Objective: The aim of this study was to determine self-reported knowledge and practice of physical activity among male school students and their teachers in Al Khobar, Saudi Arabia.

Methods: This was a cross-sectional study conducted in the Al Khobar area, Eastern Province of Saudi Arabia. The target population consisted of third grade intermediate and all three grades of male secondary school students. A multistage stratified self-weighting sampling design was adopted. All students, a total of 1240, in the selected classes as well as their teachers (142) in the selected schools were included in the sample. Two sets of self-administered questionnaires were used: one for male students and the other for teachers. The questionnaire contained demographic data and data on knowledge and practice of physical activity.

Results: The majority of male students knew that physical activity was protective against diseases in general (92.3%) and was helpful in the prevention of obesity (74.4%). Teachers had poor knowledge about the role of physical activity in the prevention of diabetes mellitus and hypertension (36.6% and 28.8% for students vs. 43.0% and 46.5% for teachers respectively). The results and data on knowledge and practice of physical activity.

Significant better knowledge about the benefits of physical activity. Both students and teachers in general (92.8%) and was helpful in the prevention of obesity (74.4%). Teachers had poor knowledge about the role of physical activity in the prevention of diabetes mellitus and hypertension (36.6% and 28.8% for students vs. 43.0% and 46.5% for teachers respectively). The data and data on knowledge and practice of physical activity.

نتائج الدراسة: كانت نسبة كبيرة من الطلاب ترى أن ممارسة الرياضة البنية مفيدة في الوقاية من الأمراض (92.3% و28.8% للطلاب، و28.8% و43.0% للأساتذة). وقد أوضحت الدراسة أن ممارسة الرياضة النشطة عن دور الرياضة البنية في الوقاية من أمراض السكري وارتفاع ضغط الدم الشرياني (36.6% و43.0% للطلاب وأساتذتهم). وكانت ممارسة الرياضة النشطة عن دور الرياضة البنية في الوقاية من أمراض السكري وارتفاع ضغط الدم الشرياني (36.6% و43.0% للطلاب واساتذتهم). وكانت النتيجة النهائية أن العصر ومعرفة أن الرياضة البنية تقي من السمنة من أهم محددات ممارسة الرياضة النشطة عن دور الرياضة البنية. معرفة الأساتذة عن دور الرياضة البنية أفضل من الطلاب، و23.0% والأشعة (36.6% و28.8% للطلاب، و28.8% و43.0% للأساتذة) وكان الغرق ذو دلالات إحصائية. وقد أوضحت الدراسة أن العصر ومعرفة أن الرياضة البنية تقي من السمنة من أهم محددات ممارسة الرياضة النشطة عن دور الرياضة البنية. معرفة الأساتذة عن دور الرياضة البنية أفضل من الطلاب، و23.0% والأشعة (36.6% و28.8% للطلاب، و28.8% و43.0% للأساتذة) كان الغرق ذو دلالات إحصائية. وقد أوضح الدراسة أن العصر ومعرفة أن الرياضة البنية تقي من السمنة من أهم محددات ممارسة الرياضة النشطة عن دور الرياضة البنية. المกายية. كما توصي الدراسة بإنشاء برامج عملية وفعالة لممارسة الرياضة البنية باستمرار.
frequency and duration of practice of effective physical activity were significantly better than their teachers (45.6% and 71.3% for students vs. 23.1% and 36.6% for teachers respectively). Age and the knowledge that exercise protects from obesity were the main determinants of practice of physical activity among male students. Youthfulness was statistically significantly associated with practice of physical activity.

**Conclusions:** Teachers had significantly better knowledge about the benefits of physical activity than their students. Both students and teachers had poor knowledge about the role of physical activity in the prevention of diabetes mellitus and hypertension. Health education should concentrate on clarifying this area. Students practiced effective physical activity significantly more than their teachers. Programs to increase regular physical activity were suggested.

**Key Words:** School students, teachers, knowledge, physical activity

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**INTRODUCTION**

Research has shown that regular exercise/physical activity provides considerable benefits in reducing morbidity and mortality from several chronic diseases in adults. Several studies have shown that the risk of coronary heart disease is reduced by physical activity. Scientific evidence has established an association between regular physical exercise and the lowering of several other risk factors for cardiovascular disease, including blood lipid levels, resting blood pressure among persons with borderline hypertension, overweight, glucose tolerance and insulin sensitivity.

Observations and current studies indicate that today’s children are probably less fit than children of previous decades. Children tend to be more overweight and sedentary than they were before. A recent study of male and female adolescents 10-16 years of age, in the USA, showed that the weight status of male adolescents appears to be more related to exercise habits than to television or video game habits. Increased participation in high-intensity exercise appears to be important. A survey of the associations between physical activity and other health behaviors in a sample of United States high school children showed that low physical activity was associated with several other negative health behavior in teenagers. These included cigarette smoking, marijuana use, lower fruit and vegetable consumption, greater television watching, and failure to wear a seat belt.

Al Refaee and Al-Hazza in their study of 1333 Saudi males 19 years and older in Riyadh, Saudi Arabia, had shown that over 53% of Saudi males were totally physically inactive, and another 27.5% were irregularly active. Only 19% of the entire sample were active on a regular basis. Results of heart rate telemetry of Saudi boys during and after school time indicated that Saudi boys spent on the average a limited time on activities that raised the heart rate above 159 beats per minute. The study showed that both levels of moderate and vigorous physical activities among Saudi boys were considerably lower than those levels reported from other countries.

The aim of this study was to determine self-reported knowledge and practice of physical exercise among male school children and their teachers in Al Khobar, Saudi Arabia.

**MATERIALS AND METHODS**

This was a cross-sectional study conducted in the Al Khobar area, Eastern Province of Saudi Arabia in November 1998. The target population consisted of third grade intermediate and all three grades of secondary school male students (both Saudis and Non-Saudis) in the Al Khobar area. A multistage stratified self-weighting sampling design was adopted. The schools were divided into government and private, and further classified as intermediate or secondary. At the first stage, a systematic random sampling procedure (probability proportional to size) was used to select the schools. At the second stage, classes were selected at each level using simple random sampling design. All students in the selected classes were included in the study. The total number of selected students was 1240. All teachers in the selected schools were included in the sample. There were 142 male teachers, 75.4% belonging to government and 24.6% to private schools.
Two sets of self-administered questionnaires were used: one for male students and the other for teachers. The questionnaire was part of a comprehensive questionnaire on life-style, knowledge and self-reported behavior among students and teachers in Al Khobar schools. The questionnaire contained questions on demographic data, data on knowledge about physical activity such as benefits, frequency, duration, and on practice of physical exercise. Other questions also included knowledge about healthy foods, obesity, diabetes mellitus, hypertension, smoking, and drug addiction.

Three male physicians participated in the data collection under standardized conditions. A similar questionnaire administered to female students and female teachers will be reported on in a separate paper. Physical activity was defined as any bodily movement produced by skeletal muscles that results in energy expenditure above the basal level. Effective physical activity was defined as regular exercise three or more times per week for at least 20 minutes. A pilot study was conducted to test the questionnaires and organizational procedures. The field work took about eight weeks. Those who were absent or on vacation were interviewed during this period, so a response rate of 100% was obtained. SPSSPC computer software was used for data analysis. The difference between two proportions (using X²-test) was used to detect any significant difference between students and teachers. Test-retest method was used to check for reliability of the questions. Reliability was calculated for each question concerned with self-reported knowledge and behavior. Kappa statistic was found to range from 0.4 to 0.7. This was considered as fair to good reliability.

RESULTS

Table 1 shows the demographic characteristics of students and teachers. About three-quarters of the selected schools were government schools. Students in the secondary schools comprised 59% while the majority of teachers were in the intermediate schools. The majority of students and teachers were Saudis. The mean age of the students was 16.5 ± 1.8 years while that of teachers was 35.1 ± 8.8 years respectively.

The majority of the students knew that exercise in general protects from certain diseases (92.8%) and could prevent obesity (74.4%) as shown in Table 2. Fewer students knew about the beneficial effects of physical activity in the prevention of heart disease, hypertension, diabetes mellitus, smoking, psychological and other diseases. Teachers had significantly better knowledge about the benefits of physical activity. The poor knowledge of both students and teachers about the role of physical activity in the prevention of diabetes mellitus and hypertension was a surprising result.

The frequency and duration of practice of effective physical activity were better in the case of students than their teachers as shown in Table 3. The difference was statistically significant. In addition, a significantly higher proportion of...
Table 3: Self-reported practice of physical exercise by male students and their teachers in Al Khobar area

| Practice of physical exercise | Male students (n=1240) | Male teachers (n=142) | p-value (X²-test) |
|------------------------------|------------------------|-----------------------|------------------|
| Frequency of practice of physical exercise: | | | |
| Three or more times/week | 565 (45.6) | 27 (23.1) | 0.00001 |
| Time spent in practice of physical exercise: | | | |
| Half an hour or more | 884 (71.3) | 52 (36.6) | 0.0000 |
| Those who practice physical exercise | 1129 (91.0) | 103 (72.5) | 0.0000 |

Students than their teachers reported that they practiced physical activity (92% vs. 76% respectively). The main types of exercise for students were football (69.8%), swimming (39.6%), walking (32.7%), and jogging (27.7%). For teachers, it was mainly walking (58.5%), football (27.5%), swimming (26.8%), and jogging (15.5%). Working out in a gymnasium was practiced the least by both students and teachers (7.1% vs. 6.3% respectively).

Obesity was significantly associated with the practice of physical activity (p=0.000). About 75.0% of non-obese students (body mass index [BMI] < 25 kg/m²) did physical exercise compared with 13.3% who were overweight and 11.5% who were obese (BMI ≥ 30 kg/m²). There was no significant difference between obese and non-obese students on the knowledge of the health benefits of physical activity.

Parents' education (both father and mother) was not significantly associated with the practice of physical exercise among students. However, mother's education was significantly associated with student's knowledge that physical activity prevented hypertension, heart disease, obesity, smoking, and psychological stress. The higher the educational level of the mother (from primary up to university), the better the student's knowledge was.

Students in government schools were not different from those in private schools in terms of exercise patterns. However, the knowledge of students in government schools about the benefits of physical activity was significantly better than that of students in private schools. A higher proportion of students in government schools reported that exercise prevented hypertension, diabetes mellitus, and heart disease (66.6%, 67.3%, 68.9% vs 33.4%, 32.7%, 31.1% respectively).

Logistic regression analysis was used to identify the determinants of the practice of physical activity among male students while controlling for other variables. Nineteen independent variables were entered into the model (Appendix 1). The only two variables found to be significantly associated with the practice of physical activity were age and the knowledge that exercise protects from obesity. Younger students were 7% more likely to practice physical activity than older students. Students who knew that exercise protects from obesity were 7 times more likely to practice physical activity than students who had no such knowledge (Table 4). Further analysis showed that there was a statistically significant, steady and consistent decline in the level of exercise habits with age from third grade intermediate up to third grade secondary school (96.8% practice at age 14 years compared to 85.1% at age 18 years). This decline was also coupled with inadequate knowledge about the benefits of physical activity. A significantly lower proportion of older students (ages 18-23 years) reported that exercise prevented smoking, hypertension, diabetes mellitus, heart disease, and psychological stress than younger students (ages 12-17 years).

DISCUSSION
In this study, students were found knowledgeable on the health benefits of physical activity. This is a desirable situation that has to be maintained, developed and improved by well-organized school health education programs. However, students'
knowledge about beneficial effects of exercise against specific chronic serious problems such as diabetes mellitus and hypertension was not adequate. This reflects their lack of orientation about these common chronic health problems which might possibly be due to the lack of health information at school or in the mass media, or the lack of enough material about health and disease in the school curriculum.

A study of the prevalence of cardiovascular risk factors, attitudes and behavior in Abha, Saudi Arabia, for Saudis 20 years and above, showed that 22.6% of inactive people perceived their inactivity as harmful to health.23 The results were similar to the study conducted among college students in Canada, Nigeria and the United States to detect the adequacy of health knowledge necessary for a healthy life. These showed that chronic diseases and physical fitness were the greatest areas of weakness in health knowledge.24-26

Moreover, the results showed that male teachers were more knowledgeable than students on the preventive benefits of physical activity. This result probably reflects their longer experience in life.

A significant proportion of students more than their teachers claimed to do physical exercise. This is encouraging and should be maintained among this young generation in order to enable them to live a healthy life. Since all age groups lead a sedentary life what with all the television they watch, encouragement of physical activity will no doubt be very beneficial. However, the practice of physical activity among teachers was less than that among their students. This finding could be partly due to the fact that teachers are rather busy and partly because of their age.

The finding that practice of physical activity was significantly low among obese students was consistent with several studies which showed that obese subjects were less active than non-obese persons.11,12 Al-Refaee and Al-Hazzaa in their study on Saudi males 19 years and older showed a higher percentage of obesity among inactive (18%) than among active (13%) groups.14

The influence of mother's education on student's knowledge of the benefits of physical activity was an interesting finding. A possible explanation might be that educated mothers are more conscious and worried about the health of their children and try to influence their activities. Further enquiry is needed to explore this point for future intervention strategies to promote physical activity. Students in government schools were more knowledgeable about the benefits of physical activity than those in private schools. Although three-quarters of students were from government schools, no explanation could be given for this difference. The curriculum of the schools, the teachers' roles, and health education opportunities might have played a role in this.

Possible reasons for younger students practising physical activity more than older students were that older students might be spending most of their time on the internet, watching television, or playing videogames. Another reason might be the high prevalence of obesity among older students. This study showed a significant association between knowledge that exercise protects from obesity and the practice of physical exercise. A similar study in the USA found a significant relation between physical activity and healthy eating.27 The steady decline in the level of exercising habits of students with age and with class level was consistent with many findings from Saudi Arabia28,29 and Western countries.30,31 Although psychosocial factors and students beliefs were shown by some studies to be important determinants of physical exercise,22,33 these were not explored in this study.

CONCLUSIONS AND RECOMMENDATIONS

Teachers had significantly better knowledge about the benefits of physical activity than their students. Both students and teachers had poor knowledge about the role of physical activity in the prevention of diabetes mellitus and hypertension. Health education should concentrate clarifying these areas. Students practice effective physical activity better than their teachers. Age and the knowledge that exercise protects from obesity were the main determinants of the practice of physical activity among male students. These findings support the need for health promotion programs that will increase the number of physically active students. Positive long-term lifestyle changes, including physical exercise, need to be established early in life because cardiovascular risk factors, including obesity, tend to begin from childhood in to adulthood.32,33 Therefore, programs to increase regular physical
activity should be established. Such programs should include health education, increased supervised physical education and physical exercise sessions, competition and prizes, and active teachers’ involvement.

ACKNOWLEDGMENT
The author extends his thanks and appreciation to the faculty and staff of King Abdulaziz City for Science and Technology (KACST) for their support in conducting this study, and to all schools administrators, teachers and students.

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Appendix 1
Independent variables entered into the logistic regression model

1. Type of school (government/private; intermediate/secondary)
2. Age
3. Nationality
4. Father’s and mother’s education
5. Weight
6. Height
7. Body mass index
8. Knowledge of healthy fats in food
9. Knowledge of benefits of fiber-rich diets
10. Knowledge of dangers of drug addiction
11. Knowledge of complications of diabetes mellitus
12. Knowledge of complications of high blood pressure
13. Knowledge of complications of obesity
14. Knowledge that exercise protects from disease
15. Knowledge that exercise protects from heart disease
16. Knowledge that exercise protects from obesity
17. Knowledge of toxic substances in cigarettes
18. Knowledge of dangers of passive smoking
19. Current cigarette smoking