Knowledge, attitudes, and resources of sex education among female adolescents in public and private schools in Central Saudi Arabia

AlJoharah M. Alquaiz, MSc, MRCGP, *Maha A. Almuneef,* MD, FAAP, *Hafsa R. Minhas,* MD, FCP.

ABSTRACT

الأهداف: قياس المعلومات والمصادر والمواقف للثقافة الجنسية والصحة الانجابية بين المراهقات السعوديات في المدارس الخاصة والحكومية في مدينة الرياض.

الطريقة: أجريت دراسة مقطعية خلال الفترة من يناير 2009م حتى أبريل 2009م. تراوحت أعمار الطالبات من 11ـ 21 عام. تم اختيار 5 فصول عشوائية من المرحلة المتوسطة والثانوية من مدرستين في مدارس مدينة الرياض، وضمت الدراسة على 417 طالبة أجبن على الاستبيان.

النتائج: تحدث (42%) من الطالبات عن الأمور الجنسية مع زميلاتهن. حيث ذكر (15.8%) فقط من المشاركات في الدراسة أنهم ناقشوا المواضيع الجنسية براحة مع أمهاتهن وتحدث (17.3%) من الطالبات عن الأمور الجنسة مع العاملة المنزلية. ذكر غالبية الطالبات (61%) أن المدرسات كانت مواقفهن سلبية عندما كن يسألن عن مواضيع جنسية. وقد وجد كذلك أن (33.3%) من الطالبات عرفن أن مرض الزهري مرض تناسلي، و(37.9%) للسيلان، و(14.5%) لالتهاب الكبد الوبائي "ب". ولم يكن هناك فروقات تذكر بين المدارس الحكومية والخاصة بالنسبة لثقافة البلوغ والثقافة الجنسية.

خاتمة: يجب أن تدرس الثقافة الجنسية ضمن المنهج الدراسي مع الأخذ في الأعتبار تعاليم ديننا وعاداتنا وتقاليدنا. كما يجب على الوالدين والمدرسات أن يكن أكثر انفتاحا في مناقشة الأمور الجنسية مع بناتهن وطالباتهن.

Objectives: To investigate the knowledge and sources of knowledge among Saudi female adolescent students, attending public and private schools in the city of Riyadh with regard to sexuality and reproductive health.

Methods: This cross sectional survey was conducted from January to April 2009. Female adolescents between 11 and 21 years of age were invited to participate in the survey. Five classes of intermediate and secondary levels were randomly selected from 2 schools in Riyadh city. A total of 417 female students were included into the sample. Students were asked to answer a self-administrated questionnaire.

Results: Forty-two percent of the participants reported that they discussed sexual matters with their friends. Only 15.8% discussed these matters with their parents (mothers). Interestingly, 17.3% discussed sexual matters with the domestic helper. Most (61%) reported that their teachers had negative attitudes toward questions related to sexual issues. Only 33.3%, 37.9% and 14.5% knew that syphilis, gonorrhea, and hepatitis B, are sexually transmitted diseases. No significant differences were found between students in private schools and public schools.

Conclusion: Formal sexual education should be introduced in the curriculum of the schools within the context of our religion and culture. Parents and teachers should be more open to discuss sexual issues with their children and students.

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From the Princess Nora bint Abdallah Chair for Women's Health Research (Alquaiz, Minhas), King Saud University, and the National Program for Family Safety (Almuneef), National Guard Hospital, Riyadh, Kingdom of Saudi Arabia.

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Address correspondence and reprint request to: Dr. AlJoharah M. Alquaiz, Department of Family and Community Medicine, College of Medicine, King Saud University, PO Box 231831, Riyadh 11321, Kingdom of Saudi Arabia. Tel. +966 (1) 4690186. E-mail: Jalquaiz@yahoo.com

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Adolescents are particularly vulnerable to being misled if they are not properly informed around a range of life matters. Accurate and timely sex education in adolescents can augment their knowledge on sexuality, reproductive health, and modify behaviors.[1] The fear that formal sexual education can increase sexual behavior has been shown to be untrue.[2] In fact, reviews of sexuality education programs worldwide show that they generally do not encourage early sexual activity. On the contrary, if prepared right, the programs can delay first intercourse, and lead to a more consistent contraceptive use, and safe sexual practices.[3] In most of the Middle East and North African (MENA) countries, sexual and reproductive health is politically and culturally sensitive issue.[4] As a result, reproductive health information and services do not reach the majority of adolescents, leading to misconception, confusion, and lack of awareness among this vulnerable group. Few countries such as Tunisia, Morocco, Yemen, Turkey, and Iran have begun to focus on youth sexual and reproductive issues, using international policy frameworks to map out their approach.[4] Sex education includes a broad spectrum of subject matters, such as puberty and puberty related topics, reproductive system anatomy and physiology, pregnancy and birth, contraception and infertility, violence between genders, sexually transmitted Infections by diseases (STDs), and human immunodeficiency virus (HIV).[5] Among all the developmental milestones, puberty may be the most noteworthy. It refers to the process of physical changes, by which a child's body becomes that of an adult, capable of reproduction. A recent study conducted in Sultanate of Oman has shown that pubertal changes were neither identified, nor apprehended among youths as they reached puberty.[6] Ali et al[7] found that only 66% of their study participants were able to identify correctly the names of reproductive organs. In the new era of globalization, adolescents are exposed to unlimited information from numerous resources. Television, movies, music, magazines and internet play a pivotal role in providing information on every topic, particularly sexuality and reproductive health. However, in many instances, the information provided is not accurate or culturally competent.[8-10] While parents and schools should play a significant role in providing sex education, studies show that parents rarely talk in a timely and comprehensive manner to their children, and schools are limited in what they can teach.[11] To counteract any possible adverse physiological impact that information from the mass media can have on adolescents, a French study conducted by the Population Council suggested that adolescents need more accurate information on sexuality and reproductive health, including physiological changes during puberty.[12] Research on youth sexuality in MENA countries is still in the early phase of establishing a baseline of information on knowledge, attitudes, and behaviors among diverse populations.4 There are some unpublished reports regarding the level of sexual education imparted through the schools in the Kingdom of Saudi Arabia (KSA), but no scientific epidemiological survey has been conducted among adolescent girls on sexual health in KSA. This study is conducted to determine sexual knowledge, and the sources of information among the female adolescent population in public and private schools in Riyadh city; in an attempt to highlight the need for sex education programs in schools.

Methods. A cross-sectional survey was conducted among adolescent girls attending private and public schools in Riyadh city, KSA, from January to April 2009. The initial aim was to include male and female students. A total of 4 schools, from the different regions of the city of Riyadh were randomly selected. From these schools, a random sample of the required number of male and female students, intermediate and secondary school levels was selected from both public and private schools. On average, each school has 5-6 classes of each grade, with approximately 25-30 students per class. The first part of the project was on prevalence and correlates of sexual violence among adolescent females,[13] and this is the second part. Since no studies were available on sexual education in KSA, therefore figures from a regional country (Egypt)[4] were taken. Assuming a prevalence of sexual education of 5% among the school going girls, with 2% width of confidence interval, and at 0.05 significance level, we need to interview 419 adolescent girls. A response rate of 80-90% was assumed with a final sample size of 500 female, and 500 male students. An approval of the Riyadh Regional Education Supervision Office to conduct this study was obtained for female students only. Consents were also taken from the school principals. Students were invited to answer a self-administered questionnaire. Students whose classes were randomly selected were invited to participate in the study, those who refused were excluded, and the study objectives were explained clearly. Confidentiality of the written information was assured, and students were instructed not to write their names. Further, the names of the schools were also kept confidential. The sample was then divided equally between the public

and the private schools, and further divided equally between the intermediate and the secondary levels. Five classes from the intermediate level, and 5 classes from the secondary level from each public, or private school were randomly selected. All the classes belonging to the same level were coded, and mentioned on separate slips of paper. Five classes per level were randomly selected out of these, and all students in the selected class were invited to participate in the survey. The final sample size was 417 female students. The sample included 251 participants from public schools, divided equally between intermediate and the secondary level, and 166 participants from private female schools (84 intermediate levels and 82 secondary levels).

Data collection instrument. Students were asked to complete 5 pages of self-administered questionnaire. The first section was on socio-demographic characteristics included age; marital status; school grade; siblings; order among siblings; state of parents, whether living together or separated; with whom the student is living; and educational level of the parents. The second section was exploring knowledge on pubertal changes that occur in boys and girls, sources of knowledge, parents, and school's role in explaining these changes. The third section was examining sexual knowledge and sources by asking about sexual intercourse, sexual topics discussed in school, whether the school curriculum was enough to provide reasonable sexual knowledge, attitudes of teachers and parents towards questions related to sex. There were also questions on the suggested age to start sexual education, and with whom they felt comfortable to discuss sexual matters. Sexual intercourse was defined as "the penetration of the male penis into the female vagina".[14] Participants more than 14 years of age were also asked to answer questions on normal and abnormal sexual behaviors, and sexually transmitted disease. All questions were close ended (options were available for the students to mark). The questionnaire was first pre-tested and validated on a sample of 30 adolescents. Students in the classrooms were asked to answer the questionnaire in private. The time allocated for answering the questionnaire was 15 minutes. The questions were further explained to participants, as much as possible, using simple and clear Arabic language. Two to 3 research assistants attended and supervised each class, and asked to clarify any of the questions on the questionnaire. Teachers and school staff were not present, while the questionnaire was completed by the students.

Education in KSA is provided separately for males and for females with 3 educational levels; primary school level (grade 1-6) attended by 6-12 years old children, intermediate school level (grade 7-9) attended by 13-15 years old children, and secondary school level (grade 10-12) attended by 16-18 years old adolescents. All 3 levels of schooling are provided by the government to all children living in KSA. Nevertheless, private schools are on the increase, providing the same curriculum as the public schools, with additional English language courses. Private schools are attended by children of families who can afford their tuition.

Statistical analysis. Data entry and data analysis were carried out using Statistical Package for Social Sciences version 13 (SPSS Inc, Chicago, IL, USA). The data were presented as proportions along with 95% confidence interval and p-value. P-value was significant at <0.05. The main plan for the analysis was to measure the frequency distribution of specific variables independently for the whole group, and subsequently for the subgroups of participants attending either, public or private schools. Chi-squared test was used to examine the distribution of the data and the differences between the public and the private schools.

Results. The age of the 417 students ranged from 11-21 years, with a mean of 15.1±1.87 years. There were 382 students (91.6%; CI: 88.9-94.2%) who lived in 2 parents household, while only 34 (8.2%, CI: 5.5-10.8%) lived in a single parent household (**Table 1**).

Table 2 shows the pubertal and sex related knowledge of the students. Most students 384 (92.1%, CI: 89.5 - 94.6%) had general knowledge on puberty with no difference between public and private schools. However, only 295 (70.7%, CI: 66.3-75%) were aware of the physiological and anatomical changes, which occur at puberty before their own puberty commenced. Only 267 (64%, CI: 59.3-68.6%) knew how intercourse occurs. Knowledge on some sexual behaviors' terms and their definitions, such as gays (men having sex with men) were reported by 183 participant students (70.1%, CI: 65.7-74.5%), lesbian (women having sex with women) by 131 students (50.2%, Ci: 45.4-55%). The term masturbation was known by only 88 students (33.7%, CI: 29.1-38.2%). Adolescent females attending private schools were more likely to know, and define the term "masturbation" compared to those attending public schools (45.8%, CI: 38.2-53.3%) versus (28.1%, CI: 22.5 - 33.6%) (x^2=7.16, p=0.0074). In most participant students 250 (95.8%, CI: 93.3% to 98.2%) knew that HIV is a sexually transmitted disease, while only 100 students (38.3%, CI: 32.4-44.2%) had knowledge on syphilis, and 99 students (37.9%, CI: 32-43.7%) had knowledge on gonorrhea. Only 38 students (14.6%, CI: 16.3-18.8%) knew that

Table 1 - Socio-demographic characteristics of female adolescent students attending public and private schools in the city of Riyadh.

Characteristics	Total N=417 (%)	Private n=166 (%) (95% CI)	Public n=251 (%)	X^2	*P*-value
Age*					
≥12 years	22 (5.3) (3.0 - 7.5)	14 (8.4) (4.1 - 12.6)	8 (3.2) (1.0 - 5.3)	2.98	0.08
13-15 years	196 (47.0) (41.9 - 52.0)	82 (49.4) (41.7 - 57.0)	114 (45.4) (39.2 - 51.5)		
>15 years	164 (39.3) (34.3 - 44.2)	55 (33.1) (25.9 - 40.2)	109 (43.4) (37.2 - 49.5)		
School level					
Intermediate	210 (50.4) (45.6 - 55.2)	84 (50.6) (42.9 - 58.2)	126 (50.2) (44.0 - 56.3)	0.01	0.98
Secondary	207 (49.6) (44.8 - 54.4)	82 (49.4) (41.7 - 57.0)	125 (49.8) (43.6-55.9)		
Marital status					
Married	7 (1.7) (0.4 - 2.9)	6 (3.6) (0.7 - 6.4)	1 (0.4) (-0.3 - 1.1)	4.46	0.0175*
Single	410 (98.3) (97 - 99.5)	160 (96.4) (93.5 - 99.2)	250 (99.6) (98.8 - 100.3)		
Parent status					
Live together	382 (91.6) (88.9 - 94.2)	153 (92.2) (88.1 - 96.2)	229 (91.2) (87.7 - 94.7)	0.11	0.948
Separated	14 (3.4) (1.6 - 5.1)	5 (3.0) (0.4 - 5.6)	9 (3.6) (1.3 - 5.9)		
One of them is dead	20 (4.8) (2.7 - 6.8)	8 (4.8) (1.5 - 8.0)	12 (4.8) (2.1 - 7.4)		
Father's education					
Intermediate	45 (10.8) (7.8 - 13.7)	3 (1.8) (-0.2 - 3.8)	42 (16.7) (12.0 - 21.3)	44.34	0.0000†
Secondary	49 (11.8) (8.7 - 14.9)	9 (5.4) (1.9 - 8.8)	40 (15.9) (11.3 - 20.4)		
College	181 (43.4) (38.6 - 48.1)	75 (45.2) (37.6 - 52.7)	106 (42.2) (36.0 - 48.3)		
Postgraduate	137 (32.9) (28.3 - 34.4)	76 (45.8) (38.2 - 53.3)	61 (24.3) (18.9 - 29.6)		
Mother's education					
Cannot read or write	15 (3.6) (1.8 - 5.3)	2 (1.2) (-0.4 - 2.8)	13 (5.2) (2.4 - 7.9)	21.62	0.0006†
Elementary	24 (5.8) (3.5 - 8.0)	2 (1.2) (-0.4 - 2.8)	22 (8.8) (5.3 - 12.3)		
Intermediate	41 (9.8) (6.9 - 12.6)	12 (7.2) (3.2 - 11.1)	29 (11.6) (7.6 - 15.5)		
Secondary	108 (25.9) (21.7 - 30.1)	44 (26.5) (19.7 - 33.2)	64 (25.5) (20.1 - 30.8)		
College	160 (38.4) (33.7 - 43.0)	70 (42.2) (34.6 - 49.7)	90 (35.9) (29.9 - 41.8)		
Postgraduate	67 (16.1) (12.8 - 19.6)	35 (21.1) (14.8 - 27.3)	32 (12.7) (8.5 - 16.8)		
Residency					
With both parents	382 (91.6) (88.9 - 94.2)	152 (91.6) (87.3 - 95.8)	229 (91.2) (87.7 - 94.7)	0.02	0.89
With one parent	34 (8.2) (5.5 - 10.8)	13 (7.8) (3.7 - 11.8)	22 (8.8) (5.3 - 12.3)		

*37 adolescent did not record their ages, †p<0.005

hepatitis B can be a sexually transmitted disease. There were no differences between public and private schools on knowledge related to sexually transmitted diseases (STDs). **Table 3** shows the sources of sexual knowledge of adolescent females attending public and private school in the city of Riyadh. Most participants (n=239, 57.3%, CI: 52.5-62%) reported their mothers as having the major role in the explanation of sex

Table 2 - Pubertal and sexual knowledge of female adolescent students attending public and private schools in the city of Riyadh.

Definition	Total N=417 (%)	Private schools n=166 (%)	Public schools n=251(%)	x^2	*P*-value
Students who have knowledge about puberty					
Yes	384 (92.1) (89.5 - 94.6)	156 (94.0) (90.3 - 97.6)	228 (90.8) (87.2-94.3)	0.95	0.328
No	33 (7.9) (5.3 - 10.4)	10 (6.0) (2.3 - 9.6)	23 (9.2) (5.6 - 12.7)		
Students who were aware of puberty changes before it happened to them					
Yes	295 (70.7) (66.3 - 75.0)	115 (69.3) (6.2 - 76.3)	180 (71.7) (66.1 - 77.2)	0.18	0.67
No	122 (29.3) (24.9 - 33.6)	51 (30.7) (23.6 - 37.7)	71 (28.3) (22.7 - 33.8)		
Students who know how intermarriage occur					
Yes	267 (64.0) (59.3 - 68.6)	108 (65.1) (57.8 - 72.3)	159 (63.3) (57.3 - 69.2)	0.127	0.721
No	150 (36.0) (31.3 - 40.6)	58 (34.9) (27.6 - 42.1)	92 (36.7) (30.7 - 42.6)		
Students who have knowledge about sexual terms*					
Gays (n=261)					
Yes	183 (70.1) (65.7 - 74.5)	64 (77.1) (70.7 - 83.4)	119 (66.9) (61.0 - 72.7)	2.37	0.123
No	78 (29.9) (25.5 - 34.3)	19 (22.9) (16.5 - 29.2)	59 (36.7) (30.7 - 42.6)		
Lesbians (n=261)					
Yes	131 (50.2) (45.4 - 55.0)	37 (44.6) (37.0 -52.1)	94 (52.8) (46.6 - 58.8)	1.22	0.266
No	130 (49.8) (45.0 - 54.6)	46 (55.4) (47.8 - 62.9)	84 (47.2) (41.0 - 53.3)		
Masturbation (n=261)					
Yes	88 (33.7) (29.1 - 38.2)	38 (45.8) (38.2 - 53.3)	50 (28.1) (22.5 - 33.6)	7.16	0.0074†
No	173 (66.3) (61.7 - 70.8)	45 (54.2) (46.6 - 61.7)	128 (71.9) (66.3 - 77.4)		
Students who have knowledge about STD §					
HIV (n=261)					
Yes	250 (95.8) (93.3 - 98.2)	80 (96.4) (93.5 - 99.2)	170 (95.5) (92.9-98.0)	-	0.5‡
No	11 (4.2) (1.7 - 6.6)	3 (3.6) (0.7 - 6.4)	8 (4.5) (1.94 - 7.0)		
Syphilis (n=261)					
Yes	100 (38.3%) (32.4 - 44.2)	36 (43.4) (35.8 - 50.94)	64 (36.0) (30.0 - 41.94)	2.65	0.103
No	161 (61.7%) (55.8 - 67.6)	47 (56.6) (49.0 - 64.1)	134 (75.3) (69.9 - 80.6)		
Gonorrhea (n=261)					
Yes	99 (37.9%) (32.0-43.7)	37 (44.6) (37.0 - 52.1)	62 (34.8) (28.9 - 40.6)	1.89	0.169
No	162 (62.1%) (56.2 - 67.9)	46 (55.4) (47.8 - 62.9)	116 (65.2) (59.3 - 71.0)		
Hepatitis B virus (n=261)					
Yes	38 (14.6) (16.3 - 18.8)	12 (14.5) (9.1 - 19.8)	26 (14.6) (10.2 - 18.9)	0.02	0.87
No	223 (85.4) (81.1 - 89.6)	71 (85.5) (80.1 - 90.8)	152 (85.4) (81.0 - 89.7)		

*Students who answered this question were above 14 years of age n=261, †$p<0.05$, ‡Fisher Test, §sexually transmitted disease, HIV - human immune deficiency virus

related issues, while only 106 participants (25.4%, CI: 21.2-29.5%) reported that they had the support of both parents in maintaining their self-esteem, and increasing their self confidence by explaining all the concepts related to sexuality. Sixty-nine participants (16.5%, CI: 12.9-20%) reported that they had no support from either parent in explaining sexual concepts. Although 189 (45.3%, CI: 40.5-50%) thought that the school

Table 3 - Sources of sexual knowledge for female adolescent students attending public and private schools in the city of Riyadh.

Variables	Total N=417 (%)	Private schools n=166 (%)	Public schools n=251(%)	x^2	*P*-value
Role of parents in sexual knowledge					
Both parents have the biggest effect in supporting my self-esteem and explaining the concept of sexual rights	106 (25.4) (21.2 - 29.5)	42 (25.3) (18.6 - 31.9)	64 (25.5) (20.1 - 30.8)	0.14	0.933
My mother only took over the explanation	239 (57.3) (52.5 - 62.0)	96 (57.8) (50.2 - 65.3)	143 (57.0) (50.8 - 63.1)		
I had no cooperation from either.	69 (16.5) (12.9 - 20.0)	26 (15.7) (10.1 - 21.2)	43 (17.1) (12.4 - 21.76)		
Role of school curriculum in sexual knowledge					
The school curriculum discussed sexual knowledge	228 (54.7) (49.9 - 59.4)	91 (54.8) (47.2 - 62.3)	137 (54.6) (48.4 - 60.7)	0.007	0.933
The school curriculum was enough to provide correct sexual knowledge for the future.	189 (45.3) (40.5 - 50.0)	77 (46.4) (38.8 - 53.9)	114 (45.4) (39.2 - 51.5)		
Attitude of teachers towards questions on sexuality					
Positive	164 (39.3) (34.6 - 43.9)	68 (41.0) (33.5 - 48.4)	96 (38.2) (32.1 - 44.2)	0.492	0.483
Negative	253 (60.7) (56.0 - 65.3)	98 (59.0) (51.5 - 66.4)	155 (61.8) (55.7 - 67.8)		
Appropriate school level for starting sexual education					
Elementary (4^{th},5^{th},6^{th} level)	28 (6.7) (4.3 - 9.1)	9 (5.4) (1.9 - 8.8)	31 (12.4) (8.3 - 16.4)	6.77	0.08
Intermediate	128 (30.7) (26.2 - 35.1)	74 (44.6) (37.0 - 52.1)	98 (39.0) (32.9 - 45.0)		
Secondary	132 (31.7) (27.2 - 36.1)	82 (49.4) (41.7 - 57.0)	114 (45.4) (39.2 - 51.5)		
Sources of information about puberty changes*					
Parents	142 (34.1) (27.3 - 36.2)	50 (27.0) (20.2 - 33.7)	92 (35.1) (29.2 - 41.0)	4.85	0.302
School	84 (18.8) (15.0 - 22.5)	32 (17.3) (11.5 - 23.0)	52 (19.8) (14.8 - 24.7)		
Maid	101 (22.6) (18.5 - 26.6)	44 (23.8) (17.3 - 30.2)	57 (22.7) (16.6 - 26.9)		
Friends	34 (7.6) (5.06 - 10.1)	10 (5.4) (1.9 - 8.8)	24 (9.2) (5.6 - 12.7)		
Sisters	25 (5.6) (3.3 - 7.8)	13 (7.0) (3.1 - 10.8)	12 (4.6) (2.0 - 7.1)		
Others	61 (13.6) (10.3 - 16.8)	36 (19.5) (13.4 - 25.5)	25 (9.5) (5.8 - 13.1)		
Discussing sexual information comfortably with					
Friends	175 (42.0) (37.2 - 46.7)	71 (42.8) (35.2 - 50.3)	104 (41.4) (35.3 - 47.4)	1.89	0.756
Aunt	34 (8.2) (5.5 - 10.8)	14 (8.4) (4.1 - 12.6)	20 (8.0) (4.6 - 11.3)		
Older sister	57 (13.7) (10.4 - 17.0)	25 (15.1) (9.6 - 20.5)	32 (12.7) (8.5 - 16.8)		
Maid	72 (17.3) (13.6 - 20.9)	24 (14.5) (9.1 - 19.8)	48 (19.1) (14.2 - 23.9)		
Mother	66 (15.8) (12.3 - 19.3)	28 (16.9) (11.2 - 22.6)	38 (15.1) (10.6 - 19.5)		

* Some students checked more than one source of information on puberty changes

curriculum was enough to provide accurate sexual knowledge, 253 participants (60.7%, CI: 56-65.3%) reported that their teachers had negative attitudes towards questions related to sexual issues. One hundred twenty-eight (30.7%, CI: 26.2-35.1%) thought that the appropriate school level for starting sex education is the intermediate level, compared to 132 (34.1%, CI: 27.2-36.1%) who thought the appropriate level was at the secondary school. Only 28 (6.7%, CI: 4.3-9.1%) thought that early sex education should start at the elementary level. One hundred forty-two (31.8%, CI: 27.3-36.2%) participant students reported that their parents were their source of knowledge on puberty. Interestingly, second to parents, maids were reported as the source of knowledge on puberty by 101 participant students (22.6%, CI: 18.5-26.6%). The

school curriculum was reported as the third source of knowledge on puberty at 84 (18.8%, 15-22.5%), friends and sisters followed at 34 (7.6%, CI: 5.06-10.1%) and 25 (5.6%, CI: 3.3-7.8%) respectively. Other sources of knowledge such as media were reported by 61 (13.6%, CI: 10.3-16.8%) students participant. The students felt more comfortable discussing sexual issues with friends (n=175 [42%], CI: 37.2-46.7%), maids (n=72 [17.3%], CI: 13.6-20.9%), mother (n=66 [15.8%], CI: 12.3-19.3%), and older sisters (n=57 [13.7%], CI: 10.4-17%).

Discussion. This study represents an important first step towards the understanding of the extent of knowledge, attitudes, and the source of information of sexual and reproductive health of adolescents in KSA. The results indicate that most female adolescents (92.1%), attending schools in the city of Riyadh had general information on puberty with no difference between those attending public and private schools. However, almost one third (29.3%) of the sample were not aware of puberty changes before they attained these changes themselves. This may indicate that most mothers in KSA may have discussed pubertal changes with their daughters. This is largely determined by the Arabic culture more than the socioeconomic class or level of parental education. Similar studies conducted in Oman and Pakistan where there is a similar culture and/or religion, found even larger percentages of adolescents (77%) who were not aware of pubertal physiological changes before being exposed to such changes themselves,[6,7] Other studies showed that adolescent girls described the occurrence of menstruation, as shocking and fearful for them.[9] This study found that knowledge of participants of sex related issues was very low. Only 64% of the participants knew how intercourse occurs. Knowledge of some sexual terms and their definitions, such as gays (men having sex with men) was reported only by 70.1% of participants, lesbian (women having sex with women) by 50.2%, and the term masturbation reported by 33.7% of participants. Only 28.1% of the participants attending public schools know the meaning of the term masturbation.

It is obvious that there is a gap between mothers and daughters in discussing sexual matters, although this gap is smaller in issues related to puberty. This can be understood if we take into consideration the religious and cultural beliefs in KSA. Islam forbids pre-marital sexual contact, and Arabic culture emphasizes the issue of virginity for girls. There is a widespread view that discussion of sexual health with adolescents will provoke pre-marital activities. However, studies have shown that rather than increasing sexual activity, discussing sexual health with adolescents is more likely to reduce sexual activity.[2,3,8,9] The American Academy of Pediatrics (AAP) encourages the integration of sexual education into clinical practice, and emphasizes the role of pediatricians in this education from early childhood to adolescence. This sexual education should respect the family's individual and cultural values.[1] The AAP further notes that educational materials, such as handouts, pamphlets, or videos, should be available in the pediatric office, to reinforce and complement the sex education given at schools and by the parent.[1]

The study participants showed very low knowledge regarding STDs, such as syphilis, gonorrhea, and hepatitis B virus. Only 14% were able to identify that hepatitis B may be sexually transmitted. These findings are consistent with findings from other studies,[10,11,14] that found that while adolescents have heard about STDs, they lacked accurate knowledge regarding transmission and risk factors. Although KSA has a low prevalence of HIV/AIDS and other STDs, due to globalization and an increase in traveling abroad, Saudi Arabian adolescents are likely to be exposed to much more information on these conditions, as well as the possible risk of getting into contact with them. This represents a serious challenge where the Saudi Society has to open up, and provide accurate information to their adolescents on sexual and reproductive health issues, so that they are less likely to be influenced by information from the wrong sources.

Although parents (mothers) were the primary source of information (31.8%), we were surprised that maids (housekeepers) were the second most common (22.6%) source of information on puberty and sexuality. Schools came in third place (18.8%). Further, most participants stated that they feel more comfortable discussing these issues with the maids (17.3%), than with their mothers (15.8%) or their sisters (13.7%). This study has shown that schools do not play a vital role in sex education. Most teachers (60.7%) had a negative attitude toward questions related to sexual knowledge. This is a matter of concern and needs attention. Schools in the West have incorporated sex education into their curricula so as to provide correct and accurate information to high school students.[12] Schools in KSA are doing very little in the sexual health program. Sex education program (curriculum) should rather be selective with each grade, and not a generalized curriculum. Several

educational guidelines have been developed by Regional and International agencies regarding sexual health (United Nations educational, scientific and cultural organization).[2] Most participants reported being more comfortable discussing sexual matters with friends (42%), and maids (housekeepers [17.3%]). This is not the best way for adolescents to obtain sexual knowledge. It is likely that they obtain their sex information from other "friends," and mass media sources. The maids (housekeepers), on the other hand, are usually of different culture, of low socioeconomic class, and the sex information they provide is not of the required level of religious and cultural competence.

Our findings are limited to female adolescents attending public and private in schools in the city of Riyadh. Therefore, the findings cannot be generalized to males and to community adolescents who are not attending school. However, it is likely that the community picture will be similar to that of this sample, possibly revealing an even greater lack of knowledge.

In conclusion, based on the findings of this study, it is recommended that female adolescents should be provided with appropriate knowledge regarding sexual information and reproductive health to help them develop confidence for their future reproductive and sexual lives. It is clear that we need to encourage mothers to take the lead in providing discussion of sexual matters with their daughters, rather than their daughters obtaining this information from other sources, such as their maids and friends. Schools should be encouraged and given the resources to incorporate sexual health programs into their curriculum. However, no one set curriculum can be said to fulfill the needs of all. Untill now no such curriculum exists in KSA.

In this study knowledge gaps have been identified, and with comprehensive efforts, the next step should be to develop a curriculum, which should address these knowledge gaps. Schools should also provide training for teachers on how to teach topics of a sexual nature. Teachers should be encouraged to take a leading role, be positive, and answer the concerns of their students on the matter of sexual information and reproductive health issues in a responsible way.

These recommendations can only be achieved by the collaboration of community groups, peer groups, school curriculum developers, and religious leaders to provide culturally appropriate knowledge to our youth.

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Illustrations, Figures, Photographs

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