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Towards gender-sensitive health promotion strategies:

Understanding the barriers and enablers of health promoting attitudes and behaviors among secondary school students in Abu Dhabi

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ABSTRACT

Objective: The present study seeks to explore the environmental, psychosocial and gender-specific needs of Emirati students as it concerns their capacity to adopt health promoting attitudes and behaviors. **Methods:** Using a cross-sectional mixed-methods design, the health behavior and gender-specific needs of Grade 12 secondary school students in the Emirate of Abu Dhabi (N=152) were assessed with a Student Health Promotion Questionnaire (SHPQ) and Focus Group Discussions (FGDs), as well as, through FGDs with school staff (N=75). Probabilistic models were created to analyze the factors explaining students' adoption of healthy eating (HE) and physically active (PA) behaviors using polytomous and binary logistic regressions. FGDs were analyzed using the framework analysis approach and were then used to create systemic maps explaining gender-sensitive health behavior adoption processes. **Results:** In adjusted analysis, HE behavior adoption was explained by age (OR: 0.35; 95% CI: 0.18-0.70), healthy eating scores (OR: 8.37; 95% CI: 2.23-31.50), intention to maintain weight (OR: 12.43; 95% CI: 2.26-68.35) and self-perceived ability to manage problems (OR: 3.92; 95% CI: 1.47-10.50). In turn, PA behavior adoption was explained by intention to gain (OR: 8.72; 95%CI: 1.53-49.56) and maintain weight (OR: 4.98; 95% CI: 1.04-23.78), annual weighting and measuring (OR: 4.77; 95% CI: 1.18-19.25) and self-perceived opportunity to participate in extracurricular school activities (OR: 5.63; 95% CI: 1.88-16.85). FGDs revealed relevant gender differences in (1) attitudes towards health and health promotion, (2) health beliefs and behaviors, (3) health issues and concerns, and (4) barriers and enablers of behavior adoption. **Conclusion:** This study provides evidence of behavior adoption correlates among adolescent Emirati students and reveals significant gender differences in healthy eating, physical activity and health protective factors. The results highlight the need for culturally appropriate, gender-responsive and evidence-based school health promotion interventions targeting the environmental and psychosocial needs of Emirati students.

Keywords

Health promotion, School, Gender-sensitive, Psychosocial, Physical activity, Healthy Eating

RESUME

Objectif: La présente étude vise à explorer les besoins psychosociaux, spécifiques au genre et liés à l'environnement des étudiants émiratis dans la mesure où ils concernent leur capacité à adopter des attitudes et comportements de promotion de la santé. **Méthodes:** Dans une approche méthodique mixte et transversale, les comportements en matière de santé et les besoins spécifiques au genre des étudiants de terminale de l'Emirat d'Abu Dhabi (N=152) ont été évalués par le biais d'un Questionnaire de Promotion de la Santé des Etudiants (QPSE) et de discussions thématiques de groupe (DTG), ainsi que par des DTG avec le personnel scolaire (N=75). Des modèles probabilistes ont été déployés afin d'analyser les facteurs explicatifs de l'adoption de comportements d'alimentation saine (AS) et d'activité physique (AP), à l'aide de régressions logistiques binaire et multinominale. Les DTG ont été analysées en utilisant une approche analytique de cadre puis utilisées par la suite pour créer des cartographies systémiques expliquant le processus d'adoption de comportements de santé sensibles au genre. **Résultats:** Dans l'analyse ajustée, l'adoption d'un comportement d'alimentation saine s'explique par l'âge (OR: 0.35; 95% IC: 0.18-0.70), des évaluations d'une alimentation saine (OR: 8.37; 95% IC: 2.23-31.50), l'intention de maintenir son poids (OR: 12.43; 95% IC: 2.26-68.35) et un sentiment propre de capacité à gérer des problèmes (OR: 3.92; 95% IC: 1.47-10.50). En outre, l'adoption d'un comportement d'activité physique s'explique par l'intention de gagner (OR: 8.72; 95% IC: 1.53-49.56) puis de maintenir son poids (OR: 4.98; 95% IC: 1.04-23.78), des mesures du poids et de la taille annuelles (OR: 4.77; 95% IC: 1.18-19.25) et l'opportunité propre de prendre part à des activités extrascolaires (OR: 5.63; 95% IC: 1.88-16.85). Les DTG ont révélé des différences pertinentes entre les genres dans (1) les attitudes à l'égard de la santé et de sa promotion, (2) les croyances et comportements individuels (3) et les enjeux et préoccupation en matière de santé, et (4) les barrières et catalyseurs d'adoption de comportements. **Conclusion:** Cette étude apporte la preuve de corrélats entre les étudiants adolescents émiratis dans l'adoption de comportements et révèle des différences significatives entre les genres dans l'alimentation saine, l'activité physique et les facteurs de protection liés à la santé. Les résultats soulignent la nécessité d'interventions à l'école en faveur de la promotion de la santé, qui soient appropriées culturellement, sensibles aux différences entre les genres et fondées sur les faits, en ciblant les besoins psychosociaux et reliés à l'environnement des étudiants émiratis.

Towards gender-sensitive health promotion strategies:

Understanding the barriers and enablers of health promoting attitudes and behaviors among secondary school students in Abu Dhabi

BACKGROUND

Countries worldwide are experiencing an increasing trend in the prevalence of chronic diseases like diabetes, obesity, cardiovascular diseases and cancers (Centers for Disease Control and Prevention, 2010; Flegal et al., 2010; Ghafoor et al., 2003; Hassan et al., 2009; Malik and Razig, 2008; Saadi et al., 2007; Sheik-Ismail et al., 2008). Environmental and lifestyle factors have been identified as strong contributors to these diseases (Boffetta et al., 2010; Booth et al., 2007; Ignarro et al., 2006; Warburton et al., 2006; Wong et al., 2011; Zhang et al., 2010). Among these, both physical activity and dietary habits have been shown to significantly impact overall health status and quality of life (Drenowski et al., 2001; Kennedy, 2006), as well as, play an important synergistic role in the prevention, delay and reduction of lifestyle-related chronic disease conditions (Gonzalez and Riboli 2010; Retelny et al., 2008; Sobieszczańska et al., 2009).

In Middle Eastern countries, particularly the United Arab Emirates (UAE), large shifts in dietary behavior and physical activity patterns are increasingly reflected on detrimental nutritional and health outcomes (Sibai et al., 2010; Galal, 2003). This is especially alarming among children and youth. A study conducted in the UAE, found that, at age 10, boys had 1.7 times, and girls 1.8 times, the rate of overweight compared to international standards (Al-Haddad et al., 2005). Moreover, Al-Haddad et al. found that, at age 14, the child obesity rates rose to 2.3 folds for boys and girls, and increased to 3.6 times the international standards for boys and 1.9 times for girls aged 18 (2005). In par, recent studies confirm very high prevalence of overweight and obesity among the UAE school children population (bin Zaal et al., 2009; Malik and Bakir, 2007). This is particularly relevant when considering the accretion of studies revealing that health-impairing behaviors adopted during childhood and young adulthood, including sedentary lifestyle and detrimental dietary intake, predict elevated risks of chronic disease mortality and morbidity in adulthood (Baker et al., 2007; Kvaavik et al., 2009; Lawlor, 2006; McCarron, 2003) and condition health behaviors later in life (Han et al., 2010; Limbers et al., 2008). It is therefore critical that health-impairing behaviors, such as physical inactivity and poor diet, be addressed in this region at the earliest stage possible as a way to prevent and significantly reduce the prevalence of risk factors associated with chronic disease. This further highlights the necessity for health promotion in the UAE to move forward with large-scale prevention by enhancing the environments that support youth health and strengthening the design of strategies that enable younger generations to lead healthier lives.

The case for school-based health promotion

The World Health Organization (WHO) defines health promotion as the 'process of enabling people to increase control over, and to improve, their health' (1986). In this regard, its overall purpose is to enable individuals to realize their aspirations, satisfy their needs and enhance their physical and social environments in a way that promotes health (Mittelmark et al. 2008). The nuanced understanding that environments play an important role in determining health outcomes, offers a unique opportunity to target health promoting actions in the settings where people live, learn, work and play. Thus, health promotion effectively moves beyond the scope and responsibility of the health sector, while building intersectoral capacity to create environments that promote and maintain healthy living. As such, the education sector is increasingly recognized for its potential to create conditions that are conducive to health and wellbeing while reducing the prevailing health concerns of the population (WHO, 1998).

In the context of health promotion, schools are well positioned to foster healthy lifestyles in youth. They have been shown to represent the most effective and efficient setting to target the health of large portions of the population, as school-based initiatives not only reach the students, but also their families and communities (WHO, 2003a; 2003b). In fact, the positive contribution of schools as loci for health promotion and disease prevention, with respect to physical activity and healthy diet programming has been examined extensively (Bayne-Smith et al., 2004; Carrel et al., 2005; Knox et al., 2009; Manios et al., 1999; Reed et al., 2008; Warren et al., 2003). These studies have pointed to the cost-effectiveness of school-based strategies as a way to combat chronic disease risk factors in young adulthood through physical activity and healthy eating.

Furthermore, systematic reviews and studies evaluating the health outcomes of school-based health promoting programs have found apparent benefits to the social and physical environment of the schools, as well as, benefits relating to dietary behavior and physical fitness among students (Gadin and Hammarstrom, 2000; Stewart-Brown, 2006). Evaluation studies have demonstrated the positive impact of school regulatory and physical environments on the adoption of health-promoting behaviors among youth (Barnett et al. 2006; WHO, 2007; Jaime and Lock, 2009). However, most studies use a conventional approach to assess the capacity of schools to promote adolescent health, which consists mainly of examining the health effects of curricular health education and the programmatic aspects of extracurricular activity (Knox et al., 2009; Martinez Vizcaino et al., 2008; Nakamura, 2008; Reed et al., 2008).

These studies demonstrate compelling evidence of the individual level health effects of school-based health promoting interventions. However, there is a growing need to complement previous

findings by elucidating the reasons why certain programs are better equipped for success than others. Thereupon, understanding why they are able to reach some students and not others. For this reason, it is imperative to consider alternative ways through which differences in individual exposure to health protective factors, as well as, social vulnerability to health risks could lead to significant differences in an adolescent's capacity to adopt health-enhancing behaviors. In this regard, it is becoming increasingly relevant to understand the underlying factors determining the capacity of programs to reach students, influence the adoption of healthy attitudes and behaviors and ultimately impact health.

The emerging need for gender-sensitive health promotion

The effectiveness of school-based health promoting initiatives has been evidenced widely. However, the literature increasingly demonstrates differential health effects due to gender (Doyal, 2001; Shepherd et al., 2002). Gender differences in cause-specific morbidity and exposure to risk factors and protective behaviors have been broadly corroborated (Simen-Kapeu and Veugelers, 2010; Davidson et al., 2006; Ostlin et al., 2007). Research on gender as a determinant of health has become increasingly important due to the growing recognition that the differential social roles and status that are assigned to women and men greatly influence their experience of health and illness. As a multi-faceted construct, the predictive power of gender on health outcomes may be explained by differences in lifestyle choices, decision-making power, health-seeking behavior, and access to resources that protect health (Interagency Working Group on Gender and WHO, 2005).

In particular, recent studies have paid closer attention to the gender etiology of overweight and obesity among adolescents (Krieger, 2003; Sweeting, 2008). Current studies have demonstrated gender differences regarding the behavioral determinants of overweight (Al Sabbah et al., 2007; Caine-Bish and Scheule, 2009; Galloway, 2007; Lorson et al., 2009) and physical and sedentary activities (De Cocker et al, 2010; Hoelscher et al., 2009; Kirchengast and Marosi, 2008; Irving et al., 2003). Girls were shown to prioritize dietary behavior as a way to influence health and meet nutritional recommendations, while boys reportedly ate less nutritious foods (Galloway, 2007; Lorson et al., 2009). Other studies have consistently demonstrated that adolescent girls have significantly lower levels of physical activity, fewer active role models, more barriers and lower perceived benefits to physical activity compared to boys (Hoelscher et al., 2009; Kirchengast and Marosi, 2008; Irving et al., 2003).

These findings suggests that gender-sensitive health promotion and disease prevention would be necessary to ultimately impact the potential for success and increased efficiency of school health promoting strategies. In an attempt to better understand the implications of the gender construct for health promotion and disease prevention, further research has began to elucidate the complex

role that gender plays in the adoption of health-enhancing behaviors. Among them, Davidson et al. argue in favor of incorporating psychological, social, cultural, educational and economic indicators that are known to differentiate based on gender, and not merely biological sex, as a way to explain the differential health-seeking behaviors between men and women (2006). In fact, the current state of knowledge, as it regards the effect of gender on health, is moving further into a discussion of the latent gendered mechanisms that shape the way women and men realize their health potential (Krieger, 2003). It follows that, health promotion programs that incorporate a nuanced understanding about gender-health dynamics will be more likely to influence behaviors, as well as, positively impact social and built environments in ways that are conducive to health.

Indeed, consideration of gender-differentials in the practice of health promotion could potentially impact the effectiveness and reach of interventions (Simen-Kapeu and Veugelers, 2010). Notwithstanding growing evidence to suggest that integrating gender into health promoting interventions could have a positive effect on health outcomes across various domains (Bloom and Arnoff, 2011; IWGG and WHO, 2005), there is marked paucity of studies that examine the gender differentials in adoption of health promoting behaviors among adolescents. In fact, many health promotion programs are gender blind (Ostlin et al., 2007). Gender blindness in the planning and implementation of interventions may, in turn, lead to the misallocation of scarce health resources and ultimately hinder the potential for success.

Despite a thorough review of the Arabic and English health literature, no relevant studies were found on the effects of gender on health outcomes nor on gender-sensitive approaches to health promotion policies and programs in the UAE. Moreover, all studies identified so far concerning gender differentials in barriers and enablers of health promoting behaviors have been conducted in Western countries (Sweeting, 2008; Krieger, 2003; Munakata et al., 2010). This further explains the lack of knowledge translation about gender differences in health into the planning of health promotion interventions in the UAE. Considering that programs that address gender-related barriers to healthy attitudes and behaviors are better positioned to impact health than those that ignore these differences, the current state of school health promotion in the country may be limiting the capacity of students to attain health.

Understanding the needs of Emirati students

Indeed, school-based interventions in the UAE aimed at ensuring supportive environments, healthy lifestyles and community participation would need to address the gender differences in barriers and enablers of health promoting behaviors between female and male students. Notwithstanding the relevance of applying a gender-sensitive approach to health promotion, more is needed in order to progress student health. In parallel to exploring the gender-specific needs of students,

health promotion research must also seek to reveal students' global needs with regards to enhancing their capacity to take control over, and improve their health.

Much research has targeted the associations between health protective factors, such as self-efficacy, self-esteem and pro-social involvement, and adolescents' ability to adopt healthy attitudes and behaviors (Bauman et al., 2002; Dzewaltowski et al., 2002; Sallis et al., 2000). The current state of knowledge on physical activity is replete with evidence of cross-sectional correlations between a diversity of individual and environmental variables and levels of physical activity (Bauman et al., 2002; Bebetsos et al., 2002; Norman et al., 2005). On the other hand, research on correlates of dietary behavior has focused on elucidating the paths linking healthy eating with self-efficacy and role modeling, among other psychosocial factors (Saksvig et al., 2005; Strachan and Brawley, 2009). In addition, some studies have pointed the need to create models that help explain multi-level correlates of healthy behaviors (Owen et al. 2000; Sallis and Owen, 1999), including healthy eating and physical activity.

Conversely, until now research on the correlates of dietary and physical activity behavior in the context of Middle Eastern countries remains scarce (Shuval et al., 2009). As it relates to the environment of school health promotion in the UAE, the lack of knowledge about healthy behavior correlates relevant to Emirati students hinders a complete understanding of the factors that lie at the root of healthy behavior adoption. In particular, it is exceedingly important to have a clearer, and culturally appropriate, picture of the psychosocial correlates of healthy eating and physical activity among Arab youth. Psychosocial variables could be necessary to complete effect links between a health-promoting environment and adoption of health enhancing behaviors (Sallis and Fotheringham, 2000). Hence, psychosocial correlates could be of utmost relevance in understanding 'the reasons why young people engage or fail to engage' with school health promoting programs addressing healthy eating and physical activity (Knox et al., 2009).

Determining the correlates of health-enhancing behavior adoption among Emirati adolescent students is the first step in understanding the mechanisms that influence healthy eating and physical activity, which can then be incorporated into evidence-based school health promotion interventions (Bauman et al., 2002). The literature highlights the potential benefits of going beyond conventional approaches when assessing the capacity of schools to promote health, and digging deeper to understand the mechanisms through which interventions exert their effects on student health. Indeed, school-based health promoting interventions in the UAE can be systematically improved only via a better understanding of the environmental and psychosocial reasons behind their successes and failures.

Purpose

In this context, the present study seeks to explore the environmental and psychosocial needs of secondary school students in the Emirate of Abu Dhabi with regards to enhancing their capacity to adopt healthy eating and physical activity behaviors. In parallel, we aim to understand the gender-specific needs of female and male Emirati students, considering their gendered differences in perceived barriers and enablers of health promoting attitudes and behaviors. By understanding what lies at the root of adoption of health-enhancing behaviors among secondary school students, our research has the capacity to inform health and educational institutions about the potential benefits of designing health-promoting school environments that respond to the specific needs of students. Indeed, it is hoped that this work will lead to more culturally appropriate, evidence-based and effective school-based health promoting interventions in the future. Ultimately, our research may influence policies at the intersection of health and education and impact the ways through which schools can become loci for health promotion and disease prevention in the UAE.

This paper reports on a mixed methods study with the specific aims to: (1) examine associations between health protective factors, adoption of health-enhancing behaviors, healthy eating and physical activity among secondary school students in Abu Dhabi, (2) explain their likelihood to adopt healthy eating and physical activity behaviors using known psychosocial, health protective correlates, (3) explore their gender-specific barriers and enablers of health promoting attitudes and behaviors, (4) identify gender-specific priority areas for health promoting school environments, (5) describe how gender-specific differences shape female and male students' perceptions of heath-promoting action and determine their willingness to adopt healthy attitudes and behaviors, and (6) recommend school-based health promoting strategies for the Emirate of Abu Dhabi that could better target students' needs.

METHODS

Study Design

A cross-sectional, mixed-methods study was conducted during the months of April, May and June 2012 with a sample of Grade 12 students, teachers, nurses, social workers and school staff from 8 secondary, non-coeducational, government schools in the city of Al Ain. Data was collected using a Student Health Promotion Questionnaire (SHPQ) and focus group discussions (FGDs). The SHPQ was administered once and it assessed students' physical activity, dietary behavior and health protective indicators. The FGDs assessed gender-specific barriers and enablers to physical activity and healthy eating.

Ethical Approval

The Al Ain Medical District Human Research Ethics Committee (AAMDHREC) reviewed and approved this study. Following the Committee's approval, the Abu Dhabi Education Council (ADEC) approved our research proposal, and provided its support by granting permission to carry out the study in the schools' premises. Signed informed consent was obtained from all participants prior to the start of the study.

Selection of Schools

Eight government, non co-educational secondary schools were randomly selected. The investigator searched for female and male schools through ADEC's School Finder portal using the following criteria: (1) Region: Al Ain, (2) Location: All, (3) Type: Public, (4) Gender: Female/Male, (5) Grade: 12. The portal produced 22 male schools and 18 female schools matching these criteria. Seven new schools were excluded because it was deemed that potential participants from these schools would not have had sufficient time to engage with the health promoting activities of their respective schools. The remaining schools were listed in alphabetical order and assigned a number from 01 to 20 (male schools) and 01 to 13 (female schools). Using Excel™, eight random numbers were produced and matched to the ordered lists of female and male schools. The male schools that were selected were: Al Ain School, Al Ma'haad Al Islami, Khaled Bin Al Waleed and Khalifa Bin Zayed. The selected female schools were: Al Naeem, Al Zayediyyah, Um Al Emarat and Um Kolthoom.

Participants

Students

One hundred and fifty two students were recruited from the selected secondary schools: 78 female students and 74 male students. A sub-sample of 90 students (approximately 8 to 14 per school) was selected from the 152 to participate in FGDs. The methodology for sampling was non-probability ad hoc quota. The criteria for inclusion were: (1) the student is enrolled in Grade 12 at one of the eight secondary schools, and (2) he/she is available and willing to complete the SHPQ and/or participate in a FGD. Students were excluded from participating if they were enrolled in Grade 11 or under.

School staff

Using purposive non-probability expert sampling, 75 school staff members, namely teachers, nurses and social workers, were recruited from the same secondary schools as the students to participate in FGDs (approximately 4 to 13 per school). Hence, recruitment focused only on school

staff members with knowledge and expertise regarding health-promoting activities at their respective schools. The criteria for inclusion were: (1) the staff worked at the school for at least 2 years, (2) he/she has taken part in planning, organizing, and/or implementing health promoting activities at his/her school, and (3) he/she is available and willing to participate in a FGD. Staff members were excluded from participating if they had worked at the school for less than 2 years and did not have expertise on health promotion at their school.

Instruments

The Student Health Promotion Questionnaire (SHPQ)

The SHPQ is a self-administered, 52-item questionnaire consisting of 3 main components: dietary behavior (13 items) physical activity (9 items), and protective factors (30 items). For the complete questionnaire, see Appendix A. The dietary behavior and physical activity components were adapted from the Global School Based Student Health Survey (GSHS)'s core expanded questionnaire, which was developed by the WHO and the Centers for Disease Control and Prevention (CDC) (2009). The protective factors component consists of 3 sections: (1) pro-social involvement, (2) self-efficacy, and (3) self-esteem. The pro-social involvement section is based on the Communities That Care (CTC) Youth Survey (Pollard, et al., 1996). Ten questions from the CTC youth survey concerning community and school pro-social involvement were added to the SHPQ. The self-efficacy section consists of 14 questions from the General Self Efficacy (GSE) Scale, which has been widely used as a psychometric instrument for high school students (Schwarzer and Jerusalem, 1995). The self-esteem section consists of 6 questions extracted from the Rosenberg's Self Esteem Scale, which was originally developed for high school students and has been validated by numerous studies (Rosenberg, 1965).

Focus Group Discussions (FGDs)

Sixteen FGDs were conducted: 2 for each school, one involving students and the other involving school staff. Appendix B.1 and B.2 contain the complete guides used to facilitate the discussions with students and school staff, respectively. Each FGD was at least one hour in duration and was voice recorded. The participants were free to speak both in English and in Arabic. Two research assistants, native Arab-speakers, translated the sections of the FGDs where Arabic was spoken. During the Student FGDs, the participants were asked about: (a) the meaning they attach to health and health promotion, (b) their perceived barriers and enablers of health promoting attitudes/behaviors, (c) the health issues that they consider to be important, (d) how they perceive the health promoting actions at their schools, (e) whether they adopt the healthy behaviors promoted by these actions, and (f) how could these health promoting actions be enhanced. During the Staff FGDs, the participants were asked to discuss: (a) the barriers and enablers of health

promoting activities at their schools, (b) recommendations for health promoting actions, and (c) future directions regarding the design of strategies to promote healthy behavior among students.

Data Analysis

Statistical Analysis

Statistical analysis proceeded in several stages. First, Chi-squared and Fischer's exact tests were used to examine differences in (1) dietary behavior, (2) physical activity and (3) health protective indicators, as well as, (4) likelihood to adopt HE and PA behaviors, between female and male students. These tests were also used to determine differences in health protective factors by HE and PA score tertiles, as well as, by degree of likelihood to adopt HE and PA behaviors. Second, Kruskal-Wallis and One-Way Analysis of Variance (ANOVA) were used to explore associations between (1) pro-social involvement, (2) self-efficacy and (3) self-esteem scores and adoption of HE and PA behaviors. Bonferroni correction was used to make post-hoc comparisons between categories. Third, Spearman Rank and Pearson Correlations were used to examine inter-score associations between health protective factors[1], healthy eating, physical activity and general health. Appendix C.1 and C.2 provide information on how the healthy eating and physical activity score were calculated. Fourth, healthy eating scores were regressed against (1) demographic indicators, (2) health protective scores, (3) health education items and, (4) likelihood to adopt HE behavior, using simple and multivariate linear regression. The assumption of normality was tested with the Shapiro-Wilk test. Homogeneity of the variances across tertiles of the health eating score was tested through the Bartlett's test. Linearity of healthy eating scores was assessed using a scatterplot. Fifth, tertiles of physical activity scores were regressed on (1) demographic indicators, (2) health protective scores, (3) health education items and, (4) likelihood to adopt PA behavior, using polytomous bivariate logistic regression. Explanatory variables with a p-value lower than 0.20 were pre-selected and added to the adjusted analysis. Finally, dichotomized HE and PA behavior adoption (low vs. high) were regressed against (1) demographic, (2) weight-related, and (3) health protective indicators using crude and adjusted binary logistic regression. Adjusted models' goodness-of-fit was measured using Pearson chi-squared tests. All reported P values were based on two-sided tests and compared to a significance level of 0.05. Logistic regression coefficients were used to estimate odds ratios. Odds ratios (OR) and 95% confidence intervals (CI) are reported. Stata version 11.0 was used throughout the analyses.

Framework Analysis

The FGDs were coded and analyzed using the framework analysis approach (Rabiee, 2004). First, the researcher listened to the tapes and read the transcripts in its entirety several times prior to

[1] A pro-social involvement score ranging from 0 to 30, a self-efficacy score ranging from 0 to 56 and a self-esteem score ranging from 0 to 18, were computed by adding together the scores of each of their respective items.

breaking them into parts, with the aim of immersing into the details and identifying the main themes. Second, thematic frameworks were identified consisting of common concepts emerging from the transcripts. These were then developed into categories. Third, quotes from each discussion were highlighted, sorted and indexed, in order to allow for comparisons between FGDs. Fourth, the quotes were lifted from their original context, compared, contrasted and re-arranged into the categories previously identified. At this stage, data was significantly reduced by cutting and pasting similar quotes together. Finally the main themes, categories and concepts were mapped as a way to make sense of individual quotes and illustrate relationships between ideas. The thematic maps were developed using these criteria: frequency of the ideas, internal consistency of main themes, and intensity/extensiveness of comments. A systems thinking approach was then used to create maps that explained healthy behavior adoption among female and male students. A month after the FGDs had taken place, the researcher visited the eight schools and validated the maps with the help of the students and staff.

RESULTS

Student Health Promotion Questionnaire (SHPQ)

One hundred and fifty-two students completed the SHPQ: 78 girls and 74 boys. The majority of students reported having very good (43.4%) and good (48%) general health, whereas few students reported having fair (5.9%) and very bad (2.6%) health. Most of the students had spent from 1 to 4 years at their respective schools (67.1%), followed by 5 to 10 years (16.5%), less than one year (13.8%) and more than 10 years (2.6%). The most predominant nationalities among the students were Emirati (55.9%) and Middle Eastern North African (MENA) (40.8%).

Chi-squared and Fischer's Exact tests revealed marked differences in healthy eating, physical activity and health protective factors between female and male students. No significant gender differences were found in likelihood to adopt HE or PA behavior. Regarding dietary behavior, the significant gender differences to note are in breakfast consumption ($p=0.027$), daily consumption of foods that are high in fats ($p=0.048$) and daily consumption of fruits and vegetables ($p=0.034$). Female students reported eating breakfast less frequently than their male counterparts (32% of girls vs. 50% of boys eat breakfast always or most of the time), eating foods that are high in fat more frequently (31% of girls vs. 19% of boys eat high fat foods at least 3 times daily) and eating less servings of fruits and vegetables (15% of girls vs. 4% of boys report no fruits and vegetables intake in the past week). Regarding healthy eating education, girls are more likely to report not having any lessons on healthy food preparation (73% of girls compared to 58% of boys; $p=0.042$) or on healthy ways to gain/lose weight (68% of girls compared to 45% of boys; $p=0.004$), during the school year.

Concerning physical activity, significant gender differences were found in sports teams involvement (p=0.000), toning and strengthening exercise frequency (p=0.000), stretching exercise frequency (p=0.009) and nightly sleeping hours (p=0.040). Male students are more likely to participate in sports teams (49% of boys vs. 9% of girls participate in at least 2 sports teams), do toning and strengthening exercises more frequently (46% of boys vs. 19% of girls do these exercises at least 3 times per week) and do stretching exercises more frequently (41% of boys vs. 19% of girls do them at least 3 times per week). In contrast, female students are more likely to sleep 9 hours or more on an average school night than their male counterparts (21% vs. 8%).

Significant gender differences were also revealed across pro-social involvement, self-efficacy and self-esteem indicators. Regarding pro-social involvement, male students were more likely to report having opportunities to get involved in sports, clubs and other school activities outside of class (72% vs. 46%; p=0.012), as well as, more opportunities to speak with teachers one-on-one (91% vs. 78%; p=0.021) than their female counterparts. On the other hand, girls were more likely to report lack of parental recognition when doing a good job (20% vs. 13%; p=0.010) but more likely to report opportunities to do fun activities with their parents (40% vs. 18%; p=0.005) when compared to boys.

In terms of self-efficacy, male students were more likely to report feeling responsible for their own life than female students (76% vs. 45%; p=0.000), whereas female students were more likely to report being driven by a sense of purpose when compared to their male counterparts (56% vs. 30%; p=0.001). Female students were also more likely to report having abundant opportunities awaiting them than their male counterparts (44% vs. 28%; p=0.007). Finally, concerning self-esteem indicators, girls are more likely to report greater feelings of self-worth than boys (47% vs. 26%; p=0.029). Female students also report taking a positive attitude towards themselves more often than males (65% vs. 32%; p=0.000).

Chi-squared and Fischer's Exact tests also revealed significant differences in health protective factors across healthy eating and physical activity score tertiles. We identified two health protective factors revealing marked differences across tertiles of healthy eating scores and one with marked differences across tertiles of physical activity. Among pro-social involvement indicators, students in the middle tertile of healthy eating scores were the least likely to report having opportunities to do fun activities with their parents, when compared to students in the lowest and highest tertiles (p=0.046). Among self-efficacy indicators, students in the highest tertile of healthy eating scores were more likely to report no difficulty sticking to plans and accomplishing goals compared to students in the middle and low tertiles (p=0.023). Further, students in the middle tertile of physical activity scores were more likely to report not feeling responsible for their own lives compared to

students in the lowest and highest tertiles (p=0.041).

Additionally, Fischer's Exact tests revealed important differences in health protective factors by degree of likelihood to adopt HE and PA behaviors. As regards pro-social involvement, students who were more likely to report having many opportunities to get involved in sports, clubs and after school activities outside of class were more likely to adopt healthy eating (p=0.025), as well as, physical activity behaviors (p=0.005) than those who did not. Moreover, students who reported being able to ask their parents for support when facing a personal problem were more likely to adopt healthy eating behaviors than those who did not feel they could (p=0.008). In terms of self-efficacy, students who reported being able to find several solutions when confronted with a problem (p=0.006) and those who reported spending time identifying long-range goals (p=0.036) were more likely to be in the highest healthy eating behavior adoption category. As well, students who reported having abundant opportunities awaiting them were more likely to place in the highest physical activity behavior adoption category (0.027). Regarding self-esteem, students who reported having a number of good qualities were more likely to place in the highest category of healthy eating behavior adoption (p=0.004).

Kruskal-Wallis confirmed significant differences in the distribution of pro-social involvement scores across low, middle and high categories of likelihood to adopt HE behavior (p=0.0094). Using Bonferroni correction method, we identified that the significant difference in scores lied between the low and high categories (p=0.033). No significant associations were found between the composite scores of self-efficacy and self-esteem and degree of likelihood to adopt HE behaviors. Using one-way ANOVA, we revealed significant differences in mean healthy eating scores across categories of likelihood to adopt HE behavior (p=0.0041). The significant difference in mean healthy eating scores was found between the low and high categories of HE behavior adoption (p=0.005).

Spearman Rank and Pearson Correlations exposed associations between composite scores of health protective factors, healthy eating, physical activity and general health. Pro-social involvement scores were moderately correlated with self-esteem scores (r =0.3127; p=0.0001), and had weaker correlations with general health (*rho*=0.2484; p=0.0020), self-efficacy (*rho*=0.1612; p=0.0473), and physical activity (*rho*=0.1652; p=0.042) scores. Physical activity scores were moderately correlated with healthy eating scores (*rho*=0.4031; p=0.0000) and weakly correlated with general health (*rho*=0.2095; p=0.0096). Finally, self-efficacy scores were correlated with self-esteem scores (*rho*=0.2121; p=0.0026) and general health (*rho*=0.1727; p=0.0334).

In simple linear regression, healthy eating scores regressed significantly on likelihood to adopt healthy eating behavior (p=0.001) and gender (p=0.050). In crude analysis, students with high

likelihood to adopt HE behavior, had a 2.17-point increase in their healthy eating scores when compared to students with low likelihood to adopt HE behavior (95% CI: 0.90-3.43) and male students 1.09 times the healthy eating scores of their female counterparts (p=0.050). In adjusted analysis, gender lost its significance level (p=0.102).

Using polytomous logistic regression, we identified independent variables that significantly explain physical activity scores among students. In crude analysis, male students had a 6.83-fold increase in odds of placing in the highest tertile of physical activity (vs. the lowest; 95% CI: 2.87-16.27) and a 3.08-fold increase in odds of placing in the highest tertile (vs. the middle; 95% CI: 1.29-7.34), when compared to female students. Students with high likelihood to adopt PA behavior were 12.06 times more likely to be in the highest tertile of physical activity scores (vs. the lowest; 95% CI: 4.09-35.53) and 5.25 times more likely to be in the highest tertile (vs. the middle; 95% CI: 1.91-14.40), when compared to students with low likelihood to adopt PA behavior.

Students who reported being taught about how to develop a physical fitness plan had 9.8 folds increase in odds of being in the highest tertile of physical activity scores (vs. the lowest; 95% CI: 3.73-25.75) and 4.12 folds increase in odds of being in the highest physical activity tertile (vs. the middle; 95% CI: 1.67-10.14), when compared to students who were not taught similar lessons. Students who reported having had lessons about preventing injury during physical activity, had a 7.32-fold increase in odds of being in the highest tertile of physical activity (vs. the lowest; 95% CI: 2.97-18.07) and those who reported having had lessons about the benefits of physical activity were 4.83 folds more likely to place in the highest physical activity category (vs. the lowest; 95% CI: 1.95-11.99). As well, those who reported having had lessons about opportunities for physical activity in their communities were 3.67 folds more likely to place in the highest tertile (vs. the lowest; 95% CI: 1.51-8.88).

In adjusted analysis, male students were 13.19 times more likely than female students to place in the highest physical activity tertile (vs. the lowest, 95% CI: 4.08-42.60). Students who were taught about how to develop a physical fitness plan were 11.63 times more likely to be in the highest physical activity tertile (vs. the lowest; 95% CI: 3.49-38.70) and those who were taught about injury prevention were also 4.8 times more likely to be in the highest physical activity tertile (vs. the lowest; 95% CI: 1.56-14.80), when compared to students who were not taught these lessons.

Using binary logistic regressions, we identified factors that significantly explain students' likelihood to adopt healthy eating and physical activity behaviors. Table 1 shows the results from the crude and adjusted analyses on healthy eating adoption. In crude analysis, for each one-year increase in students' age, there is a 0.54-fold decrease in odds of having high healthy eating behavior adoption (95% CI: 0.30-0.96). In contrast, when students report trying to maintain weight, they are

Table 1. Crude and Adjusted Odds Ratios (OR) and 95% Confidence Intervals (CIs) from binary logistic regression of healthy eating behavior adoption on demographic, weight-related, healthy eating and health protective indicators, Abu Dhabi 2012 (N=108)

	Range	Crude OR (95%CI)	Adjusted OR (95%CI) Model 1	Model 2	Model 3
Demographic Indicator					
Age	15-20	0.54*(0.30-0.96)		0.35***(0.18-0.70)	0.34**(0.16-0.72)
Healthy Eating (HE) Indicator					
HE Score					
1st quantile (lowest)	1-10	1	1	1	1
2nd quantile	11-13	1.62(0.66-3.96)	2.35(0.82-6.78)	3.93**(1.25-12.34)	4.18*(1.21-14.48)
3rd quantile (highest)	14-20	4.58**(1.57-13.31)	4.77*(1.34-17.07)	8.37***(2.23-31.50)	8.19***(2.0-33.58)
Weight-related Indicator					
Trying to do about weight					
Nothing		1	1	1	1
Lose weight		1.80(0.49-6.58)	3.18(0.70-14.33)	3.04(0.66-13.90)	2.98(0.64-13.92)
Gain weight		1.93(0.43-8.61)	2.00(0.36-11.19)	2.31(0.42-12.72)	2.24(0.380-13.16)
Maintain weight		4.23*(1.11-16.17)	8.34*(1.66-41.92)	12.43***(2.26-68.35)	14.36***(2.43-85.01)
Pro-social Involvement (PS) Indicators					
PS Score					
1st quantile (lowest)	0-18	1	1		
2nd quantile	19-22	0.57(0.21-1.50)	0.81(0.27-2.44)		
3rd quantile (highest)	23-30	3.53*(1.31-9.46)	4.25*(1.38-13.08)		
Self-perceived recognition from teachers					
1st quantile (lowest)		1			
2nd quantile (highest)		2.78*(1.22-6.34)			
Self-perceived opportunity to participate in class					
1st quantile (lowest)		1			1
2nd quantile (highest)		4.05***(1.63-10.07)			3.50*(1.15-10.60)
Self-perceived parental support					
1st quantile (lowest)		1			1
2nd quantile (highest)		2.81*(1.22-6.50)			3.83*(1.27-11.59)
Self-efficacy Indicators					
Self-perceived ability to manage problems					
1st quantile (lowest)		1	1	1	1
2nd quantile (highest)		3.02**(1.37-6.66)	3.41*(1.30-8.94)	3.92**(1.47-10.50)	5.58***(1.82-17.12)
Self-perceived ability to accomplish goals					
1st quantile (lowest)		1			
2nd quantile (highest)		2.35*(1.02-5.38)			
Goodness of Fit					
Pearson chi^2			49.08	28.60	62.48
P-value			0.3131	0.7292	0.4949

***p<0.005, **p<0.01, *p<0.05

4.23 times more likely to adopt healthy eating behavior, compared to those who report not trying to do anything about their weight (95% CI: 1.11-16.17). The probability of high healthy eating behavior adoption increases when students healthy eating scores increase from the lowest to the highest tertile (OR: 4.58; 95% CI: 1.57-13.31), as well, as, when their pro-social involvement scores increase from the lowest to the highest tertile (OR: 3.53; 95% CI: 1.31-9.46). Further, students' likelihood to adopt healthy eating behavior increases when they report high self-perceived recognition from teachers (OR: 2.78; 95%CI: 1.22-6.34), opportunity to participate in class (OR: 4.05; 95%CI: 1.63-10.07), parental support (OR: 2.81; 95%CI: 1.22-6.50), ability to manage problems (OR: 3.02; 95%CI: 1.37-6.66) and ability to accomplish goals (OR: 2.35; 95%CI: 1.02-5.38).

After constructing three probabilistic binary logistic regression models, we selected Model 2 as having the best fit (chi^2=28.60, p=0,7292). In adjusted analysis, the probability of high healthy eating behavior adoption decreased by 0.35 folds for each one-year increase in age. The

probability of adopting healthy eating behaviors increased when students' healthy eating scores increased from the lowest to the highest tertile (OR: 8.37; 95% CI: 2.23-31.50), and from the middle to the highest tertile (OR: 3.93; 95% CI: 1.25-12.34). When students reported an attempt to maintain weight, their likelihood to adopt healthy eating behaviors increased by 12.43 folds (95% CI: 2.26-68.35). Finally, students with high self-perceived ability to manage problems were 3.92 times more likely to adopt healthy eating behaviors than their counterparts in the lowest quantile (OR: 3.92; 95% CI: 1.47-10.50).

Table 2. Crude and Adjusted Odds Ratios (OR) and 95% Confidence Intervals (CIs) from binary logistic regression of physical activity behavior adoption on demographic, weight-related, physical activity and health protective indicators, Abu Dhabi 2012 (N=116)

	Range	Crude OR (95%CI)	Adjusted OR (95%CI)		
			Model 1	**Model 2**	**Model 3**
Demographic Indicator					
Age	15-20	0.55*(0.31-0.98)		0.49*(0.25-0.94)	
Weight-related Indicators					
Trying to do about weight					
Nothing		1			1
Lose weight		3.08(0.758-12.52)			3.86(0.84-17.69)
Gain weight		5.76*(1.18-28.25)			8.72*(1.53-49.56)
Maintain weight		3.3(0.79-13.74)			4.98*(1.04-23.78)
Weighted/measured in the past 12 months					
No		1	1		1
Yes		4.33*(1.16-16.14)	5.86*(1.22-28.12)		4.77*(1.18-19.25)
Physical Activity (PA) Indicators					
PA Score					
1st quantile (lowest)	0-2	1	1	1	
2nd quantile	3-6	2.30(0.87-6.09)	1.71(0.61-4.80)	2.19(0.77-6.27)	
3rd quantile (highest)	7-17	12.06***(4.09-35.53)	11.66***(3.62-37.53)	13.24***(4.10-42.74)	
Pro-social Involvement Indicators					
Self-perceived opportunity to participate in sports/extracurricular activities outside of class					
1st quantile (lowest)		1	1	1	1
2nd quantile (highest)		4.89***(1.77-13.49)	4.02*(1.29-12.55)	3.12*(1.01-9.66)	5.63***(1.88-16.85)
Goodness of Fit					
Pearson Chi^2			8.56	22.31	9.41
P-value			0.1997	0.0999	0.3086

***p<0.005, **p<0.01, *p<0.05

Table 2 shows the results from the crude and adjusted analyses on physical activity behavior adoption. In crude analysis, the odds of adopting physically active behavior decreased by 0.55 folds per year increase in students' age (95% CI: 0.31-0.98), whereas it increased when students reported an attempt to gain weight (OR: 5.76; 95% CI: 1.18-28.25), as well as, when they reported being weighted and measured in the past twelve months (OR: 4.33; 95% CI: 1.16-16.14). Moreover, likelihood to adopt physically active behavior increased as students' physical activity scores increased from the lowest to the highest tertile (OR: 12.06; 95% CI: 4.09-35.53) and when their self-perceived opportunity to participate in sports and extracurricular activities outside of class increased from the highest to the lowest quantile (OR: 4.89; 95% CI: 1.77-13.49).

In adjusted analysis, Model 3 was selected as having the best fit (chi^2=9.41; p=0.3086). The analysis revealed that the probability of adopting physical activity behavior increased when students reported an attempt to maintain weight (OR: 4.98; 95% CI: 1.04-23.78), as well as, gain weight (OR: 8.72; 95% CI: 1.53-49.56). Students who reported being weighted and measured in the past twelve months were 4.77 times more likely to adopt physically active behavior (95% CI: 1.18-19.25). Further, students in the highest quantile of self-perceived opportunity to participate in sports and extracurricular activities had a 5.63-fold increase in their likelihood to adopt physically active behaviors (95% CI: 1.88-16.85).

Focus Group Discussions (FGDs)

The FGDs revealed a gendered leitmotif underlying important differences, as well as, similarities between female and male students. The results from the student FGDs were sorted into four major categories: (i) Attitudes towards health and health promotion, (ii) Health beliefs and behaviors, (iii) Health issues and concerns, and (iv) Enablers and barriers of health promoting attitudes and behaviors. The main themes from the school staff FGDs were also sorted into categories: (i) Factors determining the success of programs, and (ii) Recommendations for the future of health promotion at schools.[2]

Attitudes towards health and health promotion

When asked about the meaning of health, female students equated health with beauty and attractiveness (see Appendix D.1 for the "what is health?" thematic map from female FGDs). Being healthy took the meaning of having the "right" or "perfect" body shape. In fact, feeling comfortable with one's body was the most desirable result of attaining health. Further, girls were more likely to identify food choices, rather than fitness as the way to achieve their desired body weight and ultimately maintain good health. Freedom and happiness were important correlates of health for many girls, and maintaining healthy relationships with their families was regarded as the way to ensure stability and contentment in their lives, thus a good health practice. Another important concept related to the meaning of health was cleanliness of mind and body. Girls spoke about health as having a spiritual and emotional connotation. Indeed, being healthy was strongly related with "having inner peace", which was, in turn, achieved by praying, "having a good heart", "being good" and "doing good."

> *Health is very spiritual as well. I feel good when I pray because I feel praying is sort of exercise and a good way to get bad thoughts outside my body and prepare for peace.*

[2] For the purpose of this thesis, and in keeping with the page limit, the results from FGDs with school staff will not be discussed as extensively as the results gathered from the student FGDs.

Male students' meaning of health was strongly associated with lifestyle choices, which included doing sports, "doing things that make you happy", eating fresh foods and having a healthy social life at school (see Appendix D.2 for the "what is health?" thematic map from male FGDs). While improved physical appearance was an important result from engaging in regular fitness, it was not regarded as the sole result or the only goal of doing sports. Similar to girls, boys also desired to feel comfortable with their bodies, but in their case, this meant, "having lots of muscles" and "getting stronger." An important difference between female and male students was that boys attached concepts of responsibility, usefulness and respect to their general attitude towards health. In fact, boys spoke about health as either a means to achieve the end of "being a useful man in the community" or as "Allah's blessing", hence a duty to protect. Consequently, health was sought after in a very spiritual way: by "treating your body as a blessing" and "respecting Allah's gift." For this reason, the equation to becoming healthy was very clear to boys:

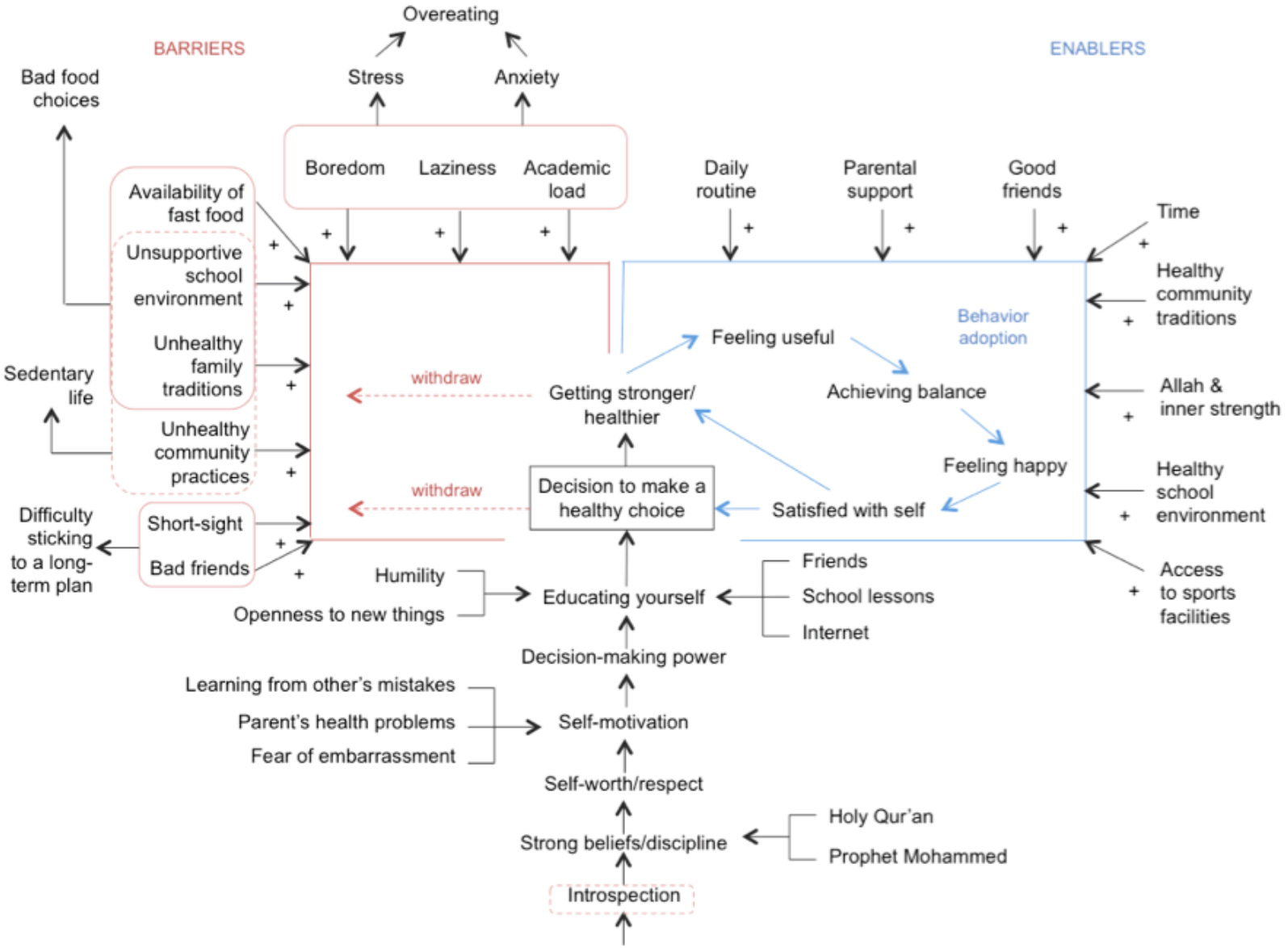
> *To be healthy, you have to do halal [actions permissible in Islam] and don't do haram or sinful things like smoking, drinking alcohol, sex, or eating junk.*

When asked about health promotion, female students frequently spoke about extraneous factors that gave them a structure within which to be healthy. These included: schools' provision of free meals and sports classes, military training and lessons from popular health television shows. In particular, military training was a source of knowledge for values they considered important for health and complete personhood, namely, discipline, loyalty and responsibility. The fitness component of the training was secondary to these lessons. Further, girls identified the Holy Qur'an to be the most important and trust-worthy source of health knowledge they had available and spoke of Prophet Mohammed's teachings very often as a way to provide examples of timeless health recommendations:

> *The Prophet was talking about these health things thousands of years ago, about moderation, no overeating, good foods to eat, and patience […] now Dr. Oz has figured it out and all of a sudden it's modern medicine. But first, there was the Holy Qur'an.*

For boys, health promotion was mostly defined as an internal, and rather personal, process of achieving health. In fact, boys spoke about health promotion as preconditions for health that started from the self, and self-realization. Concepts such as openness to new things, self-improvement, self-motivation, self-knowledge and humility were identified as necessary drivers for health promotion. Indeed, boys reflected on their ability to internalize health knowledge as conditioned by their own humility to accept their ignorance about certain health topics. Humility, in turn, would be reflected in their disposition to change or improve individual behaviors. Like female students, male students spoke about Islamic teachings as pillars for health. However, boys further extrapolated these teachings to explain the health relevance of "being involved" and "useful to

Figure 1. Health behavior adoption process with relevant enablers and barriers for Grade 12 male students, Abu Dhabi 2012



others in their communities." Hence, health promotion was also perceived as being part of a good community that cared about people and motivated them to be healthy.

> *For me being healthy starts from having a healthy society, having healthy socials and being part of a community that really cares about how you are doing.*

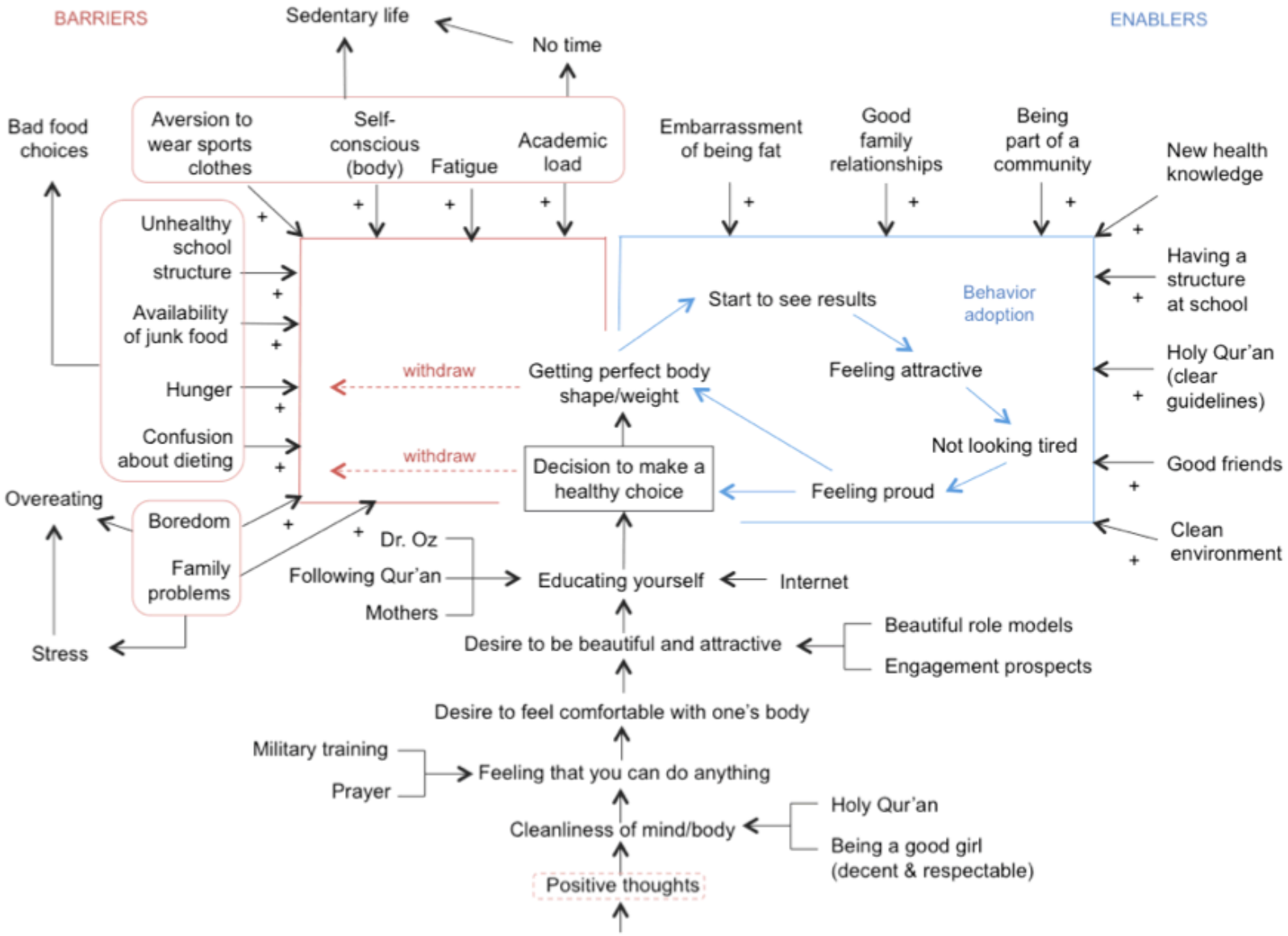
Health beliefs and behaviors

A crosscutting theme in the discussions between female and male students was the dominant belief that individual and community health was "a woman thing." Males often spoke about their mothers as gatekeepers for health, explaining that their food habits were especially dependent on "what mother cooks for the family." Boys also spoke about the importance of what they learned about health, and being healthy, during their childhood from the women in the family, which included their older sisters, mothers and grandmothers. In contrast, few girls were as explicit about the health-gatekeeping role that their society had assigned them. However subtly, when asked about their own health, girls would very often redirect the discussion to speak about the health of the family and the environment. This demonstrated that they were not as interested in what made them healthy, but in how they could ensure that everyone around them was healthy. Moreover, girls identified the health importance of their role as stewards of the environment and caregivers in their families. Hence, "recycling and planting trees", as well as, "knowing how to cook and promoting good family relations" were frequently perceived as healthy behaviors to engage in. In fact, one student made it very clear that the potential for motherhood in the near future was a reason why her peers needed to be healthy:

> *Many of my friends will become mothers right after leaving high school, so spreading this health awareness among them, means spreading awareness for our future communities. If a mother is not healthy, the children and the husband cannot be healthy.*

On the other hand, at the core of male students' health-related beliefs, was the concept that disease originated from failing to respect one's body. In this sense, being unhealthy was a sign of weakness of character and a source of embarrassment. Boys often referred to being overweight as the "deepest shame" because it revealed having "succumb[ed] to temptation over and over again" and not being strong enough to practice balance and moderation. Smoking, however, was not judged as harshly. Boys often laughed in complicity with one another when asked about whether they smoked and quickly warmed up to share stories about overcoming the challenges of security cameras and smoke detectors at school. Nonetheless, smoking often generated a debate between students who were trying to reconcile their smoking behavior with their overall Islamic beliefs, and those who rejected such a possibility and offered to help their peers to "stop doing *haram* [sin]." One of them offered valuable insight into what is needed for his peers to stop smoking:

Figure 2. Health behavior adoption process with relevant enablers and barriers for Grade 12 female students, Abu Dhabi 2012



Most of the students think that smoking is bad but everyone does it. So we need to do something more than just awareness. Because people already know… more than that, people already believe that it is sin. I think that there is something else happening other than just knowing. You need to teach students to respect themselves and to be strong from the inside. Then they will want to stop smoking.

Health issues and concerns

When asked about their personal health issues, girls commonly referred to their reliance on energy drinks, "having a perfect body" and "looking yellow [anemia]" as the main concerns they had. Energy drinks were seen as a solution to feeling fatigued during periods of increased academic pressure, which some of them associated with poor time and stress management. Many of them admitted "not being able to start their day properly", "not being able to focus" and "not being able to study" without having an energy drink in the morning, sometimes as a breakfast substitute. Few of them believed that energy drinks would help them lose weight, but their peers, who shared having tried them for similar reasons without success, quickly corrected them. Further, female students spoke about the concerns they had for the health of their peers, most of whom did not eat breakfast regularly, "probably ha[d] anemia" and often complained about fatigue and common headaches. In three of the FGDs, girls candidly talked about the need to have sexual education at school and "learn about things they don't want us to know about, but we know." They complained, albeit shyly, about the lack of openness, the fear and the limited knowledge they had about the workings of "certain body parts."

I don't understand why they don't teach us this. We have these parts, we are born with them and having them is not haram [sinful] so why not teach us more so that we know. I don't want to know before I get married, I want to know now.

Male students, on the other hand, mostly spoke about their mental health concerns. It took a few brave students who started sharing about "feeling lonely", "feeling shy" and "feeling like there is no purpose in life" for deeper conversations to begin, but once this process started, they were supported by their peers who admitted having similar feelings. Many boys spoke about having to deal with a lot of pressure from their families, their academic load and their own expectations, which would make them feel anxious, nervous about the future and alone. Further, some of them identified that their feelings were magnified during the weekends and long holidays when they could not see their friends as often. Few of them felt that it was "not normal to spend this much time alone", often wishing they had more friends in whom to confide.

I keep remembering the problems of the past and it makes me feel bad about myself, that I didn't achieve what I needed… and it doesn't help me be healthy. I only feel sad. When I am by myself the feeling is too much sometimes.

Other concerns included "wanting to stop smoking but not knowing how", "having bad thoughts" and fear that their parents' health problems could predict their own. Boys identified that it was

important for those who smoked to find someone that they can confide in about their smoking and who could help them stop. Giving that smoking is considered sinful, students who smoked, but wanted to stop, could not seek help from adults and health professionals for fear that they would be reprimanded and morally judged. Regarding "bad thoughts", boys clarified that this related to masturbation and having sexual thoughts, for which they felt very ashamed. Few students remarked that these thoughts were normal, however, most students referred to them as a source of worry and were very uncomfortable speaking about them.

Enablers and barriers of health promoting attitudes and behaviors

Figure 1 illustrates the healthy behavior adoption process for female students with the relevant enablers and barriers. As it regards enablers, the dominant themes identified by female students were their religious belief and self-identity as Muslim women, having a structure at school and having healthy family traditions (Appendix D.3 contains the thematic map on "Enablers" from female FGDs). The girls' self identity as Muslims was a constant reminder of belonging to a "community that believed in the same things" and abided by the "same instructions" in a way that made it "easier to follow *halal* [actions permissible in Islam] and avoid *haram* [sin]." Without exception, the girls agreed that reading the Holy Qur'an was the "most important part of [their] daily lives that helped [them] be healthy". Many also spoke about the added benefits of having a structure in their daily lives, by virtue of being students, which allowed them to dedicate the greatest part of their day to studying and praying. In turn, this meant that they were using their time productively and had fewer opportunities to give in to the temptation of unhealthy habits. Further, family traditions was a very important enabler of health for them, as it dictated the overall health habits they had, the kinds of foods they ate and whether or not they were physically active.

> *I think family helps me be healthy because my parents teach me about healthy things showing me how they do. When we eat dinner and we talk about our day… that is health. Or when we go for a walk after dinner, they show me how I can do with my own family one day.*

Figure 2 illustrates the healthy behavior adoption process for male students with the relevant enablers and barriers. Boys, on the other hand, mainly spoke about introspection, self-worth, self-respect, discipline and inner strength as their most important enablers of health (Appendix D.4 contains the thematic map on "Enablers" from male FGDs). Many of them agreed that their health, and their adoption of healthy behaviors was dependent on how well they were able to integrate the motto: "I believe so I do", in their daily lives. Hence, personal qualities such as "motivation", "determination", "inner strength" and even "self-respect and self-preservation" were commonly viewed as necessary for any healthy decision to be made. Self-respect was particularly relevant when speaking about food choices. Many of them agreed that without it, it would be difficult to "treat your body with respect and make your food choices" based on "what you deserve to put into your body." Boys also talked about social support, originating from their friends and families, as

enabling most of the healthy choices they made. However, being supported by the social environment was only secondary to the more important roles that motivation and inner strength played. In fact, they were described as "what you need to keep it [healthy choice] up" but not what was needed to make a health-conscious decision in the first place.

> *When your beliefs are linked to your actions, then you can be healthy. But you need to have discipline to do as you believe. Nobody can do it for you because it is from inside.*

Among female students, the main barriers to healthy attitudes and behaviors were: absence of a structured meal time at school, not wanting to wear sports clothes, being used to sedentary life and lack of motivation to change (Appendix D.5 contains the thematic map on "Barriers" from female FGDs). Girls often complained about not having long enough breaks during the school day to eat lunch. They explained "having a 25-minute break at 10 in the morning and a 5-minute break for praying later in the afternoon". Absence of an appropriate break time to eat lunch often led to the problem of overeating, giving that many of them would eat throughout the day and without putting much care into the kinds of food they were constantly snaking on. Girls also recognized "feeling uncomfortable wearing sports clothes in front of each other because they revealed their bodies" and made them feel self-conscious about their different shapes. Another important barriers among them were "being used to the way we are" and "not being motivated to become more active". In fact, many girls saw no problem in having low fitness, with some even giving cultural justifications about the reasons why it was not appropriate for women to exercise:

> *Why should we change? We are fine. Women here don't exercise, it's not part of the culture. When you are a girl… ok you can do. But when you become woman: halas [finished]. If I look around in my family, women don't do exercise, we don't like to sweat and wear fitted clothes… that is for men. Exercise is for your culture [Western], not ours.*

For male students, the barriers to health were: "academic load and pressure to succeed", lack of family support and "bad food served at the school". (Appendix D.6 contains the thematic map on "Barriers" from male FGDs). Academic load was unanimously agreed upon as a barrier in each FGD. Students frequently referred to the pressure they experienced from the school, their parents and even from each other to compete academically and succeed. This was manifested mostly during exam periods and often led to unmanageable stress and anxiety, which in turn, would lead to overeating and "giving into bad things." Further, their increased focus on academic achievement would leave them little time to do exercise or engage in health promoting activities at their schools. Boys also identified lacking family support when trying to implement healthy lessons at home, including healthy eating recommendations. They spoke about "not being taken seriously" and giving up because they were "obviously not in charge of making decisions involving food choices or cooking at home". Many of the male students also talked about the detrimental health effect of

the “bad food served in the cafeteria, that is not tasty nor healthy”. Many of them reasoned that the state of the cafeteria showed that the school did not take healthy eating seriously:

> *Ok, you want us to eat healthy yes? Look at the food they serve us in the canteen. Nobody wants to eat it, not even the teachers. They give us only chicken shawarma and we are supposed to eat it in the morning! Everyday the same.*

Factors determining the success of programs

When asked to discuss what was needed for health promoting programs to succeed in reaching students, school staff from female and male schools indistinctly spoke about: the “need for parental involvement in the schools’ activities”, the “need for every teacher to get involved earnestly”, and the “need for students to be consulted first and foremost as the biggest stakeholders of these activities”. Teachers often complained about the overwhelming absence of parents during parent-teacher meetings and their lack of support and interest regarding their children’s involvement in non-academic activities. Further, they were concerned that if the parents did not show enthusiasm for the activities in the school, then it was likely that they were not supporting their children with the healthy lessons at home. In fact, lack of parental involvement could “render the health education provided at school completely useless” if it was not implemented at home. School staff also admitted to not having enough time to dedicate to support the school’s health promoting activities, thus hindering their credibility among students. Many teachers pointed out that the activities were sometimes perceived as burdensome to their already busy school schedules. Few teachers spoke about needing to reform health promotion at their schools “from events to a way of living and working at school” in order to decrease the generalized perception that it was a burden. Moreover, school staff unanimously agreed that students were not consulted enough prior to implementing the programs, and that this most likely explained why they were not invested in them.

> *The students need to be the biggest stakeholders. They are the one who decide whether to take part in it or not. If they decide what they want to see happening in the school and we provide it, of course the health programs will be successful because it is coming from them. We won’t need to chase after them, they will chase after us to get healthy!*

Recommendations for the future of health promotion at schools

Teachers, school nurses, social workers and other school staff agreed that the future of health promotion at their schools depended on a complete shift towards long-term wellness goals. For instance, they spoke about the contradiction of organizing yearly breakfast competitions, where students are encouraged to eat healthy meals, and not providing adequate food in the canteens the rest of the year. Indeed, the staff recommended that schools look into the overall programmatic and physical environments they provide students with regards to health. With regards to programmatic changes to the health education curriculum, teachers and nurses pointed to the relevance of having sexual education lessons among older students, as well as, mental health programs that specifically “help them cope with stress and avoid burn-out.” Moreover, the provision

of healthy food at school was a recurrent theme. Teachers voiced the students' overwhelming dissatisfaction with the kind of food provided at the canteen and admitted not wanting to eat there themselves. Many of them saw an opportunity for the students, parents and teachers to come together and reform the schools' canteens and cafeterias. It followed that, in order to achieve any long-term health gains among the students, the schools needed to become meeting places for the community to rally around health. As such, they endorsed the creation of "health committees and specialized health teams" consisting of representatives from the student, teacher and parent communities as a way to ensure that all stakeholders were continuously involved in the design, planning and implementation of programs.

DISCUSSION

We revealed significant differences in dietary behavior, physical activity and health protective factors between female and male students. Female students were more likely to engage in unhealthy dietary behaviors and least likely to be physically active. Male students had generally higher pro-social involvement, whereas female students had a stronger sense of self-esteem. Further, our findings reveal that age, healthy eating scores, intention to maintain weight, pro-social involvement and self-efficacy indicators significantly explained adoption of healthy eating behaviors among students. Indeed, younger students, those with comparatively higher healthy eating scores, as well as, those who report trying to maintain weight were significantly more likely to adopt healthy eating behaviors. Of particular relevance, we revealed marked differences in psychosocial indicators among students with high likelihood to adopt healthy eating behaviors compared to students with low likelihood to adopt the same behaviors. Concerning pro-social involvement, high self-perceived recognition from teachers, opportunity to participate in class, and parental support significantly explained adoption of healthy eating behaviors among students. In parallel, self-efficacy indicators including high self-perceived ability to manage problems and ability to accomplish goals were associated with healthy eating behavior adoption. Moreover, adoption of physical activity was significantly explained by age, intention to gain, as well as, maintain weight, annual weighting and measuring, physical activity scores and self-perceived opportunity to participate in sports and extracurricular activities outside of class.

The FGDs revealed important gender differences underlying the students' attitudes towards health and health promotion, their health beliefs, behaviors and health issues, as well as, their perceived barriers and enablers to health promoting behaviors. In this regard, the discussions held with female and male students were exceedingly important in providing qualitative richness to the explanations behind the gendered differences revealed in the quantitative analysis. Through mapping the main themes discussed as barriers and enablers of health promoting attitudes and

behaviors among students, we were able to create systemic maps explaining gender-sensitive health behavior adoption processes.

For female students, adoption of health promoting behaviors begins with a self-perceived sense of cleanliness of mind and body, followed by a desire to feel comfortable with the body. This sense of comfort is attached to feeling attractive; hence, her ultimate health goal tends to gravitate around the achievement of the perfect body shape and weight. Her likelihood to begin and maintain a healthy behavior adoption cycle is thus strongly influenced by her own ability to see positive results regarding her appearance. As such, one of the most important factors enabling her adoption of healthy behaviors is her embarrassment of being fat. Other enablers include: good family relationships, sense of community belonging, constantly updated health knowledge, having a structure at school, her faith in the teachings of the Holy Qur'an, as well as, availability and quality of friends. On the other hand, important barriers to adopt healthy behaviors are: unmanageable academic load, fatigue, feeling self-conscious about her body and aversion to wearing sports clothes, all of which contribute to a more sedentary life. Further, availability of junk food, hunger and confusion regarding healthy ways to lose weight contribute to bad food choices. In parallel, boredom and self-identified family problems often lead to stress and overeating.

For male students, introspection and strength of self-belief are the starting point in adopting health promoting behaviors. The preconditions to adopt a particular healthy behavior are strongly influenced by his sense of empowerment. In this regard, a decision to make a healthy choice is conditioned by his self-esteem and how confident he is about affecting change in his own life. Hence, self-efficacy and decision-making power are exceedingly important in order to begin making decisions that positively impact his health. In parallel, his social environment greatly informs his ultimate health goal, as it tends to gravitate around a desire to become stronger and feel like a useful man for his community. This further explains his preference to engage in physical activity, compared to healthy eating, as the way to achieve and maintain health, giving that, it promotes involvement in his community through participation in sports teams and it enables him to feel physically stronger. The main factors enabling his healthy behavior adoption process are: having a daily routine, parental support, availability of good friends, having time, being exposed to healthy community traditions, the strength of his belief in Allah and Qur'anic teachings, a healthy school environment and access to sports facilities. In contrast, factors that act as barriers are: unmanageable academic load, laziness and boredom, which in turn contribute to, increased stress, anxiety and ultimately overeating. In parallel, availability of fast food, unsupportive school environments and unhealthy family traditions add to adoption of bad food choices and sedentary lifestyle.

Gender specific priority areas in school health promotion

Our findings reveal important gender differences in the ways through which female and male students perceive health and adopt health promoting attitudes and behaviors. In parallel, having exposed significant gender differences in health protective factors, as well as, associations between these factors and likelihood to adopt healthy behaviors among students, our findings point to the potential benefits of gender mainstreaming school health promotion. In fact, greater sensitivity to gender will be needed in order for health promotion programs to effectively reach the Emirati student population.

For female students, gender-specific priority goals in health promotion should include: first, a deconstruction of the existing detrimental body and health stereotypes that hinder girls' capacity to conceive health as holistic wellness. Second, a re-focus on individual health practices. As important as environmental stewardship and traditional care-giving roles may be, female students will continue to be disadvantaged if school health education pays more attention to community health rather than individual health practices. Third, encouraging physical activity through role modeling. Girls' ability to perceive physical activity as a viable and culturally acceptable way of attaining and maintaining health is influenced by her family environment, as well as, by the lack of active female role models in their community. Hence, in order to benefit from physical activity, parents and teachers will need to lead by example. In this regard, cooperative and intergenerational learning will be of utmost importance for female students to begin to see sports as activities that are acceptable and encouraged for women to engage in.

For male students, school health promotion must focus first and foremost on mental health, stress coping and wellness. Boys' association of health with usefulness is rather telling of the kind of societal, family and self-imposed pressure that they feel under. In fact, boys often discussed feeling distressed from competing and unmanageable pressure to succeed across different dimensions of their lives. Further, in discussions, they identified sadness, anxiety and loneliness as recurrent health concerns. It is thus important that school health promotion focuses on enabling male students to address stress through coping mechanisms, as well as, by challenging detrimental social conceptions of masculinity and usefulness. Moreover, stress also has a detrimental effect on adoption of healthy behaviors. Naturally, boys are least likely to engage in health promoting behaviors when they feel overwhelmed by stress in their lives, thus, attention to mental health could have long-term positive externalities in healthy behavior adoption.

Future directions for school health promotion in the UAE

Having identified important environmental and psychosocial correlates of health-enhancing behavior adoption among Emirati adolescent students, we put forth the following recommendations to be incorporated in future evidence-based school health promotion interventions. In order to optimize the way through which interventions impact students' health, closer attention must be paid to the psychosocial needs of students. Of these, pro-social involvement and self-efficacy were shown to be exceedingly important as linking mechanisms between a health promoting environment and adoption of healthy behaviors. For this reason, it is relevant that school health promotion programs focus not only in providing environments conducive to health but also pay attention to the ability of students to accept health knowledge and integrate health practices into their daily lives. This ability is influenced by the students' self-perceived pro-social involvement with parents and teachers, as well as, by a strong sense of self-efficacy. Hence, health promotion programs will be better able to reach students if they address and enhance these psychosocial health protective factors.

Finally, if the ultimate goal is for schools to become loci for health promotion, it is important that students be involved as principal stakeholders in the design and implementation of the programs that they consider are relevant for their health. Hence, bottom-up school health promotion is in order. As investigators, we have witnessed first-hand the leadership potential of students and their willingness to meaningfully engage in creating healthy environments not solely for themselves, but also for their teachers, their parents and their communities at large. The power to improve school environments lays in fact, in the hands of students and in our capacity to empower them to take control over and improve their health.

Limitations

Present findings should be interpreted in light of the following limitations. First, in order to participate in the FGDs, students with high English proficiency were chosen by the investigators. For this reason, the student subsample population involved in the FGDs cannot be easily generalized to represent the source population of Emirati students in Abu Dhabi. It may be argued that their levels of English proficiency indicate that these students were more likely to be in the highest academic percentile. Hence, what they may perceive as enablers and barriers to health promoting behaviors and attitudes may discern from those of students with different levels of academic performance. Second, school staff who participated in the FGDs were generally reluctant of speaking about school health promotion programs that were unsuccessful for fear that they could be identified and penalized in some way. This was exacerbated by the fact that the investigators were entering the school premises under the authorization of the Abu Dhabi

Education Council, the highest education authority in the region. In fact, some teachers may have had the impression that the aim was to evaluate their performance rather than to learn from their experiences. This, in turn, could have had a detrimental impact on the sincerity of the discussions and their reluctance to speak about the factors acting as barriers to the success of school health promotion. Third, female student FGDs were systematically highly supervised by teachers, social workers and other school staff. This, of course, may have hindered the openness with which female students could engage in rather intimate topics such as their beliefs regarding health, as well as, their health concerns. We accept that this may raise questions regarding the comparability of the discussions involving female and male students. However, this limitation could not have been bypassed, as it would not have been culturally appropriate for female students to engage in discussions with outsiders without school supervision. These issues are assumed to be minor limitations in the overall work.

Conclusion

This study provides evidence of behavior adoption correlates among adolescent Emirati students and reveals significant gender differences in healthy eating, physical activity and health protective factors. The results highlight the need for culturally appropriate, gender-responsive and evidence-based school health promotion interventions targeting the environmental and psychosocial needs of Emirati students. Our research may influence policies at the intersection of health and education and impact the ways through which schools can become loci for health promotion and disease prevention in the UAE.

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APPENDIX A

The Student Health Promotion Questionnaire

School ID:
Student ID used in this study:

Thank you for agreeing to participate in this study. This survey asks your opinion about a number of things in your life, including your eating habits, your involvement with physical activity and sports, your school, your family and how you see yourself. Your answers to these questions will be confidential. That means no one will know your answers. To help us keep your answers secret, please do not write your name on this survey form.

Instructions:

1. This is not a test. There are no right or wrong answers.
2. If you don't find an answer that fits exactly, use one that comes closest.
3. If any question does not apply to you, or you are not sure what it means, you can ask one of the investigators in the room to clarify.
4. To answer, please check the box or circle the letter that best applies to you.

For example:

Red is my favorite color ☑ Yes ☐No

I like to spend time with my friends
a. Strongly agree
b. Agree
© Disagree
d. Strongly disagree

1. How old are you? ____

2. Are you: ☐Female ☐Male

3. How long have you been a student at your school?
   ☐<1 year ☐1-4 years ☐5-10 years ☐more than 10 years

4. Please indicate your nationality
   ☐ Emirati
   ☐ Expatriate – Middle Eastern and North African
   ☐ Expatriate – South-Asian (Indian/Pakistani/Bangladesh)
   ☐ Expatriate – Western (European/North American/Australian)

5. How is your health in general?
   ☐very good ☐good ☐fair ☐bad ☐very bad

Section 1: Healthy Eating

1. During the past week, how often did you eat breakfast?
   a. Never
   b. Rarely
   c. Sometimes
   d. Most of the time
   e. Always

2. How do you describe your weight?
   a. Very underweight
   b. Slightly underweight
   c. About the right weight
   d. Slightly overweight
   e. Very overweight

3. Which of the following are you trying to do about your weight?
   a. I am not trying to do anything about my weight
   b. Lose weight
   c. Gain weight
   d. Stay the same weight

4. During the past 12 months, have you been weighed and measured?
   a. Yes
   b. No

5. During the past week, how often did you bring your lunch to school?
   a. Never
   b. Rarely
   c. Sometimes
   d. Most of the time
   e. Always

6. During the past week, how often was breakfast/lunch offered to you at school?
   a. Never
   b. Rarely
   c. Sometimes
   d. Most of the time

e. Always

7. During the past week, how many times per day did you usually eat foods high in fat, such as potato chips, chocolate or pastries?
   a. I did not eat foods high in fat
   b. Less than 1 time per day
   c. 1 time per day
   d. 2 times per day
   e. 3 times per day
   f. 4 times per day
   g. 5 or more times per day

8. During the past week, how many times per day did you usually drink milk or eat milk products, such as yoghurt, laban or cheese?
   a. I did not drink milk or eat milk products during the past week
   b. Less than one time per day
   c. 1 time per day
   d. 2 times per day
   e. 3 times per day
   f. 4 times per day
   g. 5 or more times per day

9. During the past week, how many servings of fruits and vegetables per day did you usually eat? *You can look at the **Fruits and Vegetables Guide** at the end of this survey if you want to see examples of serving sizes.*
   a. I did not eat fruits and vegetables during the past week
   b. Less than 1 cup per day
   c. 1 cup per day
   d. 2 cups per day
   e. 3 cups per day
   f. 4 cups per day
   g. 5 or more cups per day

10. During this school year, were you taught in any of your classes the benefits of healthy eating?
    a. Yes
    b. No
    c. I do not know

11. During this school year, were you taught in any of your classes how to safely prepare or store food?
    a. Yes
    b. No
    c. I do not know

12. During this school year, were you taught in any of your classes about healthy ways to gain/lose weight?
    a. Yes
    b. No
    c. I do not know

13. If you answered “yes” to either question 10, 11 or 12 of this section, did you incorporate any of the lessons you learned about healthy eating into your daily life?
    a. Yes
    b. No
    c. I do not know

Section 2: Physical Activity

1. During the past 12 months, on how many sports teams did you play?
   a. 0 teams
   b. 1 team
   c. 2 teams
   d. 3 or more teams

2. During the past 7 days, on how many days did you do exercises to strengthen or tone your muscles, such as push-ups, sit-ups, or weight lifting?
   a. 0 days
   b. 1 day
   c. 2 days
   d. 3 days
   e. 4 days
   f. 5 days
   g. 6 days
   h. 7 days

3. During the past 7 days, on how many days did you do stretching exercises, such as toe touching, knee bending, or leg stretching?
   a. 0 days
   b. 1 day
   c. 2 days
   d. 3 days
   e. 4 days
   f. 5 days
   g. 6 days
   h. 7 days

4. On an average school night, how many hours of sleep do you get?
   a. 4 or less hours
   b. 5 hours
   c. 6 hours
   d. 7 hours
   e. 8 hours
   f. 9 hours
   g. 10 or more hours

5. During this school year, were you taught in any of your classes how to develop a physical fitness plan for yourself?
   a. Yes
   b. No
   c. I do not know

6. During this school year, were you taught in any of your classes about preventing injury during physical activity?
   a. Yes
   b. No
   c. I do not know

7. During this school year, were you taught in any of your classes the benefits of physical activity?
   a. Yes
   b. No
   c. I do not know

8. During this school year, were taught in any of your classes about opportunities for physical activity in your community?
   a. Yes
   b. No
   c. I do not know

9. If you answered "yes" to either question 7 or 8 of this section, did you incorporate any of the lessons you learned about physical activity in your daily life?
   a. Yes
   b. No
   c. I do not know

Section 3: Health Protective Factors

The following questions ask you about your experiences at school and at home, as well as, your relationships with your teachers and parents.

1. In my school, students have lots of chances to help decide things like class activities and rules.
   a. Strongly agree
   b. Agree
   c. Disagree
   d. Strongly disagree

2. There are lots of chances for students in my school to get involved in sports, clubs, and other school activities outside of class.
   a. Strongly agree
   b. Agree
   c. Disagree
   d. Strongly disagree

3. There are lots of chances for students in my school to talk with a teacher one-on-one.
   a. Strongly agree
   b. Agree
   c. Disagree
   d. Strongly disagree

4. My teachers praise me when I work hard in school.
   a. Strongly agree
   b. Agree
   c. Disagree
   d. Strongly disagree

5. I have lots of chances to be part of class discussions or activities.
   a. Strongly agree
   b. Agree
   c. Disagree
   d. Strongly disagree

6. My parents notice when I am doing a good job and let me know about it.
   a. Strongly agree
   b. Agree
   c. Disagree
   d. Strongly disagree

7. Do you share your thoughts and feelings with your parents?
   a. Strongly agree
   b. Agree
   c. Disagree
   d. Strongly disagree

8. My parents ask me what I think before most family decisions affecting me are made.
   a. Strongly agree
   b. Agree
   c. Disagree
   d. Strongly disagree

9. If I had a personal problem, I could ask my mom or dad for help.
   a. Strongly agree
   b. Agree
   c. Disagree
   d. Strongly disagree

10. My parents give me lots of chances to do fun things with them.
    a. Strongly agree
    b. Agree
    c. Disagree
    d. Strongly disagree

The following questions ask you about how you act when you face problems or difficulties.

1. I can always manage to solve difficult problems if I try hard enough.
   a. Not at all true
   b. Hardly true
   c. Moderately true
   d. Exactly true

2. It is easy for me to stick to my plans and accomplish my goals.
   a. Not at all true
   b. Hardly true
   c. Moderately true
   d. Exactly true

3. Thanks to my resourcefulness and ability to figure things out, I know how to handle unexpected or unforeseen situations.
   a. Not at all true
   b. Hardly true
   c. Moderately true
   d. Exactly true

4. I can remain calm when facing difficulties because I can rely on my coping abilities.
   a. Not at all true
   b. Hardly true
   c. Moderately true
   d. Exactly true

5. When I am confronted with a problem, I can usually find several solutions
   a. Not at all true
   b. Hardly true
   c. Moderately true
   d. Exactly true

6. If I am in trouble, I can usually think of a solution.
    a. Not at all true
    b. Hardly true
    c. Moderately true
    d. Exactly true

7. I can usually handle whatever comes my way.
    a. Not at all true
    b. Hardly true
    c. Moderately true
    d. Exactly true

8. I spend time identifying long-range goals for myself.
    a. Not at all true
    b. Hardly true
    c. Moderately true
    d. Exactly true

9. I feel in charge of making things happen.
    a. Not at all true
    b. Hardly true
    c. Moderately true
    d. Exactly true

10. I feel responsible for my own life.
    a. Not at all true
    b. Hardly true
    c. Moderately true
    d. Exactly true

11. I feel driven by my personal values.
    a. Not at all true
    b. Hardly true
    c. Moderately true
    d. Exactly true

12. I am driven by a sense of purpose.
    a. Not at all true
    b. Hardly true
    c. Moderately true
    d. Exactly true

13. I am able to choose my own actions.
    a. Not at all true
    b. Hardly true
    c. Moderately true
    d. Exactly true

14. There are abundant opportunities that await me.
    a. Not at all true
    b. Hardly true
    c. Moderately true
    d. Exactly true

The following questions ask you about how you see yourself.

1. On the whole, I am satisfied with myself.
   a. Strongly agree
   b. Agree
   c. Disagree
   d. Strongly disagree

2. I feel that I have a number of good qualities.
   a. Strongly agree
   b. Agree
   c. Disagree
   d. Strongly disagree

3. I feel I do not have much to be proud of.
   a. Strongly agree
   b. Agree
   c. Disagree
   d. Strongly disagree

4. I feel that I'm a person of worth, at least on an equal plane with others.
   a. Strongly agree
   b. Agree
   c. Disagree
   d. Strongly disagree

5. I wish I could have more respect for myself.
   a. Strongly agree
   b. Agree
   c. Disagree
   d. Strongly disagree

6. I take a positive attitude toward myself.
   a. Strongly agree
   b. Agree
   c. Disagree
   d. Strongly disagree

You have finished the survey.
Thank you

Fruits and Vegetables Guide

How much is a cup of fruits and vegetables?

1 CUP	1/2 CUP
 1 Large Banana	 5 Broccoli Florets
 1 Medium Grapefruit	 6 Baby Carrots
 8 Large Strawberries	 1/2 Medium Grapefruit
 1 Medium Potato	 4 Large Strawberries
 12 Baby Carrots	 1 Medium Cantaloupe Wedge
 1 Large Sweet Potato	 16 Grapes
 1 Large Ear of Corn	 1 Large Plum

Source: Centers for Disease Control and Prevention "Know the amounts you need each day"

APPENDIX B.1

Guide For Student Focus Group Discussions

This is a discussion guide to be used by the facilitator(s) of the focus group discussions involving secondary school students.

Questions to prompt discussion:

a. How would you define healthy attitudes and behaviors?

b. What would you describe as your main barriers to adopting healthy attitudes and/or behaviors?

c. What would you describe as your main enablers (i.e. the things that help you) to adopting healthy attitudes and/or behaviors?

d. What health issues or concerns do you consider important for students?

e. Does your school have health promoting activities?

f. What do you think about these health promoting activities?

g. Do you think that they help students live healthier lives? If not, how would you make them better?

h. Have you adopted healthy behaviors as a result of your school's health promoting activities? In other words, have they helped you feel or become healthier?

i. What kind of recommendations would you give us regarding health promoting activities at your school so that they become more popular among students and impact their health?

APPENDIX B.2

Guide For School Staff Focus Group Discussions

This is a discussion guide to be used by the facilitator(s) of the focus group discussions involving school staff (teachers, school nurses and social workers).

Questions to prompt discussion:

a. How would you define health promotion?

b. Describe the health promoting activities that your school is or has been engaged in.

c. In your opinion, which of these activities have been successful and unsuccessful in influencing healthy attitudes and behaviors among students at your school?

d. What are the common characteristics of the activities that have been successful in promoting healthy lifestyles among students?

e. What are the common characteristics of the activities that have not been successful in promoting healthy lifestyles among students?

f. What do you perceive are the main barriers to health promotion at your school?

g. What do you perceive are the main factors enabling health promotion at your school?

h. What health promoting activities and/or approaches would you recommend to your school in order to reach many more students and positively impact their health?

i. Do you think that female and male students should be targeted differently by school-based health promoting activities (for example, using different approaches, touching upon different health issues)? If not, why not?

j. If yes, what could be future directions regarding the design of gender-sensitive (i.e. targeting female students and male students according to their different needs) health promotion at schools?

k. In your opinion, is it feasible to implement gender-sensitive health promoting activities at your secondary schools? Do you foresee any factors acting as barriers to such an approach?

APPENDIX C.1

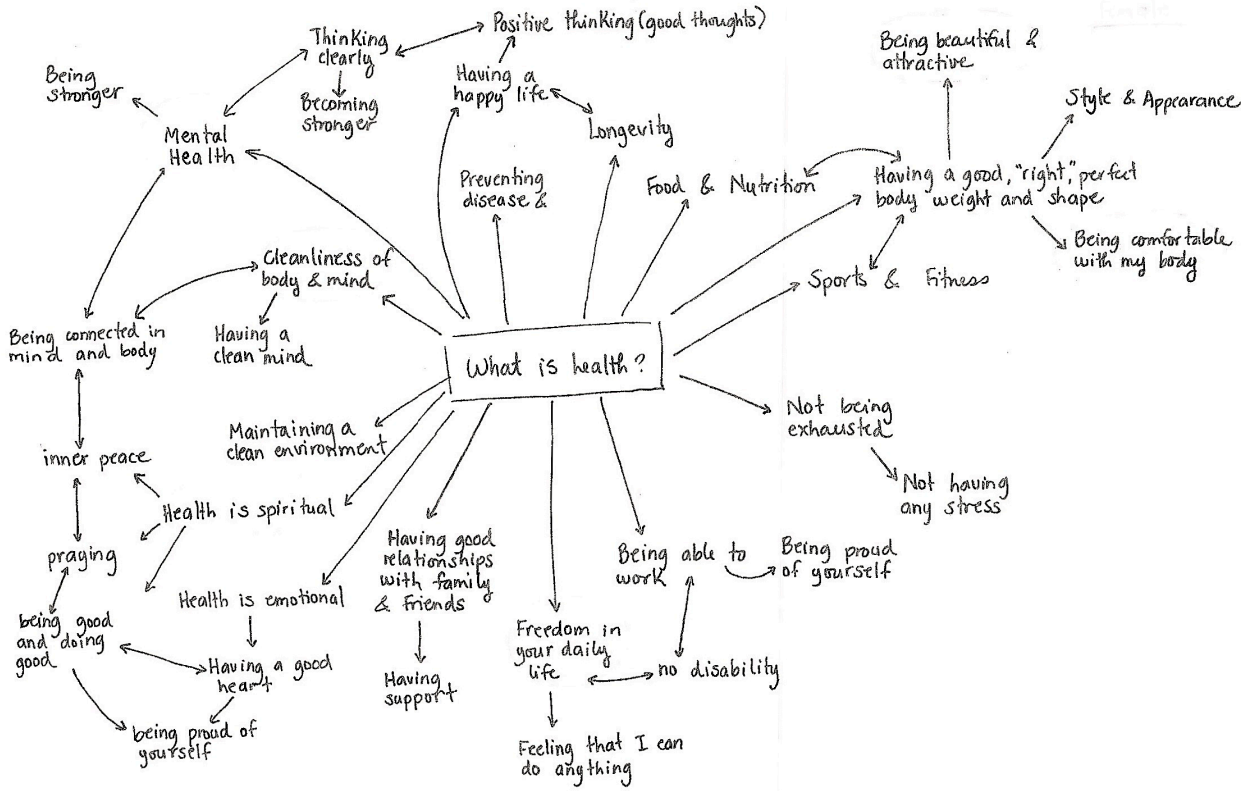
Healthy Eating (HE) Score 5 items Minimum score: 0 Maximum score: 23			
Questionnaire Item	**Code for Points**	**Standard for Maximum Score**	**Standard for Minimum Score of Zero (0)**
During the past week, how often did you eat breakfast?	4 = Always 3 = Most of the time 2 = Sometimes 1 = Rarely 0 = Never	**4** = Student always ate breakfast in the past week	**0** = Student never ate breakfast in the past week
During the past twelve months, have you been weighted and measured?	1 = Yes 0 = No	**1** = Student was weighted and measured at least once in the past twelve months	**0** = Student has not been weighted nor measured in the past twelve months
During the past week, how many times per day did you eat foods high in fat, such as potato chips, chocolates or pastries?	6 = Did not eat 5 = >1 time daily 4 = 1 time daily 3 = 2 times daily 2 = 3 times daily 1 = 4 times daily 0 = 5 times daily	**6** = Student did not eat foods high in fat in the past week	**0** = Student ate foods high in fat 5 times daily in the past week
During the past week, how many times per day did you drink milk or eat milk products, such as yoghurt, laban or cheese?	6 = 5 times daily 5 = 4 times daily 4 = 3 times daily 3 = 2 times daily 2 = 1 time daily 1 = >1 time daily 0 = Did not eat	**6** = Student drank milk or ate milk products 5 times daily in the past week	**0** = Student did not drink milk or eat milk products in the past week
During the past week, how many servings of fruits and vegetables per day did you usually eat?	6 = 5 cups daily 5 = 4 cups daily 4 = 3 cups daily 3 = 2 cups daily 2 = 1 cup daily 1 = >1 cup daily 0 = Did not eat	**6** = Student ate 5 cups of fruits and vegetables daily in the past week	**0** = Student did not eat fruits and vegetables in the past week

APPENDIX C.2

Physical Activity (PA) Score			
3 items Minimum score: 0 Maximum score: 17			
Questionnaire Item	**Code for Points**	**Standard for Maximum Score**	**Standard for Minimum Score of Zero (0)**
During the past twelve months, on how many sports teams did you play?	3 = 3 teams or more 2 = 2 teams 1 = 1 team 0 = 0 teams	**3 =** Student played on 3 sports teams or more in the past twelve months	**0 =** Student did not play on sports teams in the past twelve months
During the past seven days, on how many days did you do exercises to strengthen or tone your muscles, such as push-ups, sit-ups or weight lifting?	7 = 7 days 6 = 6 days 5 = 5 days 4 = 4 days 3 = 3 days 2 = 2 days 1 = 1 day 0 = 0 days	**7=** Student did strengthening exercises seven days in the past week	**0 =** Student did not do strengthening exercises in the past week
During the past seven days, on how many days did you stretching exercises, such as toe touching, knee bending or leg stretching?	7 = 7 days 6 = 6 days 5 = 5 days 4 = 4 days 3 = 3 days 2 = 2 days 1 = 1 day 0 = 0 days	**6 =** Student did stretching exercises seven days in the past week	**0 =** Student did not do stretching exercises in the past week

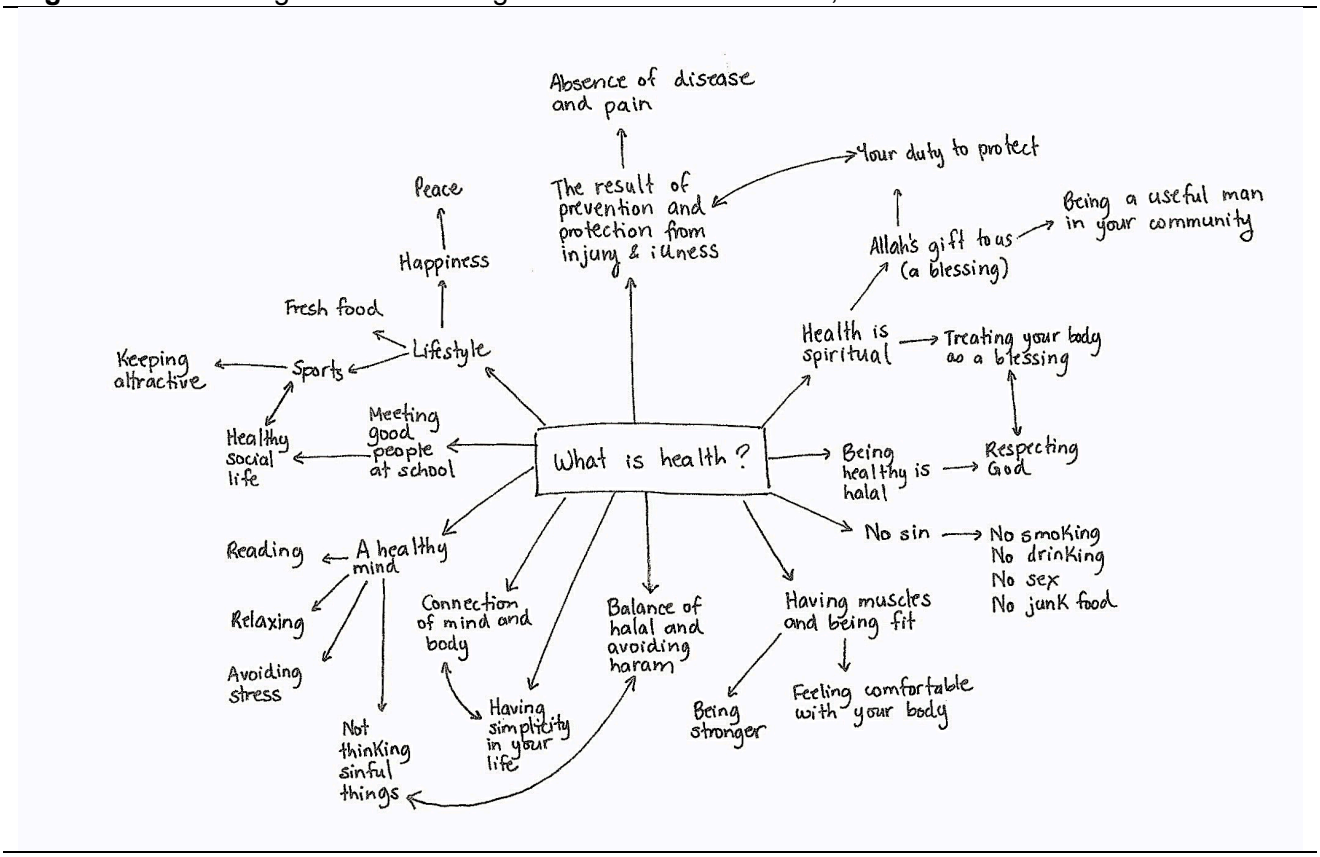
APPENDIX D.1

Figure D.1. Meaning of health among female Grade 12 students, Abu Dhabi 2012



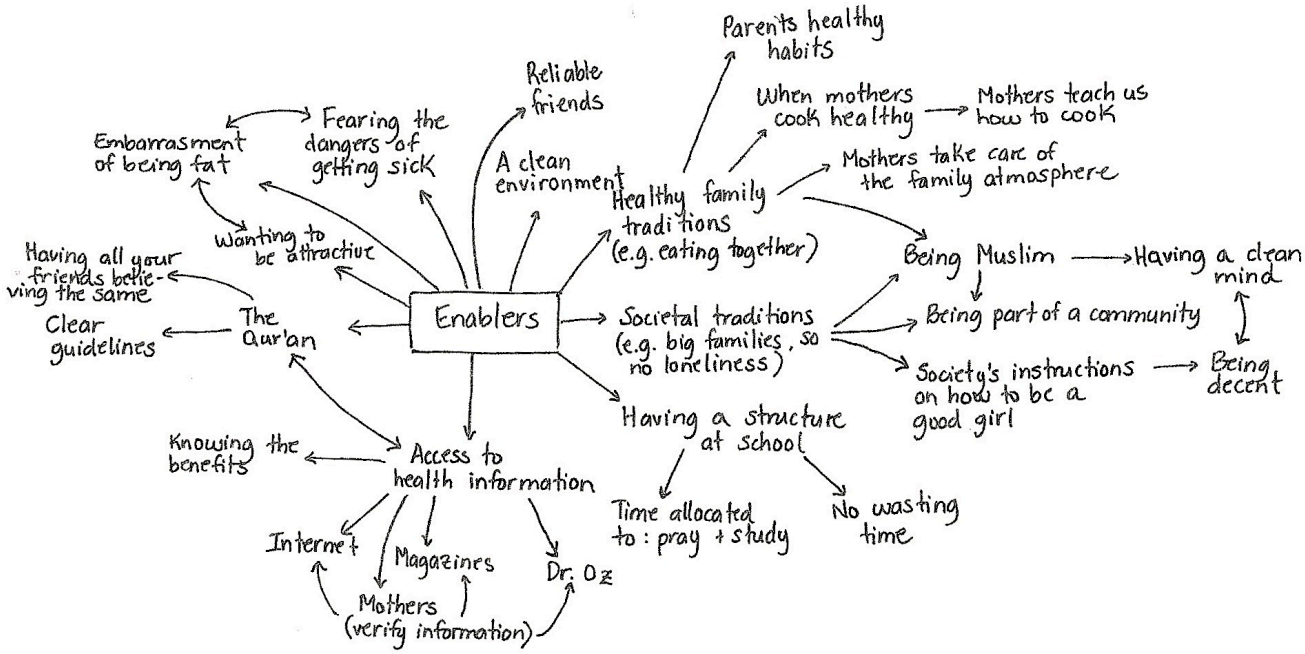
APPENDIX D.2

Figure D.2. Meaning of health among male Grade 12 students, Abu Dhabi 2012



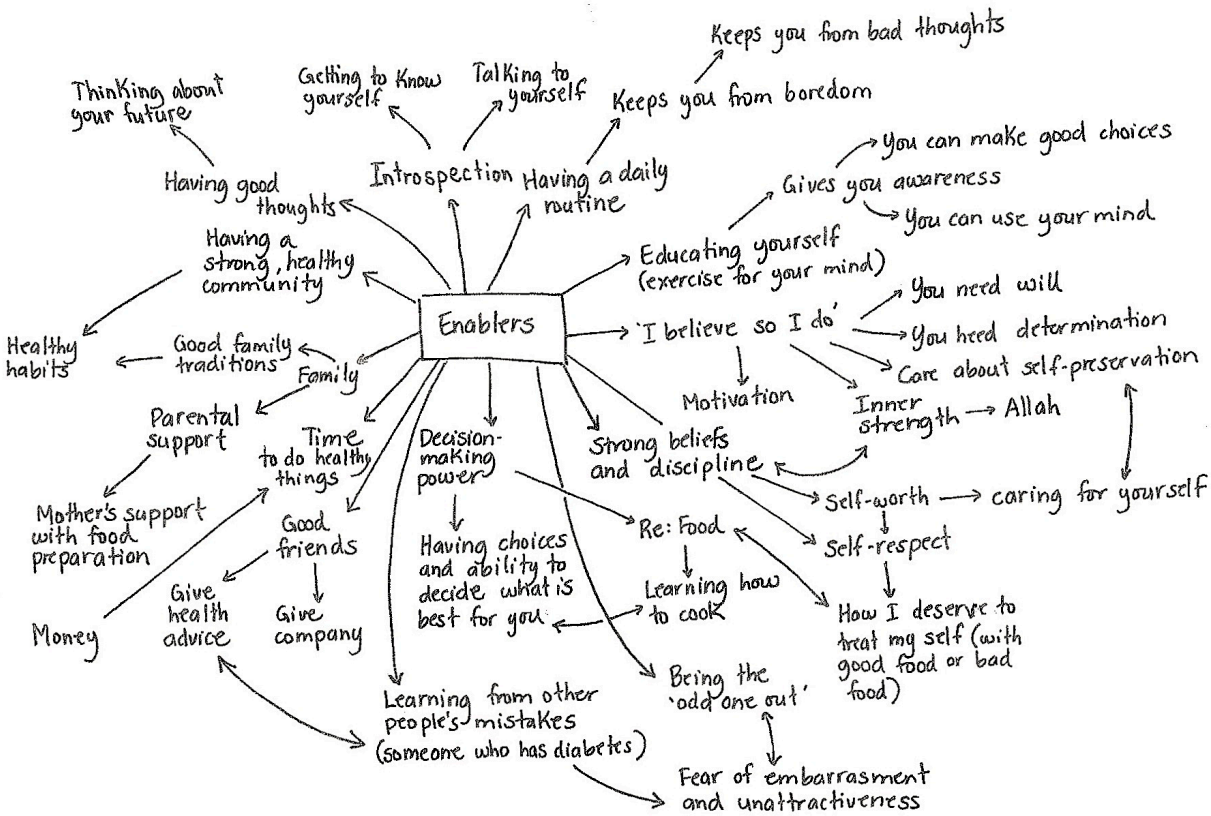
APPENDIX D.3

Figure D.3. Enablers of healthy promoting attitudes and behaviors among female Grade 12 students, Abu Dhabi 2012



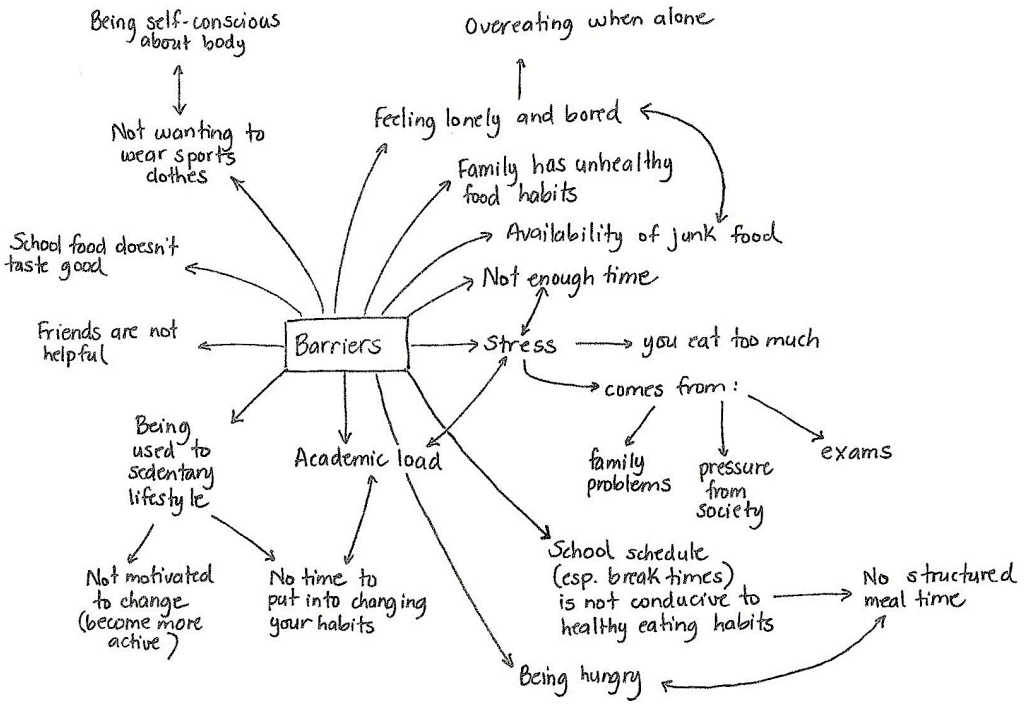
APPENDIX D.4

Figure D.4. Enablers of health promoting attitudes and behaviors among male Grade 12 students, Abu Dhabi 2012



APPENDIX D.5

Figure D.5. Barriers of health promoting attitudes and behaviors among female Grade 12 students, Abu Dhabi 2012



APPENDIX D.6

Figure D.6. Barriers of health promoting attitudes and behaviors among male Grade 12 students, Abu Dhabi 2012