

Original Article

Health-care Providers' Knowledge about Prenatal Screening: A Study in the North of Iran

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ABSTRACT

Background: Prenatal screening for birth defects is turning into a main component of prenatal care. The success of prenatal screening programs greatly depends on health-care providers' knowledge about it. **Objectives:** This study aimed to assess health-care providers' knowledge about prenatal screening. **Methods:** This cross-sectional study was conducted on June–October 2016 in Sari, a large city in the North of Iran. A sample of 472 obstetricians, general physicians, and midwives was recruited through quota and convenience sampling. Data on participants' knowledge about prenatal screening were collected through a 35-item self-administered knowledge questionnaire which contained the four domains of time, technique, legal issues, and follow-up assessment. The total score of the questionnaire could range from 0 to 35, with higher scores representing greater knowledge. Descriptive statistics measures, Mann–Whitney U-test and Kruskal–Wallis test, Spearman's correlation analysis, and multiple linear regression were used to analyze the data. **Results:** The mean score of participants' knowledge about prenatal screening was 18.34 ± 9.34 . The lowest and the highest mean scores of knowledge were obtained by obstetricians and general physicians, respectively ($P < 0.001$). The number of participants who correctly answered more than half of the questions of the knowledge questionnaire was 266 (56.35%) for the time domain, 259 (54.87%) for the technique domain, 237 (50.21%) for the legal issues domain, and 200 (42.37%) for the follow-up assessment domain. Regression analysis revealed that the significant predictors of prenatal screening knowledge were participants' profession, employment setting, and history of providing screening-related counseling ($R^2 = 0.515$; $P < 0.001$). **Conclusion:** Health-care providers have limited knowledge about prenatal screening. Thus, well-designed need-based educational interventions are needed to fulfill their educational needs and advance their knowledge about prenatal screening.

KEYWORDS: *Assessment of health-care needs, educational needs assessment, health-care providers, needs assessment, prenatal screening*

INTRODUCTION

Prenatal screening is the use of various diagnostic methods to evaluate fetal health and development in pregnancy.^[1] At present, fetal health assessment and prenatal screening are important parts of safe motherhood. Most pregnant women also tend to ensure the health of their fetuses before birth.^[2-4] Prenatal screening in Iran is also recommended to all pregnant women at the gestational age of 6–10 weeks and is performed for those who request it.^[5] Therefore,

information about prenatal screening should be provided to all pregnant women during their first medical visits early in their pregnancies.^[6]

A key factor behind successful prenatal screening is health-care providers' knowledge about it.^[7,8] However,

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previous studies revealed that health-care providers do not effectively fulfill pregnant women's educational needs and do not pay careful attention to the results of screening tests probably due to their limited screening-related knowledge. For instance, a study on 67 midwives in England indicated that some of them lacked accurate knowledge about prenatal screening and its indications.^[7] A systematic review also concluded that health-care providers' lack of knowledge is one of the major concerns related to prenatal screening.^[9] Accordingly, previous studies emphasized the importance of advancing health-care providers' knowledge about prenatal screening.^[4,10-13]

Educational interventions which are based on the educational needs of target people are more effective in advancing their knowledge.^[14] Contrarily, inattention to their educational needs may result in ineffective education delivery and thereby, cause the waste of resources. Therefore, educational need assessment is a key prerequisite to the implementation of any screening-related educational intervention.^[14,15] Yet, to the best of our knowledge, there is limited data about health-care providers' educational needs in the area of prenatal screening in Iran.

Objectives

This study aimed to assess health-care providers' knowledge about prenatal screening.

METHODS

Setting and participants

This cross-sectional study was performed in June–October 2016 in Sari, a large city in the north of Iran. For sample size calculation, a pilot study was conducted on 20 health-care providers, which showed that the standard deviation of their knowledge about prenatal screening was 17.01 ± 5.54 . Thus, with a type I error of 0.05, a precision of 0.5, and an attrition rate of 5%, sample size was estimated to be 496.

Considering the unequal number of health-care providers in different health-care professions, a quota was allocated to each profession based on the total sample size of the study and the total number of health-care providers in that profession. Then, the list of health-care providers in each profession was used to conveniently recruit health-care providers from that profession to the study based on the allocated quota. Consequently, 270 general physicians, 135 midwives, and 67 obstetricians were recruited to the study from public health-care centers, hospitals, and private offices. Inclusion criteria were agreement for participation and a professional work experience of 1 year or more.

Study instruments

Data collection instruments included a demographic questionnaire and a self-administered prenatal screening knowledge questionnaire. The items of the demographic questionnaire were on age, gender, employment status, work experience, employment setting, history of receiving education about prenatal screening, and history of providing screening-related counseling to pregnant women. The self-administered knowledge questionnaire contained 35 multiple-choice questions on the different domains of prenatal screening, including appropriate time for screening tests (five items), appropriate screening techniques in the three trimesters of pregnancy (nineteen items), legal issues of pregnancy termination in case of serious fetal defects (seven items), and follow-up assessments for abnormal test results (four items). The wrong and right answers to the questions were, respectively, scored 0 and 1, resulting in a possible total score of 0–35 with lower scores representing lower level of screening-related knowledge and greater need for education. This questionnaire was developed through a comprehensive review of the relevant literature^[4,7,9-13] and also through consulting 20 experts in obstetrics, reproductive health, and midwifery. In addition, pregnant women's opinions about the information they expected to receive from health-care providers were sought. Face and content validity and reliability assessment of the questionnaire resulted in a scale content validity index of 0.94 (in the range of 0.80–1), a content validity ratio of 0.83 (in the range of 0.60–1), a Cronbach's alpha of 0.72, and a test–retest intraclass correlation coefficient of 0.98.^[16] Participants were asked to respond to anonymous questionnaires in a private setting and return it to the researcher in her next referral.

Ethical considerations

This study was performed after obtaining ethical approval from the Ethics Committee of Mazandaran University of Medical Sciences, Sari, Iran (code: IR.MAZUM.REC.95.2346). The objectives of the study were explained to all participants, and written informed consent was obtained from all of them. They were also ensured about the confidentiality of their information and the voluntariness of participation in the study.

Data analysis

Data analysis was performed using the SPSS software version 16.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics measures (such as absolute frequency, relative frequency, mean, and standard deviation) were used for data presentation. The Kolmogorov–Smirnov test for normality testing revealed that the main study variables did not have normal distribution. Consequently, between-group comparisons respecting

the mean score of screening-related knowledge were performed through Mann–Whitney U-test and Kruskal–Wallis tests. Correlation analyses were also performed through Spearman's correlation analysis. In addition, the predictors of screening-related knowledge were identified through the multiple linear regression analysis. Accordingly, the mean score of knowledge was considered as the dependent variable while all variables which had a correlation with knowledge mean score at a value of $P < 0.2$ were considered as independent variables. The values of $P < 0.05$ were considered statistically significant.

RESULTS

In total, 496 health-care providers were recruited to fill out the study questionnaires. However, 24 of them were excluded due to their incomplete answers to the items of the questionnaires (response rate: 95%). Most participants (75.6%) were female because midwifery and obstetric care services in Iran are almost exclusively provided by women. Moreover, most participants (58.26%) had the history of providing screening-related counseling to more than 10 clients [Table 1].

The mean score of screening-related knowledge among all participants ($n = 472$) was 18.34 ± 9.34 (95% confidence interval: 17.36–19.28). This score is 52.4% of the possible total score of the knowledge questionnaire. Those participants who had the history of providing screening-related counseling to more than 10 clients obtained significantly higher knowledge scores than the other participants ($P < 0.0001$) [Table 1]. Moreover, the lowest and the highest mean scores of screening-related knowledge were obtained by obstetricians and general physicians, respectively ($P < 0.001$) [Tables 1 and 2]. However, the mean score of knowledge had no significant relationships with participants' age, gender, and work experience ($P > 0.05$) [Table 1].

Respecting the domains of screening-related knowledge, the number of participants who provided correct answers to more than half of the questions of the knowledge questionnaire was 266 (56.35%) for the time domain, 259 (54.87%) for the technique domain, 237 (50.21%) for the legal issues domain, and 200 (42.37%) for the follow-up assessment domain.

The results of regression analysis illustrated that participants' profession, employment setting, and history of providing screening-related counseling significantly predicted the mean score of prenatal screening knowledge ($R^2 = 0.515$). The strongest predictor was employment setting followed by profession [Table 3].

Table 1: The mean scores of prenatal screening knowledge based on participants' characteristics

Characteristics	n (%)	Mean±SD	P
Age (years)		50.40 ± 8.50	--
Work experience (years)		10.77 ± 7.25	--
Gender			
Female	357 (75.63)	13.61 ± 7.45	0.276 ^a
Male	115 (24.37)	12.63 ± 7.15	
Profession			
Obstetrics	67 (14.19)	31.80 ± 28.1	<0.001 ^b
General medicine	270 (57.21)	13.17 ± 8.91	
Midwifery	135 (28.60)	21.94 ± 6.15	
Employment setting			
Healthcare centers	175 (37.07)	18.53 ± 7.21	0.027 ^b
Office	218 (46.18)	16.43 ± 10.08	
Office and hospital	79 (16.75)	23.18 ± 8.68	
History of receiving education about prenatal screening			
Yes	230 (48.73)	21.73 ± 9.44	<0.001 ^a
No	242 (51.27)	15.11 ± 8.02	
History of providing screening-related counseling			
Never	102 (21.61)	12.15 ± 6.36	<0.001 ^b
1-5 times	56 (11.87)	15.32 ± 7.52	
6-10 times	39 (8.26)	12.20 ± 8.34	
>10 times	275 (58.26)	22.12 ± 8.85	

^aThe results of Mann–Whitney U-test, ^bThe results of Kruskal–Wallis test. SD: Standard deviation

DISCUSSION

This study assessed health-care providers' knowledge about prenatal screening. Findings indicated that the participants possessed almost half of the possible total score of the knowledge questionnaire. Moreover, they had limited knowledge in all domains of prenatal screening. In line with these findings, two earlier studies reported that health-care providers in Canada and England had inadequate knowledge about congenital defects and the benefits of prenatal screening.^[2,11] Several other studies also revealed health-care providers' lack of knowledge about the legal issues of therapeutic abortion.^[17-19] All these findings denote that university education is not effective enough in preparing general physicians, midwives, and obstetricians to provide their clients with counseling and education about prenatal screening. Thus, providing health-care providers with educations about prenatal screening are an urgent need. Moreover, given the fact that counseling for prenatal screening helps pregnant women make wiser decisions,^[20] educational programs are needed for health-care providers to advance their knowledge about the legal issues of prenatal screening and therapeutic abortion. Such programs can greatly

Table 2: The mean scores of prenatal screening knowledge and its domains based on participants' profession

Dimensions	Profession ^a			Total (n=472)	P ^b
	Obstetrics (n=67)	General medicine (n=270)	Midwifery (n=135)		
Time (possible range: 0-5)	4.68 ± 0.65 (4.55-4.81)*	1.94 ± 1.49 (1.77-2.11)	3.21 ± 1.25 (2.12-4.30)	2.96 ± 1.65 (2.54-2.84)	<0.001
Technique (possible range: 0-19)	17.44 ± 1.87 (17.01-17.87)	7.14 ± 4.50 (6.52-7.66)	12.23 ± 3.79 (10.53-13.93)	10.06 ± 5.49 (9.56-10.56)	<0.001
Legal issues (possible range: 0-7)	6.16 ± 1.26 (6.01-6.45)	2.58 ± 1.37 (2.39-2.77)	3.97 ± 1.66 (2.76-5.18)	3.49 ± 2.06 (3.30-3.68)	<0.001
Follow-up assessment (possible range: 0-4)	3.50 ± 0.76 (3.33-3.67)	1.51 ± 1.19 (1.38-1.64)	2.51 ± 1.04 (1.50-3.52)	2.08 ± 2.06 (1.96-2.20)	<0.001
Total (possible range: 0-35)	31.80 ± 2.81 (30.90-32.80)	13.17 ± 8.91 (12.16-14.18)	21.94 ± 6.15 (16.91-26.93)	18.34 ± 9.34 (17.36-19.28)	<0.001

^aData are presented as mean±SD (95% CI), ^bThe results of Kruskal–Wallis test. SD: Standard deviation, CI: Confidence interval

Table 3: The results of multiple linear regression analysis for the prediction of prenatal screening knowledge

Predictors	Unstandardized β	SE	Standardized β	t	P
Profession					
General medicine (reference)					
Midwifery	1.22	-0.52	0.08	2.32	0.02
Obstetrics	7.55	-0.55	0.58	13.71	<0.001
Employment setting					
Health-care centers (reference)					
Office	-0.92	-0.45	-0.70	-2.02	0.04
Office and hospital	1.47	-0.42	0.11	3.46	<0.001
Gender	0.46	-0.79	0.02	0.59	0.55
History of receiving education about prenatal screening	-0.54	-0.69	-0.02	-0.78	0.43
History of providing screening-related counseling					
Never (reference)					
1-5 times	0.96	-0.62	0.08	1.54	0.12
6-10 times	-0.50	-0.71	-0.38	-0.70	0.48
>10 times	1.65	-0.82	0.11	2.00	0.04

SE: Standard error

facilitate wise decision-making by both health-care providers and pregnant women.

Consistent with the findings of two former studies,^[9,21] the findings of this study also indicated that obstetricians had significantly greater knowledge about prenatal screening than other health-care providers. Such greater knowledge among obstetricians is attributable to their more in-depth university education and greater professional experience. Given the great importance of prenatal screening programs, extensive educational programs are needed to advance screening-related knowledge among all health-care providers. Such programs can be offered both as part of formal university education and as in-service training programs.^[21,22]

Study findings also showed that those health-care providers who were working in primary health-care centers had significantly greater knowledge about prenatal screening than those who were working in hospital settings or private offices. At present, prenatal screening

in Iran is a national health service which is offered in primary health-care centers. Thus, health-care providers who work in these centers are more familiar with its different aspects. The lower levels of screening-related knowledge among health-care providers who work in hospital settings and private offices highlight the importance of running screening-related educational programs for all health-care providers.

The other finding of the present study was that the three factors of participants' profession, employment setting, and history of providing screening-related counseling to more than 10 clients were the significant predictors of health-care providers' knowledge about prenatal screening. Similarly, an earlier research found a significant relationship between midwives' knowledge about prenatal screening and their counseling provision to their clients.^[23] However, our findings revealed that the history of receiving education about prenatal screening was not a significant predictor of knowledge. The insignificant effect of receiving education about prenatal

screening on our participants' knowledge may be due to the ineffectiveness of educational programs.^[24] Further studies are needed to evaluate whether continuing education programs for health-care providers fulfill their educational needs.

The first limitation of the study was that the data were gathered using a self-administered questionnaire, and hence, it is unclear whether participants' responses to the questionnaire really reflected their actual practice. Of course, the anonymity of the questionnaire might have made participants provide realistic responses to its items. Moreover, some general physicians who refused participation in the present study were involved in a public health program in Iran called the National Health Sector Evolution Plan, and hence, they might have been worried about the probable negative effects of their wrong answers to the study questionnaire on their professional status. This worry might have resulted in the underestimation of the educational needs of health-care providers, particularly general physicians. Finally, this was a descriptive study, and hence, it provides no information about causal relationships among the studied variables. Yet, findings provided a framework for more careful evaluation of health-care providers' educational needs regarding prenatal screening. Large-scale multicenter studies are recommended to investigate prenatal screening knowledge among different health-care providers in different health-care settings to provide more in-depth information about their educational needs.

CONCLUSION

This study shows that health-care providers have limited knowledge about prenatal screening. Thus, well-designed need-based educational interventions are needed to fulfill their educational needs and advance their knowledge about prenatal screening. Moreover, educational programs on prenatal screening for health-care providers need to be revised based on their educational needs.

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Conflicts of interest

There are no conflicts of interest.

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