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How Iranian Students Communicate About Puberty Information: Results of a Network Analysis

Leyla Halimi[1], Eshagh Dortaj Rabari[2], Reza MajdZadeh[3], Ali Akbar Haghdoost[4]*

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Abstract

Background: To evaluate the structure of students' social networks (So. N) generally and in a specific network (Sp. N), in which students discuss delicate puberty concerns with their classmates, the present research examined the communication networks of students in Hamadan, Iran, a mid-sized city in Iran.

Methods: In this cross-sectional study, the data were collected from a total of 350 students in 14 classes from 14 schools using a stratified sampling method. In each class, the communication networks of students were examined by asking direct questions about links among them. The students' centrality indices were computed using UCINET 6 software. Since the size of the classes was different, the centrality index was reported as a percentage, which was the number of reported links over the maximum number of possible ones.

Results: The centrality index in So. Ns and Sp. Ns in boys was more than those in girls (55.4% vs 47.6% in So. N, and 33.4% vs 20.1% in Sp. N). The students' centrality indices in So. Ns and Sp. Ns were also positively correlated ($r=0.58$; $p<0.001$). In addition, the Sp. N was around 45% lower than So. N in both sexes.

Conclusion: The communication styles among students in Sp. N appeared to be very different from those in So. N and the styles were related to demographic traits. As a result, it was determined that a thorough investigation of communication networks was essential for customizing health promotion initiatives for students.

Keywords: Social Network, Centrality Index, Student, Adolescence, Communication, Puberty Information, Network Analysis, Transmission

Conflicts of Interest: *None declared*
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Introduction

Adolescence is known as the time from the onset of puberty to full maturity and adulthood. The age range for adolescence also varies by gender and culture, however, adolescence in all societies is considered as a time when people acquire knowledge about fertility and sexuality. Although it is of utmost importance to provide formal education on physical and social-psychological components of this life period, it is of poor quality in many countries. For example,

Corresponding author: *Dr Ali Akbar Haghdoost, ahaghdoost@kmu.ac.ir*

1. Clinical Research Development Unit of Shahid Beheshti Hospital, Hamadan University of Medical Sciences, Hamadan, Iran
2. School of Public Health, Kerman University of Medical Sciences, Kerman, Iran
3. Interdisciplinary Research and Practice Division, School of Health and Social Care, University of Essex, Colchester, UK
4. Modeling in Health Research Center, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran

↑What is "already known" in this topic:
There is limited knowledge about the social networks of Iranian students, particularly about their specific network in which students discuss sensitive puberty issues with their classmates.

→What this article adds:
It appeared that students' communication styles regarding sensitive problems were quite different from those about more general social issues, and these styles may also change depending on their demographic makeup. Therefore, it was concluded that a deep exploration of communication networks was a key step toward adapting health promotion programs for students.

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in a study on 445, it was reported that in high school students in China, 47.9% of boys and 63.8% of girls had received enough education on puberty. Moreover, 39.9% of the boys and 52.2% of the girls had felt "puzzled and disgusted with the onset of puberty" (1).

In most countries, adolescents acquire much of their information about puberty and sexuality from various media as well as individuals in their network, particularly from their intimate friends. Even in the United States, wherein most adolescents aged 15 to 19 years receive formal education about abstinence (2), the annual 10-year trend of teen pregnancy rate in 2008 (68 per 1000 women) was more than twice compared with that in Canada (27.9) or Sweden (31.4) (3).

There is limited knowledge about general social networks (So. N) of Iranian students, and particularly about their specific network (Sp. N) in which students discuss sensitive puberty issues with their classmates

Thus, the purpose of this study was to explore communication patterns in students regarding puberty and sexuality information within small networks of classmates and also to check the main factors shaping such So.N. In this study, different methods within social network analysis were used to explore the transfer of information about puberty and sexuality among adolescents in a mid-size city, Hamadan, in western Iran.

Methods

In this cross-sectional study, a total of 350 students (50.6% boys) were selected from 14 classes with a mean size of 25 students enrolled in middle schools (Mid. S) and high schools (Hig. S) (4, 5) in the city of Hamadan, a city with a population of around 700,000 inhabitants in the western part of Iran.

The schools were stratified by (1) public school (Pub. S), private school (Priv. S), and poly-technic schools (PoTe. S); (2) gender (boys and girls are separated because of cultural and religious norms); and (3) grade (middle and high schools). From each of the 12 strata, one school was randomly selected. Within each selected school, all students of 1 class from every grade were recruited. The size of the selected classes was between 15 and 30 students (Fig. 1).

The required information was collected from students using a researcher-made questionnaire developed from an extensive search of the related literature whose items were focused on puberty and sexuality issues. The content validity of the questionnaire was also assessed by 2 experts in this field and the final draft was verified in a pilot study on 15 students. The reliability of the final version was also assessed using the test-retest method. In this phase, 82 students completed the questionnaire twice, considering a 1-week interval. The Pearson correlation coefficient between students' responses was 0.67.

The main part of the questionnaire was a 2-way matrix assessing all possible bilateral links between pairs within a class in the last 2 months. Students were asked to indicate their links within their networks to communicate about (1) general issues (So. N) and (2) specific issues (Sp. N) related to puberty. At the end of the questionnaire, demographic characteristics and the mean scores in the formal courses were elicited from students.

Having explained the main objectives, the students were encouraged to participate voluntarily in this study. On average, it took 30 to 40 minutes to fill out the questionnaire and the respondents received a small gift at the end of the data collection session. Necessarily, the names of all the students' classmates appeared in the matrix. However, to observe anonymity, one of the staff in each school distributed the questionnaires and replaced their names with a unique code before returning them to the researchers. This unique code was used to link students' responses to their demographic characteristics as well as their scores, which were recorded in the registry of the schools.

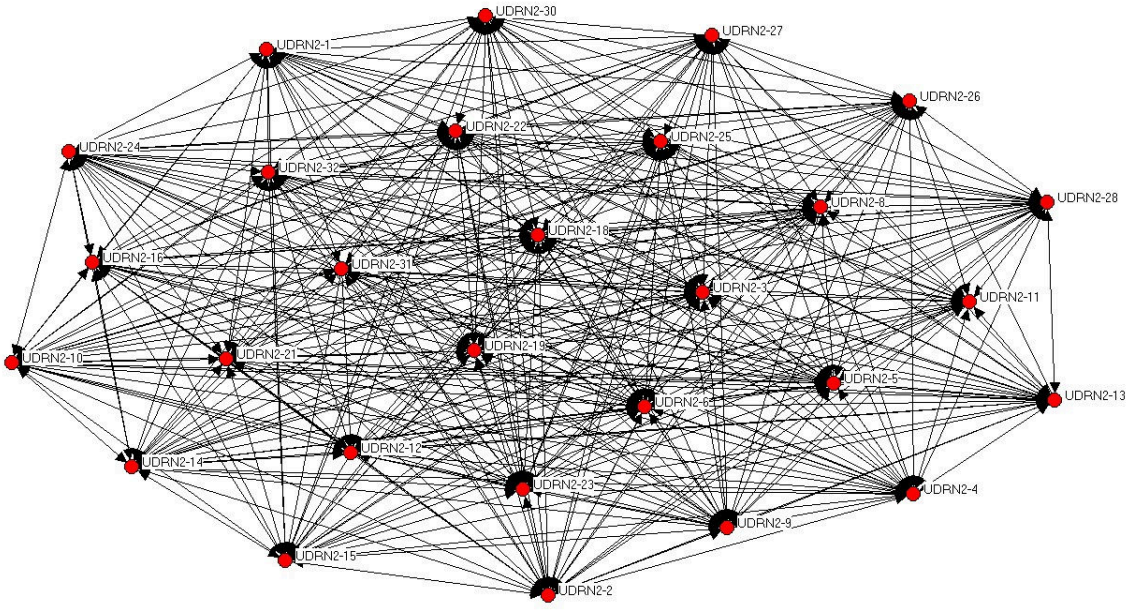

Fig. 1. An example of a communication network among female students

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The main degree centrality index of students for both So. N and Sp. N were computed using UCINET 6 software (6). Since the size of the classes was different, the centrality index was reported as a percentage that was the number of links over the maximum number of possible ones. The centrality index for each student was then imported into the SPSS Statistics software (Version 17) and consequently linked with their demographic information.

A t test and analysis of variance were used to compare the centrality indices of the subgroups, and the Pearson correlation coefficient was also used to determine the correlation between the centrality indices for So. N and Sp. N. Finally, the effects of gender, grade, school type, and parental level of education on the centrality indices were assessed in a linear regression model.

Ethical Considerations

The study protocol was approved by the ethics committees of Kerman University of Medical Sciences, Iran *(*IR.KMU.REC.1396.29*)*. Moreover, the students participated in this study voluntarily, and the data were analyzed anonymously.

Results

Out of the 350 students recruited in this study, 177 (50.6%) were boys, and 183 (52.3%) were enrolled from Pub.S. The mean±standard deviation of age in all participants was 14.93±1.91 years.

Analysis of the Social Network (So. N)

The average indices of the So. N percentage in the PoTe.S, Mid.S, and Hig.S students were 55±12.36, 52.01±10.22, and 46.86±9.72, respectively (Fig. 2). The adjusted difference between Mid.S and Hig.S students was -7.73 (p=0.001), while the adjusted difference between Mid.S and PoTe.S students was -1.5 (p=0.542), according to the model's findings (Table 1).

The adjusted difference of the centrality index in So. N between the Priv.S and Pub.S students was 2.04 (p=0.32); the corresponding difference between the PoTe.S and Pub.S students was -11.8 (p=0.001) (Table 1).

The linear adjusted association between the centrality index and the level of education of fathers and mothers was -7.5 (p=0.22) and -0.004 (p=0.99), respectively (Table 1); it means that although the level of education of fathers reduced the size of the networks of their children, the association was not statistically significant.

The mean difference between the centrality index in So. N of girls versus boys was -13.7 (p=0.001). It was revealed that the network of girls was more limited than boys. In the adjusted model, the score of students in their courses did not have a significant association with the centrality index in So. N, but age had a negative association (-.2.5; p=0.001), which means older students had a more limited network.

Analysis of Sp. N

The adjusted difference of the centrality index in Sp. N between the Priv.S and Pub.S students was 2.20 (p=0.41); the corresponding difference between the PoTe.S and Pub.S students was -9.30 (p=0.001) (Table 1).

The linear adjusted association between the centrality index and the level of education of fathers and mothers was -0.23 (p=0.76) and -0.71 (p=0.4), respectively (Table 1), meaning that the level of education of parents does not have any association with the Sp. N of their children.

The mean difference between the centrality index in Sp. N of girls versus boys was -17.5 (p=0.001). It was revealed that the network of girls was more limited than boys. In the adjusted model, the score of students in their courses and their age did not have significant associations with the centrality index in Sp. N.

The percentage of centrality index in the Sp. N network

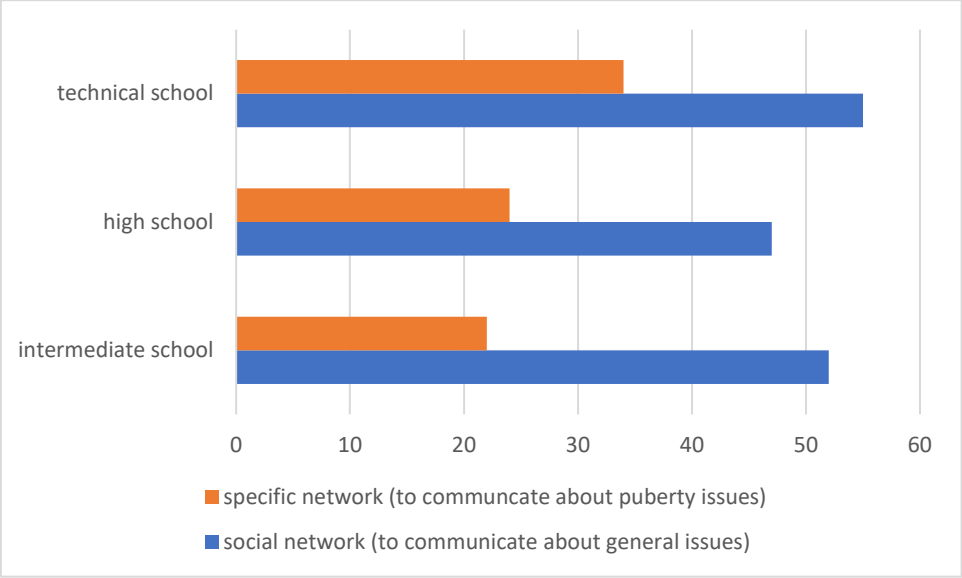

Fig. 2. The centrality index among students is classified by the type of schools in the social network and the specific network to communicate about general and puberty issues, respectively.

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Table 1. Crude and adjusted association between degree of centrality index and demographic characteristics in social network and specific network of students to communicate about general and puberty issues

Variable		Degree of Specific Network				Degree in Social Network			
		Crude		Adjusted *		Crude		Adjusted *	
		Difference	*P*	Difference	*P*	Difference	*P*	Difference	*P*
Level of education	Mid.S (base)	0	-	0	-	0	-	0	-
	Hig.S	-2.7	0.130	-0.13	0.960	-6.39	0.001	-7.73	0.001
	PoTe.S	11.37	0.001	10.83	0.002	4.99	0.001	-1.5	0.544
School type	Pub.S (base)	0	-	0	-	0	-	0	-
	Prev.S	-11.7	0.001	2.2	0.416	-3.83	0.004	2.04	0.321
	PoTe.S	-4.3	0.081	-9.3	0.001	-2.36	0.192	-11.8	0.001
Gender	Boy (base)	0	-	0	-	0	-	0	-
	Girl	-13.3	0.001	-17.5	0.001	-7.92	0.001	-13.69	0.001
Linear effect of father education**		-1.9	0.002	-0.23	0.763	-1.09	0.023	-7.5	0.221
Linear effect of mother education**		-2.5	0.001	-0.71	0.421	-0.96	0.074	0.004	0.999
Liner effect of age		-2.5	0.001	0.24	0.750	-0.65	0.061	-2.5	0.001
Linear effect of the average score		-2.24	0.001	0.17	0.683	-0.98	0.001	0.19	0.570

* The adjusted difference is calculated using a linear regression model.
** 0 = illiterate (basic) 1 = undergraduate 2 = diploma 3 = postgraduate 4 = bachelor 5 = master 6 = doctorate

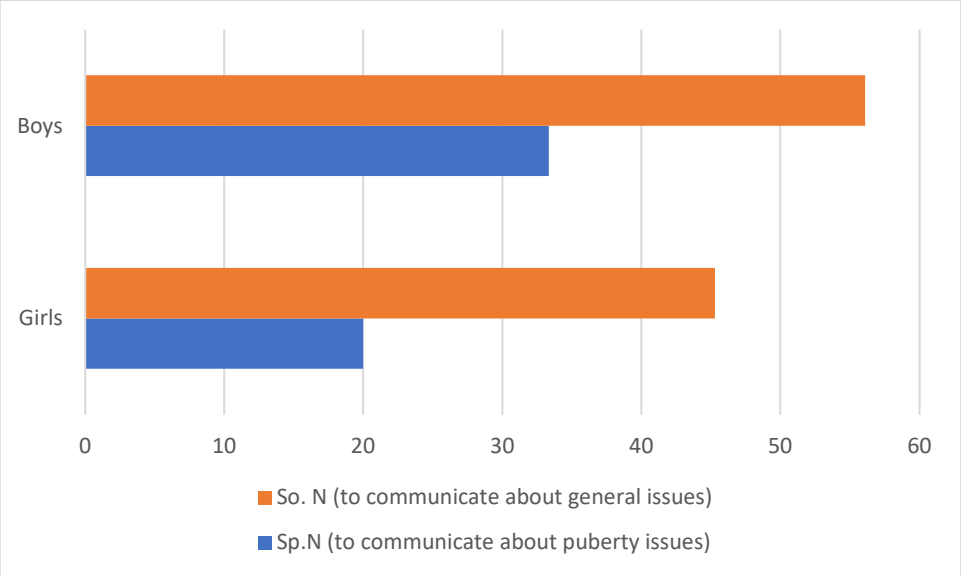

Fig. 3. The centrality index among students is classified by sex in the social network and in the specific network to communicate about general and puberty issues, respectively.

in girls and boys was 20 and 33.34 (p<0.001), respectively. The corresponding percentages in So. P were 45.3 and 56.1 (p<0.001), meaning that in both sexes, Sp. N was lower than So. N, and particularly girls shared and spoke about purity issues with a small proportion of their classmates (Fig. 3).

Discussion

In recent decades, parents and societies have had real concerns about puberty and its related health issues; and the lack of enough information about this issue particularly in developing countries may set this topic as a top research priority.

Results from the present study revealed that although classmates are communicating and sharing information about sensitive issues within their networks, the size of this network is limited particularly among girls. Similarly, in a study by Rastegari, it was reported that Iranian male students were benefiting from a wider social network (4). In another study on a cohort of 11-year-old students, it was reported that boys had bigger but looser networks, while girls mostly stayed in stronger pair relationships. Studies on social structures in 15-year-old girls also exhibited stronger relationships with groups of more than 2 (7).

Based on Marsden equations, it was found that network size was not different in men and women. Compared with men, the only significant difference was the extensive kinship network but the limited nonkinship network in women (8). The results of a study by Cerezo also demonstrated that girls could enjoy a much more friendly and stable relationship with their classmates and even their teachers (9).

Furthermore, grade students had a strong relationship with the network's sizes. Mid-S students had more connections with their classmates but their Sp. N did not have a significant difference, which means in both grades, the size

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of the network for communication about sensitive issues was limited. We did not find any significant pattern in these networks among students in public, private, and polytechnical schools.

The network size of students in this study (56.1 boys and 45.3 girls) was reported to be greater than that in many countries such as Poland (39.2) (10), meaning that probably Iranian students have a large social network in their schools.

The focus of this study was on the effect of the So. N on the Sp. N. In many cases, the So. N of friends had affected other personal and social functions. A study aimed at evaluating the effect of the So. N of friends on finding a job revealed a positive association. This impact was also more significant when friends were employed, which could also raise competition (11). This was in accordance with the communication theory and proved that adolescents could learn their behaviors from their friends or peers (12).

Another study in this area suggested a direct and favorable relationship between some students' high degree centrality index when working on a group project and their capacity for cooperation with other group members.

Students with a high degree centrality index also showed higher harmony with others (13).

In this study, it was reported that compared with Mid.S students, Hig.S and especially PoTe.S students had talked more with their classmates about puberty and sexuality. One study also showed that So. N could extend from childhood to the first years of adolescence, proving the fact that communication patterns could be changed by every evolutionary phase in one's life (14). PoTe.S students also had more significantly extensive So. N than Hig.S and Mid.S students. The stronger So. N among PoTe.S students might be explained by the infrastructure of PoTe.S and their students' personality traits.

It seems that students' tendency toward forming extensive So. N decreases with age. Based on some reports, some studies revealed that the number of relationships in adults was smaller than what was expected; however, differences in relationships in adults could also depend on other factors (15). Given the direct association between lower averages and higher communications, it is possible to conclude that if students spent less time studying during school hours, they would have more time to interact with their peers and share more knowledge. The lower mean of the PoTe.S students as well as the higher scope of the relationships among them could support this hypothesis.

Moreover, there was an inverse relationship between the mean of scores and the degree of the centrality index, implying that students having lower averages could form bigger and stronger informative and communicative networks.

It was revealed that students having illiterate parents could talk more about puberty and sexuality with their classmates, suggesting their higher levels need to be trained about puberty and sexuality. The degree of the centrality index, gender, and education level were all shown to be significantly correlated in a study by Kolin et al, although age and race were not (16).

It should be emphasized that despite the use of a random sampling approach, the results could not necessarily be extended to the entire student population in Iran; for example, schools in the city of Hamadan were not necessarily representative of all schools in Iran.

Limitations and Suggestions

Assessment levels in the present study were limited and only included classmates. Also, it was not easy to generalize the findings of this study in the city of Hamadan, a mid-sized city in western Iran, to the whole country. Nonetheless, it was recommended to conduct further comparative studies in other parts of Iran to compare the network size in Iran with that in other countries.

Conclusion

This study revealed that the So. Ns of boys were more extensive than those of girls and SP.Ns were narrower than the So. Ns, as expected. The size of these networks depended on gender (boys more than girls), grade, and special conditions in schools regarding different grades. It should be highlighted that neither the educational level of the parents nor the age of the students had any impact on this association.

The significant difference in the size of SP.N and that of the So. N in student societies also indicated that students, especially in Mid.S and girls talk less about puberty and sexuality with their classmates.

Acknowledgment

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Conflict of Interests

The authors declare that they have no competing interests.

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