) = 11.85$ ,  $p = .003$ ,  $V = .11$ . Follow up tests highlighted that while obese males were not significantly less likely to have reported usually using birth control in the past 12 months compared to normal weight males,  $\chi^2(1, N = 770) = 2.10$ ,  $p = .147$ ,  $\phi = .05$ , overweight males were significantly less likely to have usually reported usually using birth control in the past 12 months compared to normal weight males,  $\chi^2(1, N = 901) = 4.41$ ,  $p = .036$ ,  $\phi = .07$ . However, since this was an unplanned comparison, a

Bonferroni correction was applied, after which this finding no longer reached significance. In terms of the follow up tests for female adolescents in this age group, obese female adolescents were significantly less likely to have reported usually using birth control in the past 12 months compared to normal weight female adolescents,  $\chi^2(1, N = 781) = 7.29, p = .007, \phi = .10$ . Also, overweight female adolescents were significantly less likely to have reported usually using birth control in the past 12 months compared to normal weight female adolescents,  $\chi^2(1, N = 871) = 6.74, p = .009, \phi = .09$ . Odds ratios revealed that obese female adolescents in this age group were 2.42 times less likely to have reported usually using birth control in the past 12 months compared to normal weight adolescents, and overweight female adolescents in this age group were 1.87 times less likely to have reported usually using birth control in the past 12 months compared to normal weight adolescents. The null hypothesis was rejected.

*Null Hypothesis 7a:* There will be no significant difference in whether adolescents reported using no form of birth control the last time they had sexual intercourse, based on weight status, in the 15 to 17 year old age group.

A chi-square test of independence was conducted to test for any association between weight status and whether adolescents reported using no form of birth control the last time they had sexual intercourse. The test revealed that there was no significant association based on weight status,  $\chi^2(2, N = 1146) = 2.59, p = .274, V = .05$ . Further tests for gender differences also revealed no significant association for both males,  $\chi^2(2, N = 510) = 2.29, p = .318, V = .07$ , and females,  $\chi^2(2, N = 636) = 2.58, p = .275, V = .06$ . The null hypothesis was not rejected.

*Null Hypothesis 7b:* There will be no significant difference in whether adolescents reported using no form of birth control the last time they had sexual intercourse, based on weight status, in the 18 to 19 year old age group.

A chi-square test of independence was conducted to test for any association between weight status and whether adolescents reported using no form of birth control the last time they had sexual intercourse. The test revealed that there was no significant association based on weight status,  $\chi^2(2, N = 1589) = 2.73, p = .256, V = .04$ . Further tests for gender differences also revealed no significant association for both males,  $\chi^2(2, N = 779) = .78, p = .678, V = .03$ , and females,  $\chi^2(2, N = 810) = 2.80, p = .247, V = .06$ . The null hypothesis was not rejected.

*Null Hypothesis 8a:* There will be no significant difference in whether adolescents had reported being diagnosed with an STI, based on weight status, in the 15 to 17 year old age group.

A chi-square test of independence was conducted to test for any association between weight status and whether adolescents reported having being diagnosed with an STI. The test revealed that there was no significant association based on weight status,  $\chi^2(2, N = 1667) = 4.23, p = .121, V = .05$ . Further tests for gender differences revealed that there was no significant association for males,  $\chi^2(2, N = 806) = 2.291, p = .588, V = .04$ , however, there was a significant association for females,  $\chi^2(2, N = 861) = 11.99, p = .002, V = .12$ . Follow up tests highlighted that overweight female adolescents were significantly more likely to have reported being diagnosed with an STI, compared to

females who were classified as neither overweight nor obese,  $\chi^2(1, N = 835) = 10.63, p = .001, \phi = .11$ . Odds ratios revealed that sexually experienced overweight female adolescents in this age group were 3.62 times more likely to have ever reported being diagnosed with an STI compared sexually experienced adolescents who were neither overweight nor obese. The null hypothesis was rejected.

*Null Hypothesis 8b:* There will be no significant difference in whether adolescents had reported being diagnosed with an STI, based on weight status, in the 18 to 19 year old age group.

A chi-square test of independence was conducted to test for any association between weight status and whether adolescents reported having being diagnosed with an STI. The test revealed that there was no significant association based on weight status,  $\chi^2(2, N = 2115) = .17, p = .919, V = .01$ . Further tests for gender differences also revealed no significant association for males,  $\chi^2(2, N = 1114) = .42, p = .812, V = .02$ , and for females,  $\chi^2(2, N = 1001) = .59, p = .743, V = .02$ . The null hypothesis was not rejected.

*Null Hypothesis 9a:* There will be no significant difference in body image satisfaction, based on weight status, in the 15 to 17 year old age group.

Body image satisfaction scores were analyzed using a 3 (Weight Status) x 2 (Gender) analysis of variance. There was a significant difference in body image satisfaction scores based on weight status,  $F(2, 559) = 34.89, p < .001, \eta_p^2 = .11$ , where there was a decrease in body image satisfaction with a higher weight status. Adolescents who were neither overweight nor obese had the highest body image satisfaction scores ( $M = 1.84, SD = .76$ ), followed by overweight adolescents ( $M = 2.41, SD = .90$ ), and finally

obese adolescents with the lowest body image satisfaction scores ( $M = 2.59, SD = 1.09$ ). To explore the nature of the main effect, follow-up independent samples  $t$ -tests were performed comparing the means of the body image satisfaction scores at each weight status level. These indicated that obese adolescents,  $t(562) = 4.83, p < .001, d = .80$ , and overweight adolescents,  $t(562) = 5.97, p < .001, d = .68$ , had significantly lower body image satisfaction scores compared to those who were neither overweight nor obese. However, obese and overweight adolescents did not significantly differ on body image satisfaction scores,  $t(562) = 1.04, p = .298, d = .18$ . There was also a significant difference in body image satisfaction scores based on gender,  $F(1, 559) = 14.56, p < .001, \eta_p^2 = .03$ , where females had lower body image satisfaction scores ( $M = 2.11, SD = .95$ ) compared to males ( $M = 1.85, SD = .71$ ). There was also a significant interaction between weight status and gender,  $F(2, 559) = 9.85, p < .001, \eta_p^2 = .03$ . To explore the nature of the interaction effect, follow-up independent samples  $t$ -tests were performed comparing the gender means of the body image satisfaction scores at each weight status level. For adolescents who were neither overweight nor obese, females ( $M = 1.94, SD = .86$ ) had significantly lower body image satisfaction scores compared to males ( $M = 1.76, SD = .65$ ),  $t(448) = 2.58, p = .010, d = .24$ . For adolescents who were overweight, females ( $M = 3.03, SD = .92$ ) had significantly lower body image satisfaction scores compared to males ( $M = 2.02, SD = .64$ ),  $t(84) = 6.04, p < .001, d = 1.28$ . For adolescents who were obese, females ( $M = 2.75, SD = 1.04$ ) did not significantly differ in body image satisfaction scores compared to males ( $M = 2.52, SD = 1.12$ ),  $t(27) = .494, p = .625, d = .21$ . The null hypothesis was rejected.

*Null Hypothesis 9b:* There will be no significant difference in body image satisfaction, based on weight status, in the 18 to 19 year old age group.

Body image satisfaction scores were analyzed using a 3 (Weight Status) x 2 (Gender) analysis of variance. There was a significant difference in body image satisfaction scores based on weight status,  $F(2, 348) = 20.72, p < .001, \eta_p^2 = .11$ , where there was a decrease in body image satisfaction with a higher weight status. Adolescents who were normal weight had the highest body image satisfaction scores ( $M = 1.95, SD = .75$ ), followed by overweight adolescents ( $M = 2.37, SD = .88$ ), and finally obese adolescents with the lowest body image satisfaction scores ( $M = 2.89, SD = 1.09$ ). To explore the nature of the main effect, follow-up independent samples *t*-tests were performed comparing the means of the body image satisfaction scores at each weight status level. These indicated that obese adolescents,  $t(351) = 5.81, p < .001, d = 1.00$ , and overweight adolescents,  $t(351) = 3.58, p < .001, d = .51$ , had significantly lower body image satisfaction scores compared to those who were normal weight. Also, obese adolescents had significantly lower body image satisfaction scores compared to overweight adolescents,  $t(351) = 2.78, p = .006, d = .52$ . Further examination showed that an increase in body image dissatisfaction with increasing weight status was linear in nature,  $F(1, 351) (\text{Linear}) = 33.73, p < .001$ . There were no significant gender differences in body image satisfaction scores based on gender,  $F(1, 348) = 1.76, p = .185, \eta_p^2 = .005$ . Finally, there was no significant interaction between weight status and gender,  $F(2, 354) = .21, p = .807, \eta_p^2 = .001$ . The null hypothesis was rejected.

*Null Hypothesis 10a:* There will be no significant difference in self-esteem, based on weight status, in the 15 to 17 year old age group.

Self-esteem scores were analyzed using a 3 (Weight Status) x 2 (Gender) analysis of variance. There was a significant difference in self-esteem scores based on weight status,  $F(2, 1398) = 7.11, p < .001, \eta_p^2 = .01$ , where there was a decrease in self-esteem scores with a higher weight status. Adolescents who were neither overweight nor obese had the highest self-esteem scores ( $M = 20.17, SD = 2.84$ ), followed by overweight adolescents ( $M = 19.79, SD = .90$ ), and finally obese adolescents with the lowest body self-esteem scores ( $M = 19.04, SD = 3.50$ ). To explore the nature of the main effect, follow-up independent samples *t*-tests were performed comparing the means of the body image satisfaction scores at each weight status level. These indicated that obese adolescents had significantly lower self-esteem scores compared to those who were classified as neither overweight nor obese,  $t(1401) = 3.15, p = .002, d = .35$ . However, there were no significant differences between overweight and those classified as neither overweight nor obese,  $t(1401) = 1.74, p = .082, d = .18$ , and there were no significant differences in self-esteem scores between overweight and obese adolescents,  $t(1401) = 1.84, p = .066, d = .29$ . Further examination showed that a decrease in self-esteem scores with increasing weight status was linear in nature,  $F(1, 1401) (\text{Linear}) = 9.93, p = .002$ . There was also a significant difference in self-esteem scores based on gender,  $F(1, 1398) = 4.70, p = .030, \eta_p^2 = .003$ , where females had lower self-esteem scores ( $M = 19.26, SD = .25$ ) compared to males ( $M = 19.91, SD = .17$ ). Finally, there was no significant interaction between weight status and gender,  $F(2, 1398) = .72, p = .488, \eta_p^2 = .001$ . The null hypothesis was rejected.

*Null Hypothesis 10b:* There will be no significant difference in self-esteem, based on weight status, in the 18 to 19 year old age group.

Self-esteem scores were analyzed using a 3 (Weight Status) x 2 (Gender) analysis of variance. Normal weight adolescents had the highest self-esteem scores ( $M = 20.30$ ,  $SD = .274$ ) and overweight adolescents had the lowest self-esteem scores ( $M = 19.73$ ,  $SD = 3.20$ ), while the self-esteem scores of obese adolescents ( $M = 19.82$ ,  $SD = 2.75$ ) was slightly higher than overweight adolescents. However, differences in self-esteem scores based on weight status were not significant,  $F(2, 865) = 2.86$ ,  $p = .058$ ,  $\eta_p^2 = .007$ . Males scored slightly higher ( $M = 20.01$ ,  $SD = .20$ ) on the self-esteem scores compared to females ( $M = 19.90$ ,  $SD = .23$ ), although this was not a significant difference,  $F(1, 865) = .11$ ,  $p = .736$ ,  $\eta_p^2 < .001$ . The null hypothesis was not rejected.

## Chapter 5

### *Discussion*

#### *5.1 Findings*

Due to the numerous physical, emotional, situational and psychological changes that take place over the adolescent years, this study considered the 15 to 17 and 18 to 19 year old age groups separately. As such, different age-specific findings were discovered for each age group. However, it must be noted that there may be some overlap between findings for these age groups. The behaviors reported by adolescents in the 18 to 19 year old age group may have been behaviors that they exhibited when they were still in the 15 to 17 year old age group, such as reporting on condom use the last time they had sex.

This study revealed that overweight and obese adolescents from both age groups had significantly lower levels of body image satisfaction compared to those who were normal weight. For the 15 to 17 year old age group, overweight and obese females had significantly lower levels of body image satisfaction compared to overweight and obese males, while there were no significant gender differences in the 18 to 19 year old age group. This may be because levels of body image satisfaction improved with age for overweight and obese female adolescents and deteriorated with age for overweight and obese male adolescents. This study found medium to large effect sizes between weight status and body image satisfaction, with higher BMIs being associated with lower levels of body image satisfaction. This was an important finding in this study because it has

been shown in the literature that lower levels of body image satisfaction have been linked to riskier sexual behavior, often due to an inability to negotiate safe sex practices (Eisenberg et al., 2005; Gillen et al., 2006; Impett et al., 2006; Littleton, 2005; Schooler et al., 2005; Wiederman et al., 1998; Wingood et al., 2002; Yamamiya et al., 2006).

In terms of self-esteem, some findings in the literature suggest that there is an association between a higher weight status and lower levels of self-esteem, with the relationship being stronger for girls than for boys (Franklin et al., 2006; French et al., 1995; Puhl et al., 2007; Schwimmer et al., 2003; Strauss, 2000). In support of the current literature, findings from this study revealed that obese female adolescents had significantly lower levels of self-esteem in the 15 to 17 year old age group. However, there was no significant association between weight status and self-esteem in the 18 to 19 year old age group, possibly because older obese female adolescents experience less stigmatization and more acceptance with regards to their bodies. Research has shown that with age, adolescents become more accepting of body-size variations (Haines et al., 2008; Rand & Wright, 2000).

In the 15 to 17 year old age group, overweight females engaged in more risky sexual behavior as they were significantly more likely to have been diagnosed with an STI. In the 18 to 19 year old age group, obese females engaged in more risky sexual behavior as they were significantly less likely to have used a condom the last time they had sexual intercourse. The common thread that is apparent is lower levels of body image satisfaction. Overweight females in the 15 to 17 year old age group had significantly

lower levels of body image satisfaction compared to those who were neither overweight nor obese, and obese females in the 18 to 19 year old age group had significantly lower levels of body image satisfaction compared to those who were normal weight.

Adolescents with lower levels of body image satisfaction probably feel less secure, confident and comfortable in their sexual interactions and are more self-conscious about their bodies during sex (Ackard et al., 2000; Cash et al., 2004a, 2004b; Faith & Schare, 1993; Gillen et al., 2006; Trapnell et al., 1997; Wiederman, 2000). As such, these females may be less likely to refuse sexual advances and negotiate safe sexual practices (Michael, 2004), as this may prevent positive feedback that would boost their body image satisfaction (Gillen et al., 2006; Villers, 2010). For example, males are more likely to give positive feedback when a condom is not used as they view it as an obstruction to more pleasurable sex (Espinosa-Hernandez & Lefkowitz, 2009). Additionally, higher BMIs are associated with a diminished belief in a condom's ability to protect against STIs and unwanted pregnancy (Gillen et al., 2006), which may be another explanation for the increased risk in the sexual behavior of obese female adolescents in the 18 to 19 year old age group. This is strong evidence for body image satisfaction as a psychological pathway to more risky sexual behavior.

On the other hand, the only association between weight status and self-esteem occurred with obese adolescents in the 15 to 17 year old age group, where obese female adolescents experienced lower levels of self-esteem compared to those who were classified as neither obese nor overweight. However, obese female adolescents in the 15 to 17 year old age group who were sexually active were not identified as a group that

engaged in more risky sexual behavior. As such, there is no evidence to support the idea that self-esteem is a psychological pathway to more risky sexual behavior.

Across both age groups, obese female adolescents were significantly less likely to have ever had sexual intercourse compared to their normal weight peers. This is consistent with the existing literature (Averett et al., 2013; Cawley et al., 2006; Sabia & Rees, 2011; Seal et al., 2009; Ratcliff et al., 2011). Since obese adolescents are less likely to be socially engaged with their peers and more socially isolated (Strauss & Pollack, 2003; Pearce et al., 2002), opportunities for engagement in sexual intercourse are diminished (Sieving et al., 2012). Also, some studies have shown that obesity is associated with impairment in sexual function, with the impairment being more severe in women, resulting in a lack of sexual desire and difficulty with sexual functioning (Esposito et al., 2007; Kolotkin et al., 2006), which may explain why obese female adolescents were less likely to have ever had sex.

## *5.2 Conclusion*

The aim of this study was to determine if there were any direct associations between weight status and risky sexual behavior among a nationally representative sample of Canadian adolescents. The results of this study showed that obese female adolescents were less likely to have ever had sex, both in the 15 to 17 year old age group as well as the 18 to 19 year old age group. In the 15 to 17 year old age group, overweight females were more likely to be diagnosed with a sexually transmitted infection (STI) and in the 18

to 19 year old age group, obese females were less likely to have used a condom the last time they had sex and less likely to have used birth control in the past 12 months.

Overweight and obese adolescents had significantly lower levels of body image satisfaction in both age groups, while obese adolescents experienced lower levels of self-esteem in the 15 to 17 year old age group.

### *5.3 Limitations*

Since adolescent weight and height values were self-reported, these might have been under- or overestimated, which would have compromised the accuracy of the calculated BMI values. However, it has been shown that there is a strong correlation ( $r = .89$ ) between self-reported and actual values of weight and height measurements (Brenner et al., 2003; Sherry et al., 2007). The self-report nature of questions pertaining to sexual behavior relied on adolescents' ability to accurately recall and report past sexual behaviors, which may have been subject to social desirability bias. However, as far as possible, measures were put in place during the CCHS interviews to limit social desirability bias, such as asking parents to leave the room before their adolescent children were asked sensitive questions, which were subsequently delivered by using a computer aided interviewing system (CAIS). With this being said, it must be noted that differences in the computer assisted telephone interviewing (CATI) method and computer assisted personal interviewing (CAPI) method may be a potential limitation in this study. Also, although BMI and sexual behavior variables were asked of adolescents in all provinces and territories across Canada, data for body image satisfaction were only collected in

British Columbia and data for self-esteem were only collected in British Columbia and Quebec. This limits the generalizability of the findings for body image satisfaction and self-esteem to these provinces. The CCHS made use of one question to measure body image satisfaction. This complex variable could be better assessed by using a more extensive measurement tool with established levels of validity and reliability. Finally, the CCHS data are cross-sectional in design, which of course means that while associations can be identified, causal factors underlying those associations cannot be determined.

#### *5.4 Strengths*

While much attention has been given to researching adolescent overweight and obesity and its health-related consequences, equally as much attention has been given to researching the sexual behaviors and its health-related consequences in the general adolescent population. However, very little attention has been given to studying differences in the sexual behaviors of the various adolescent weight groups. To the best of my knowledge, no such study has taken place in Canada which is why the findings of this thesis fill the obvious gap that exists in the literature. This study draws on data from the Canadian Community Health Survey (CCHS), which were derived from a large, nationally representative sample of the Canadian population. Additionally, using the CCHS eliminated the potential for selection bias, and it minimized social desirability bias in adolescent responses to sensitive questions. Given that all provinces were required to gather data on height, weight and sexual behaviors of adolescents, these findings are generalizable across Canada and have nationwide implications.

### *5.5 Implications*

Given the statistically significant findings of this study, it is important to consider their implications. Overweight female adolescents in the 15 to 17 year old age group and obese female adolescents in the 18 to 19 year old age group are the most vulnerable in terms of risky sexual behavior. Additionally, both groups have also been shown to have significantly lower levels of body image satisfaction compared to their normal weight peers. Policy makers, particularly those of sex education programs in schools, school counsellors and psychologists, as well as health care professionals could benefit by being made aware of these associations.

However, it must be emphasized that due to the non-experimental nature of this study, causal links between weight status, body image satisfaction and risky sexual behavior cannot be established. As such, one should exercise caution when using the results of this study to inform intervention strategies. While this study has shown that there are relationships between these variables, conclusions cannot be drawn about the direction or time sequencing of these relationships (weight status could predict body image satisfaction and risky sexual behavior, but risky sexual behavior could also predict body image satisfaction and weight status). The presence of a third variable may explain both weight status and risky sexual behavior, so it is important that future research consider the possibility of an experimental design. Significant results from an experimental study could help shape necessary prevention and intervention strategies for vulnerable groups of adolescents.

### *5.6 Directions for Future Study*

Continued support can be provided to vulnerable adolescent groups by monitoring trends in sexual risk behavior and focussing on research that identifies ways of improving their sexual and reproductive health. While this study has revealed a number of important findings, it has also set a foundation for future research. Researchers can use the information from this study to further investigate various groups of adolescents that may be vulnerable to risky sexual behavior. A better understanding of the causes of risky sexual behavior in certain vulnerable groups will help inform prevention and intervention strategies aimed at reducing the risky behavior. Such suggestions are discussed below.

Data for body image satisfaction were only collected in British Columbia and data for self-esteem were only collected in British Columbia and Quebec in the 2009/2010 round of the CCHS. While it has been shown that there is an association between weight status and body image satisfaction for both age groups, and weight status and self-esteem in the 15 to 17 year old age group, it would be interesting to determine if there are any significant differences in the sexual risk behaviors of those adolescents who are overweight and obese based on different levels of body image satisfaction and self-esteem. This would best be done if a future round of the CCHS had more provinces and/or territories respond to the body image satisfaction and self-esteem items. Additionally, future research could also use a more extensive measurement tool with established levels of validity and reliability to measure body image satisfaction.

At the time of writing this thesis, an application had been made to the Health Analytics and Evaluation Services Department of the Newfoundland & Labrador Centre for Health Information in an effort to obtain variables that were not available in the public use microdata file (PUMF) from the CCHS. These variables included SXB\_2: Age at first Sexual Intercourse, SXB\_4: Number of Different Partners – Past 12 Months, MAM\_037: Currently Pregnant. These three variables are excellent measures of risky sexual behaviour that unfortunately could not be included in this study due to time constraints. However, future studies could draw on information from these variables to further identify differences in risky sexual behavior based on weight status.

A better understanding of why overweight and obese adolescents engage in risky sexual behavior can help inform age-appropriate intervention strategies. This study has shown that younger overweight female adolescents and older obese female adolescents engage in more risky sexual behavior. Future research could focus on what changes develop over time that lead to a decrease in the risk behavior of overweight female adolescents and an increase in the risk behavior of obese female adolescents. Future studies can also examine how differences in socioeconomic status, race/ethnicity and geographic location affect the association between weight status and risky sexual behavior. Also, additional variables can be used to include as many aspects of risky sexual behavior as possible, such as the regular use of condoms, the frequency of sexual intercourse, the risk profiles of sexual partners, the number of sexual partners, age of first sexual intercourse, current pregnancy status, participation in anal sex, participation in oral sex, and age difference of sexual

partners (since greater age differences in adolescent partners is associated with less frequent condom use (Ford et. al., 2001)).

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Tables

Table 1

Self-Reported Weight, Height and derived BMI values

Item	15 to 17 years		18 to 19 years	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Self-reported weight (kg)	65.31	14.09	70.61	14.99
Self-reported height (m)	1.710	0.944	1.720	.099
Derived BMI (kg/m <sup>2</sup> )	22.25	3.97	23.78	4.23

Notes:

N = 5 081 for the 15 to 17 year old age group and N = 3 087 for the 18 to 19 year old age group. BMI values were only calculated where both self-reported weight and height values were valid.

Table 2

Weight Status of Respondents by Gender

Sex	Neither Overweight nor Obese / Normal Weight		Overweight		Obese		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
	Male							
15 to 17	1903	72.4	538	20.5	188	7.2	2629	51.7
18 to 19	1112	69.7	341	21.4	143	9.0	1596	51.7
Female								
15 to 17	2003	81.7	333	13.6	116	4.7	2452	48.3
18 to 19	1123	75.3	253	17.0	115	7.7	1491	48.3

Table 3

Weight Status of Respondents Aged 15 to 17 by Province/Territory								
Province/Territory	Neither Overweight nor Obese		Overweight		Obese		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
	Newfoundland & Labrador	105	62.9	41	24.6	21	12.6	167
Prince Edward Island	64	78.0	9	11.0	9	11.0	82	1.6
Nova Scotia	149	71.3	43	20.6	17	8.1	209	4.1
New Brunswick	120	75.5	30	18.9	9	5.7	159	3.1
Quebec	690	81.6	116	13.7	40	4.7	846	16.7
Ontario	1414	76.5	324	17.5	111	6.0	1849	36.4
Manitoba	200	76.0	52	19.8	11	4.2	263	5.2
Saskatchewan	215	72.4	61	20.5	21	7.1	297	5.8
Alberta	393	79.9	79	16.1	20	4.1	492	9.7
British Columbia	450	79.6	86	15.2	29	5.1	565	11.1
Yukon, Northwest Territories or Nunavut	106	69.7	30	19.7	16	10.5	152	3.0
<b>Total</b>	<b>3906</b>	<b>76.9</b>	<b>871</b>	<b>17.1</b>	<b>304</b>	<b>6.0</b>	<b>5081</b>	<b>100.0</b>

Table 4

Weight Status of Respondents Aged 18 to 19 by Province/Territory								
Province/Territory	Normal Weight		Overweight		Obese		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Newfoundland & Labrador	51	54.8	26	28.0	16	17.2	93	3.0
Prince Edward Island	20	52.6	14	36.8	4	10.5	38	1.2
Nova Scotia	60	69.8	16	18.6	10	11.6	86	2.8
New Brunswick	76	68.5	26	23.4	9	8.1	111	3.6
Quebec	404	78.1	80	15.5	33	6.4	517	16.7
Ontario	784	71.7	213	19.5	97	8.9	1094	35.4
Manitoba	120	71.9	38	22.8	9	5.4	167	5.4
Saskatchewan	149	73.4	34	16.7	20	9.9	203	6.6
Alberta	240	72.1	66	19.8	27	8.1	333	10.8
British Columbia	270	76.3	57	16.1	27	7.6	354	11.5
Yukon, Northwest Territories or Nunavut	61	67.0	24	26.4	6	6.6	91	2.9
<b>Total</b>	<b>2235</b>	<b>72.4</b>	<b>594</b>	<b>19.2</b>	<b>258</b>	<b>8.4</b>	<b>3087</b>	<b>100.0</b>

Table 5

Item	Sexual Behaviors of Respondents			
	15 to 17 years		18 to 19 years	
	Yes		Yes	
	<i>n</i>	%	<i>n</i>	%
Ever had sexual intercourse	1682	34.0	2158	71.6
Had sexual intercourse in the past 12 months	1513	90.6	1957	92.2
Used a condom the last time had sexual intercourse	1213	81.1	1347	72.2
Usually use birth control in the past 12 months	1191	81.2	1646	86.4
Birth control method used last time: nothing	16	1.4	21	1.3
Ever been diagnosed with an STI	35	2.1	75	3.5

Notes:

N = 4953 for 15 to 17 year old age group and N = 3012 for 18 to 19 year old age group; Responses coded as 'don't know', 'refusal' or 'not stated' were considered as missing values and excluded; Percents refer to valid percents. After the first item, questions were only asked of those who reported that they ever had sexual intercourse.

Table 6

Item	Attitudes of Respondents towards avoiding Pregnancy			
	15 to 17 years		18 to 19 years	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Important to avoid getting pregnant	1.22	.467	1.29	.656
Important to avoid getting partner pregnant	1.27	.660	1.32	.668

Notes:

Range = 1 (Strongly Agree), 2 (Agree), 3 (Neither Agree nor Disagree), 4 (Disagree), to 5 (Strongly Disagree); First item asked of female respondents with N = 780 for the 15 to 17 year old age group and N = 929 for the 18 to 19 year old age group. Second item asked of male respondents with N = 670 for the 15 to 17 year old age group and N = 929 for the 18 to 19 year old age group. Responses coded as 'don't know', 'refusal', 'not stated', 'doesn't have a partner right now', or 'partner already pregnant' were considered as missing values and excluded.

Table 7

Body Image Satisfaction Scores of Respondents		<i>M</i>	<i>SD</i>
Item			
Adolescents aged 15 to 17		1.99	.864
Adolescents aged 18 to 19		2.07	.855

Notes:

Range = 1 (Very Satisfied), 2 (Satisfied), 3 (Neither Satisfied nor Dissatisfied), 4 (Dissatisfied), to 5 (Very Dissatisfied); Body image satisfaction item was only asked of respondents in British Columbia. In the 15 to 17 year old age group, N = 629 and in the 18 to 19 year old age group N = 388. Responses coded as 'don't know', 'refusal' or 'not stated' were considered as missing values and excluded.

Table 8

Item	Self-Esteem Scores of Respondents			
	15 to 17 years		18 to 19 years	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Has good qualities	1.67	.553	1.65	.558
Is a person of worth	1.65	.652	1.60	.583
Is able to do things well	1.67	.675	1.61	.609
Takes positive attitude towards self	1.78	.716	1.76	.720
Satisfied with self	1.73	.646	1.74	.643
Feels is a failure	4.48	.724	4.51	.674
<b>Overall self-esteem score</b>	<b>19.98</b>	<b>2.948</b>	<b>20.14</b>	<b>2.865</b>

Notes:

Range = 1 (Strongly Agree), 2 (Agree), 3 (Neither Agree nor Disagree), 4 (Disagree), to 5 (Strongly Disagree); Feels is a failure was reversed scored. Self-esteem items were only asked of respondents in British Columbia and Quebec, N = 1514 for the 15 to 17 year old age group and N = 994 for the 18 to 19 year old age group. Responses coded as 'don't know', 'refusal' or 'not stated' were considered as missing values and excluded. An overall self-esteem score was not calculated if responses to any of the items were coded as 'don't know', 'refusal' or 'not stated'.

Table 9

Correlations between Age, BMI, Body Image Satisfaction, and Self-Esteem

Measure	1	2	3	4	5
1. Age	1				
2. BMI (12 to 17)	a	1			
3. BMI (18 to 19)	a	a	1		
4. Body Image Satisfaction	.044	.288*	.299*	1	
5. Self-Esteem	.027	-.091*	-.050	-.443*	1

Notes:

\*. Correlation is significant at the .01 level (2-tailed)

a. Cannot be computed because at least one of the variables is constant

*Appendices*

Appendix 1

CCHS Groupings and Coding for Age

<b>Grouping</b>	<b>Code</b>
12 to 14 years	1
15 to 17 years	2
18 to 19 years	3
20 to 24 years	4
25 to 29 years	5
30 to 34 years	6
35 to 39 years	7
40 to 44 years	8
45 to 49 years	9
50 to 54 years	10
55 to 59 years	11
60 to 64 years	12
65 to 69 years	13
70 to 74 years	14
75 to 79 years	15
80 years or more	16

## Appendix 2

### CCHS Groupings and Coding for Height

<b>Grouping</b>	<b>Code</b>
1.257 to 1.282 metres	1.270
1.283 to 1.307 metres	1.295
1.308 to 1.307 metres	1.321
1.334 to 1.358 metres	1.345
1.359 to 1.383 metres	1.372
1.384 to 1.409 metres	1.397
1.410 to 1.434 metres	1.422
1.435 to 1.460 metres	1.448
1.451 to 1.485 metres	1.473
1.486 to 1.510 metres	1.499
1.511 to 1.536 metres	1.524
1.537 to 1.561 metres	1.549
1.562 to 1.587 metres	1.575
1.588 to 1.612 metres	1.600
1.613 to 1.637 metres	1.625
1.638 to 1.663 metres	1.651
1.664 to 1.688 metres	1.676
1.689 to 1.714 metres	1.702
1.715 to 1.739 metres	1.727
1.740 to 1.764 metres	1.753
1.765 to 1.790 metres	1.778
1.791 to 1.815 metres	1.803
1.816 to 1.841 metres	1.829
1.842 to 1.866 metres	1.854
1.857 to 1.891 metres	1.880
1.892 to 1.917 metres	1.905
1.918 to 1.942 metres	1.930
1.943 to 1.968 metres	1.956
Refusal / Not Applicable	9.996
Not Stated	9.999

### Appendix 3

International cut-off points for body mass index for overweight and obesity by sex between 2 and 18 years, defined to pass through body mass index of 25 and 30 kg/m<sup>2</sup> at age 18, obtained by averaging data from Brazil, Great Britain, Hong Kong, Netherlands, Singapore and the United States.

Age (years)	Body mass index 25 kg/m <sup>2</sup>		Body mass index 30 kg/m <sup>2</sup>	
	Males	Females	Males	Females
2	18.41	18.02	20.09	19.81
2.5	18.13	17.76	19.80	19.55
3	17.89	17.56	19.57	19.36
3.5	17.69	17.40	19.39	19.23
4	17.55	17.28	19.29	19.15
4.5	17.47	17.19	19.26	19.12
5	17.42	17.15	19.30	19.17
5.5	17.45	17.20	19.47	19.34
6	17.55	17.34	19.78	19.65
6.5	17.71	17.53	20.23	20.08
7	17.92	17.75	20.63	20.51
7.5	18.16	18.03	21.09	21.01
8	18.44	18.35	21.60	21.57
8.5	18.76	18.69	22.17	22.18
9	19.10	19.07	22.77	22.81
9.5	19.46	19.45	23.39	23.46
10	19.84	19.86	24.00	24.11
10.5	20.20	20.29	24.57	24.77
11	20.55	20.74	25.10	25.42
11.5	20.89	21.20	25.58	26.05
12	21.22	21.68	26.02	26.67
12.5	21.56	22.14	26.43	27.24
13	21.91	22.58	26.84	27.76
13.5	22.27	22.98	27.25	28.20
14	22.62	23.34	27.63	28.57
14.5	22.96	23.66	27.98	28.87
15	23.29	23.94	28.30	29.11
15.5	23.60	24.17	28.60	29.29
16	23.90	24.37	28.88	29.43
16.5	24.19	24.54	29.14	29.56
17	24.46	24.70	29.41	29.69
17.5	24.73	24.85	29.70	29.84
18	25	25	30	30