Sexual habits in childhood affect penis size in later adulthood: a cross-sectional study

Kuat Oshakbayev (okp.kuat@gmail.com)
University medical center
Gani Kuttymuratov
University medical center
Ainakulov Ardak
University medical center
Altay Nabiyev
University medical center
Zulfiya Zhankalova
Asfendiyarov Kazakh National Medical University
Meruyert Gazaliyeva
Medical University Karaganda
Attila Tordai
Semmelweis University

Research Article

Keywords: penis size, frequency of erection, masturbation, coitus, sexual abstinence, body growth.

Posted Date: November 23rd, 2022

DOI: https://doi.org/10.21203/rs.3.rs-2283550/v1

Abstract

Background Behavioral habits and parental rearing during physical and sexual growth of men can influence to their penis size.

Aim To assess the erect penis size in adult Kazakh males and study the influence of their physiological events and behavioral habits during their body growth on their penis size.

Methods A cross-sectional survey pilot study with the intention-to-treat. The study included 282 adult Kazakh fertility males aged 23-35 years. Interventions: paper-based survey administration; erect penis length and girth measurement. Two-tailed Student's t-test, Pearson correlation, and multivariate tests of the MANOVA/MANCOVA were used. The Ethics Committee of the National Research oncology center approved the study.

Outcomes In Kazakh men a mean age 29.6±4.4 years; body height 171.56±6.64 cm; BMI 24.53±3.40 kg/m^2; erect penis length 13.41±1.04 cm and girth 11.62±0.91 cm.

Results

There was a significant correlation between erect penis length and girth (P<0.0001). The frequency of erection in 54.7% males was 5-6 times a day. The frequency of masturbation or coitus with ejaculation in 42.2% males was two times per month. 40.9% males abstained to masturbation or coitus in one of two cases. The frequency of nocturnal sperm emission was in 39.1% males one time per month.

Frequencies of erection, masturbation/coitus, abstinence to masturbation/coitus, and nocturnal emission have a statistically significant effect (P<0.01) on both erect penis length and girth in Kazakh males in their body growth.

Conclusions Sexual abstinence to coitus and masturbation during childhood has a positive increasing affect on the penis size in adulthood. The more males in childhood abstains from ejaculation, the larger their penis size in adulthood. A long-lasting extended erection during body growth has a positive effect on penis enlargement.

Introduction

Consistent and topical information in the field of men's anxiety about their own penis size has evolved remarkably in the last several decades and more. (1) The anxiety has spawned a multi-million-dollar global industry in clinically unproven "male enhancement products". (2) Penile size has long been an important fixation in men's lives. Most men tend to focus their poor body image on their penis.

Men everywhere worry that their penis is smaller than it should be or that it will not satisfy a lover. The idea of most men about their penis is formed in childhood. Growing up, they can sight the penis of an older brother, friend or someone else, and mentally compare the size with their own. (3)

The human penis is an incredibly diverse and rapidly evolving structure of the body. Variation in penis form across men is extraordinary, so much so that even penis sizes can vary inter men, and penis evolves very rapidly and various. The diversification evolution of the male characteristics is a hallmark of sexual selection. (4, 5)

Penis size is a highly sensitive topic, which has often raised concerns associated to human masculinity and male sexual health. (6, 7)

Studies showed that behavioral habits and parental rearing during physical and sexual growth of men can influence to their penis size. (8, 9) Other studies also did not find correlations between penis length and 15-year-term follow-up hormonal therapy in boys during puberty. (10)

What does influence on the penis sizes? Men at birth in the same family and from the same parents have different penis sizes. (6, 11) Does long-term erection of the penis influence its size? Although data on penis size is being studied worldwide, nothing is known about these measurements in Kazakhstani men and the factors that influence penis size. The aim of this study was to: 1) assess the erect penis size of Kazakh adult males; 2) study the influence on the penis size of physiological events and behavioral habits of the males during their body growth.

Methods

Study Design

An observational cross-sectional survey pilot study using a correlational design with the intention-to-treat principle.

Participants. A total of 282 adult Kazakh males from the Republic of Kazakhstan and who have been visited at the urology units of three university centers in the biggest cities of the Republic of Kazakhstan (Astana, Almaty, and Karaganda) were prospectively included in the study, which took place between January 2020 and January 2021.

Inclusion criteria

1) male gender aged from 23 to 35 years; 2) fill out the questionnaire; 3) BMI ≤ 29.9 kilogram per meter square; 4) a male who has at least one healthy native child; 5) no non-communicable chronic diseases.

Exclusion criteria

1) female gender; 2) BMI ≥ 30.0 kilogram per meter square; 3) infertility; 4) erectile dysfunction, previous pelvic surgery, suspected hypogonadism, penile disease, or deformity; 5) specific treatment with androgens; 6) alcohol or drug abuse; 7) history of alcohol consumption ≥ 30 g/day within the past 5 years.

Interventions

paper-based survey administration; erect penis length and girth measurements by two urologists concurrently.

The questionnaire consisted of three measurements and six questions, most of which related to the retrospective events of men during their age of first ejaculation up to 23 years. (12) The males answered questions related to their natural physiological events and behavioral habits during their growth ages (see the Questionnaire in **Suppl. 1**). The following natural physiological events and behavioral habits during growth ages of the males were taken: frequency of penis erection; frequency of masturbation and/or coitus; frequency of abstinence to masturbation and/or coitus; frequency of nocturnal sperm emission.

We considered terms 'masturbation' and/or 'coitus' if the acts ended in ejaculation. The definition of 'long-lasting extended erection' if there was: 1) sexual abstinence to coitus and/or masturbation; 2) frequency of erection; 3) frequency of masturbation and/or coitus not ending in ejaculation.

Measurements of the penis erect length and girth were by two doctor-urologists according to the method of Veale D et al. (2015). (13) Penis length measurement: 1) position a ruler at the base of the erect penis, where it attaches to the body; 2) press into the pubic bone as far as you can, until you contact the bone; 3) measure from the base to the end of the tip. Penis girth measurement: 1) use a soft measuring tape or a piece of string without any stretch; 2) gently wrap the tape or string one time around the thickest part of the shaft of the erect penis; 3) note where the ends of the tape meet, which is the number you are looking for.

Penile measurements were performed between 9:00 a.m. and 12:00 a.m. under ambient light with men standing up and with the penis held parallel to the floor. Body height was measured using a wall-mounted stadiometer with metal ruler, measuring to ± 0.1 cm.

Erection inducing procedure: erections were induced by hand self-stimulation with visual sexual stimuli (Playboy and Private magazines) until a patient said that the erection had reached complete rigidity.

The measurements were performed under environmental air-conditioned room and at temperatures varying from 25 ± 1°C.

Statistical analysis. Two-tailed Student's t-test, Pearson correlation and multivariate tests of the MANOVA and MANCOVA (body height as covariate) were used. The student's t-test was used at the normalized data. The study data are presented in the text as Mean ± Standard Error of the Mean (M ± SEM). *P*-value < 0.05 was considered significant. For Pearson correlation and multivariate tests of the ANOVA (including the tests of Between-Subjects Effects) we made an alpha correction as a Bonferroni correction with more strong statistical significance at $P < 0.025$. Statistical analysis was performed using SPSS Statistics ver.21.0 for Windows (SPSS: An IBM Corp.©) and Excel-2020.

Sample size estimation. In a cross-sectional observational study in assessment of erect penis size of Kazakh adult males we supposed that the primary interest lies in assessment of erect penis sizes in the three cities (k = 3). The investigators wish to be 95% sure of detecting when the mean erect penis sizes

not exceed 1 mm (i.e., 1 − β = 0.95, and $m_1 = 1$, $m_2 = 0$). The standard deviation of erect penis size is likely to be 1.56 mm (i.e. SD = 1.56) with a statistical power of 95% and significance level of 2.5% with the Bonferroni correction based on one-sided hypothesis testing. Using SPSS, Sample Power, V23.0, the number of evaluable individuals needed per assessment arm was 74 in one group, and at least totally 148 individuals are necessary to be recruited. (14) Sample size estimation in a cross-sectional survey study in assessment of behavioral habits influencing to the penile size we supposed for the proportional variable, the level of acceptable error is 5% (i.e., d = 0.05), and the expected proportion in population is 85% (i.e., p = 0.85). At the 5% Type I error rate (i.e., α = 0.05), the sample size of the survey is 196.

Results

Of the 282 adult Kazakh males 57 were excluded: 17 males refused to measure the sizes, 18 patients refused to fill the questionnaire, and 22 males were excluded due to the inclusion and exclusion criteria. Thus, 225 participants remained under analysis. In the observed men (n = 225) a mean age 29.6 ± 4.4 years; body height 171.56 ± 6.64 cm; BMI 24.53 ± 3.40 kg/m^2; erect penis length 13.41 ± 1.04 cm; erect penis girth 11.62 ± 0.91 cm. (Table 1).

Table 1
Anthropometrical data and descriptive statistics in Kazakh males (n = 225)

	Age, year	Body height, cm	Weight, kg	BMI, kg/m^2	Penis erect length, cm	Penis erect girth, cm
Mean	29.61	171.56	72.17	24.53	13.41	11.62
Standard Error of the Mean	0.29	0.44	0.72	0.23	0.07	0.06
Standard Deviation	4.44	6.64	10.88	3.40	1.04	0.91
Attributes: BMI, body mass index.						

There were no significant correlations in the males between the body height and penis erect length (r = 0.099, $P < 0.139$); body height and penis erect girth (r = 0.12, $P < 0.065$).

There was set a strong significant correlation between penis erect length and penis erect girth (r = 0.984, $P < 0.0001$).

Frequency of erection in mostly males (54.7%) was 5–6 times per day during in their growth ages (Table 2). Frequency of masturbation and/or coitus ended in ejaculation was two times per month in 42.2% males (n = 95), and one time per week in 35.6% (n = 80). 92 males (40.9%) abstained to masturbation or coitus in one of two cases (abstinence to 50%), and 36.4% males (n = 82) abstained to masturbation or coitus in one from four cases (abstinence to 25%). Frequency of nocturnal sperm emission was one time per month in 39.1% males (n = 88), and two times per month in 36.4% males (n = 82).

Table 2
Descriptive analysis on frequency of Erection, frequency of Masturbation/ Coitus (ended in ejaculation), frequency of Abstinence to masturbation/ coitus, and frequency of Nocturnal sperm emission in Kazakh males (n = 225)

		Frequency	Percent	Cumulative Percent
Frequency of Erection	Every hour (8–12 times/day)	19	8.4	8.4
	5–6 times a day	123	54.7	63.1
	3–4 times a day	76	33.8	96.9
	1–2 times a day	7	3.1	100.0
	Total	225	100.0	
Frequency of Masturbation or Coitus	2 or more times a week	13	5.8	5.8
	1 time a week	80	35.6	41.3
	2 times a month	95	42.2	83.6
	1 time a month or less	37	16.4	100.0
	Total	225	100.0	
Frequency of Abstinence to masturbation or coitus	Never Abstained	18	8.0	8.0
	Abstinence to 25%	82	36.4	44.4
	Abstinence to 50%	92	40.9	85.3
	Abstinence to 75%	33	14.7	100.0
	Total	225	100.0	
Frequency of Nocturnal sperm emission	1 or more per week	4	1.8	1.8
	2 times per month	82	36.4	38.2
	1 time per month	88	39.1	77.3
	1 time per quarterly or less	51	22.7	100.0
	Total	225	100.0	

Multivariate tests of the ANOVA presented in Table 3, showed that penis erect length and penis erect girth significantly depend on frequency of erection ($F(6, 372) = 16.19$, $P < 0.0001$; Wilks' $\Lambda = 0.63$, partial $\eta^2 = 0.21$); frequency of masturbation/ coitus ($F(6, 372) = 2.32$, $P = 0.033$; Wilks' $\Lambda = 0.93$, partial $\eta^2 = 0.036$); frequency of abstinence to masturbation/ coitus ($F(6, 372) = 2.26$, $P = 0.037$; Wilks' $\Lambda = 0.93$, partial $\eta^2 =$

0.35), and frequency of nocturnal emission ($F(2, 186) = 8.59$, $P < 0.0001$; Wilks' $\Lambda = 0.91$, partial $\eta^2 = 0.85$). There was not a statistically significant difference in penis length/ penis girth based on body height ($F(2, 186) = 2.5$, $P = 0.083$).

Table 3

The results of the multivariate ANOVAs: the influence of the independent variables (frequency of Erection, frequency of Masturbation/ Coitus, frequency of Nocturnal emission, abstinence to Masturbation/ Coitus), covariate (body height) on the dependent variables (penis length and penis girth)

Multivariate Tests[a]

Effects		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	0.457	78.41[b]	2.0	186	0.00001	0.457
	Wilks' Lambda	0.543	78.41[b]	2.0	186	0.00001	0.457
	Hotelling's Trace	0.843	78.41[b]	2.0	186	0.00001	0.457
	Roy's Largest Root	0.843	78.41[b]	2.0	186	0.00001	0.457
Body height	Wilks' Lambda	0.974	2.52[b]	2.0	186	0.0834	0.026
Frequency of Nocturnal emission	Wilks' Lambda	0.915	8.59[b]	2.0	186	0.0003	0.085
Frequency of Erection	Wilks' Lambda	0.629	16.19[b]	6.0	372	0.00001	0.207
Frequency of Masturbation / Coitus	Wilks' Lambda	0.929	2.32[b]	6.0	372	0.033	0.036
Frequency of abstinence to Masturbation/ Coitus	Wilks' Lambda	0.931	2.26[b]	6.0	372	0.037	0.035

a. Design: Intercept + Height + frequency of Nocturnal emission + frequency of Erection + Frequency of Masturbation/ Coitus + Abstinence to Masturbation/ Coitus

b. Exact statistic

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
Penis Length	3.205	35	189	0.00001
Penis Girth	3.764	35	189	0.00001

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

Multivariate Tests[a]

a. Design: Intercept + frequency of Erection + frequency of Masturbation/ Coitus + frequency of Abstinence to Masturbation/ Coitus + frequency of Erection * frequency of Masturbation/ Coitus + frequency of Erection * frequency of Abstinence to Masturbation/ Coitus + frequency of Masturbation/ Coitus * frequency of Abstinence to Masturbation/ Coitus + frequency of Erection * frequency of Masturbation/ Coitus * frequency of Abstinence to Masturbation/ Coitus

To determine how the dependent variables (penis length and penis girth) differ for the independent variables (frequency of erection, frequency of masturbation/ coitus, frequency of abstinence to masturbation/ coitus, and frequency of nocturnal emission), we need to look at Table 4 (Multivariate ANOVAs with the tests of Between-Subjects Effects). We can see from this table that frequency of erection ($F(3, 187) = 31.04$; $P < 0.0001$; partial $\eta^2 = 0.65$), frequency of masturbation/ coitus ($F(3, 187) = 4.1$; $P = 0.008$; partial $\eta^2 = 0.062$), frequency of abstinence to masturbation/ coitus ($F(3, 187) = 4.1$; $P = 0.007$; partial $\eta^2 = 0.062$), and frequency of nocturnal emission ($F(1, 187) = 16.4$; $P < 0.0001$; partial $\eta^2 = 0.081$) have a statistically significant effect on both penis length and penis girth (for frequency of erection is $F = 23.5$, $P < 0.0001$; for frequency of masturbation/ coitus is $F = 3.76$, $P = 0.012$; for frequency of abstinence to masturbation/ coitus is $F = 3.1$, $P = 0.028$; for frequency of Nocturnal emission is $F = 12.9$, $P = 0.0004$). Table 4 shows that body height has not a significantly effect on both penis length ($F = 2.3$, $P = 0.13$) and penis girth ($F = 3.7$, $P = 0.053$). These differences can be easily visualized by the figures generated by MANCOVA procedure, as shown in **Suppl. 2**.

Table 4

Multivariate ANOVAs with the tests of Between-Subjects Effects: the influence of the independent variables (frequency of Erection, frequency of Masturbation/ Coitus, frequency of Nocturnal emission, frequency of abstinence to Masturbation/ Coitus), covariate (body height) on the dependent variables (penis length/ penis girth)

Tests of Between-Subjects Effects							
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	PenisLength	187.277[a]	37	5,062	16,625	0,00001	0,767
	PenisGirth	131.872[b]	37	3,564	12,708	0,00001	0,715
Intercept	PenisLength	43.332	1	43,332	142,329	0,00001	0,432
	PenisGirth	29.230	1	29,230	104,219	0,00001	0,358
Body height	PenisLength	0.703	1	,703	2,309	0,130	0,012
	PenisGirth	1.063	1	1,063	3,790	0,053	0,020
Frequency of Nocturnal emission	PenisLength	5.007	1	5,007	16,445	0,00001	0,081
	PenisGirth	3.624	1	3,624	12,920	0,0004	0,065
Frequency of Erection	PenisLength	28.353	3	9,451	31,042	0,00001	0,332
	PenisGirth	19.793	3	6,598	23,524	0,00001	0,274
Frequency of Masturbation/ Coitus	PenisLength	3.750	3	1,250	4,106	0,008	0,062
	PenisGirth	3.166	3	1,055	3,763	0,012	0,057
Abstinence to Masturbation/ Coitus	PenisLength	3.773	3	1,258	4,131	0,007	0,062
	PenisGirth	2.614	3	0,871	3,107	0,028	0,047
	PenisGirth	0.107	4	0,027	0,095	0,984	0,002
Error	PenisLength	56.933	187	0,304			
	PenisGirth	52.448	187	0,280			
Total	PenisLength	40714.9	225				
	PenisGirth	30581.1	225				
Corrected Total	PenisLength	244.2	224				
	PenisGirth	184.3	224				
a. R Squared = 0.767 (Adjusted R Squared = 0.721)							
b. R Squared = 0.715 (Adjusted R Squared = 0.659)							

Discussion

The results of the cross-sectional observational and survey pilot study showed that Kazakh-males' mean erect penis length (13.41 cm) lies in a row between the mean erect penis length of USA men population (13.58 cm), and the mean erect penis length of Russian men population (13.21 cm). (7) Whereas, penile length in Vietnamese men is 14.67 cm. (6)

As of 2015, a systematic review of 15,521 men, and the best research to date on the topic, as the subjects were measured by health professionals, rather than self-measured, has concluded that the average length of an erect human penis is 13.12 cm (5.17 inches) long, while the average circumference of an erect human penis is 11.66 cm (4.59 inches). (13)

Our study did not reveal a correlation between the body height and penis length ($r = 0.099$, $P < 0.139$) and girth ($r = 0.12$, $P < 0.065$). A strong significant correlation sets between the erect penis length and penis girth ($r = 0.984$, $P < 0.0001$).

The study results significantly presented that long-lasting effect of extended erection during body growth has a positive effect for growth of penis size in men. Sexual abstinence including abstinence to coitus and masturbation has a positive influence on the increase in penis size during male growth.

An erection leads to the growth of the penis corpus cavernosum in a young growing body. (15) Although, excessive long erection may lead to congestion effects. (16) Sexual activity, including ejaculatory intercourse and masturbation, reduces erections.

Masturbation act can exercise the reproductive system, but ejaculatory masturbation appears to have a negative effect on the increase in penis size as the body grows. Some studies concluded that masturbation is associated with psychopathological and reproduction health problems. (17) Sexual activity directly depends on testosterone, and testosterone therapy improves overall sexual activity, erectile function. (18)

During the period after intercourse or after masturbation, serum testosterone levels increase, which may mean that testosterone was used up, but testosterone synthesis stores in the body may decrease. A decrease in serum testosterone levels is associated with a decrease in the frequency of masturbation. (19)

The penis is a muscular body, and he can stretch the more the more often it is under blood pressure or in a state of erection. Increased blood circulation promotes to the metabolic process to expand. Serum androgen levels positively influence the growth and development of the penis sizes during adolescence. (20) But the mechanism of action of androgens on penis growth is unclear. Apparently, androgens can influence the penis size by creating an erection. Possibly, that frequency of masturbation/coitus could be a confounding factor in the direct relationship between androgens level sand penis size.

Many studies found that sexual abstinence including abstinence from masturbation in men actually demonstrated an increase in testosterone level; (21) advanced semen parameters (ROS, DNA fragmentation and seminal plasma antioxidant capacity); and pregnancy rates. (22) Serum testosterone levels drop significantly 10 minutes after ejaculation. (23) Sexual function is affected not only by testosterone, but also by prolactin, cortisol, progesterone, etc., which are hormones that also affect sexual function. (21–23) However, many studies have not found a significant correlation between testosterone and penis size. (13, 24) Perhaps that is why men who have frequent or daily sex do not have huge penises.

Ejaculatory frequency, especially in early adulthood, is negatively associated with the risk of developing prostate cancer. (25) A sufficient level of androgens in the blood during body growth contributes to more frequent erections, which, in turn, has a positive effect on the development of the cavernous bodies of the penis (weight, length and girth) (26).

Early and frequent copulation shortens the lifespan of animals and insects. (27) In a retrospective and prospective follow-up study over 45 years, the authors apparently demonstrated that sexual activity could cause natural death in individuals with pre-existing illnesses. (28) Masturbation in adolescence was seen as potentially leading to penis size reduction. (11)

Thus, the more and longer the erection lasts, the more the penis grows in a young growing organism. Perhaps, this is due to the relatively high level of sex hormones in the blood, the volume and concentration of semen. (29, 30) Since an erection is provided by the level of sex hormones and the concentration of semen, ejaculation leads to a decrease in the amount of sperm and sex hormones.

An erection activity is an unconditioned reflex, and masturbation is a conscious process. Given that the habits and temperament of a person do not change throughout life, then the habit to masturbate should be considered as a way of human behavior. The results of the survey study could reflect and indicate the temperament and habits of each male.

The investigated data can be extrapolated to other men than Kazakh, but other additional studies are needed to understand the relationships considered.

It is possible that daily morning erection of the penis contributes to an increase in the cavernous body of the penis and the size of the penis, respectively.

Conclusions

Thus, Kazakh males aged 29.6 ± 4.4 years with a height 171.56 ± 6.64 cm, BMI 24.53 ± 3.40 kg/m^2 have the erect penis length of 13.41 ± 1.04 cm and penis girth 11.62 ± 0.91 cm. Penis length and penis girth do not depend on body height.

A long-lasting extended erection during childhood has a positive effect on penis enlargement. Sexual abstinence from coitus and masturbation during childhood has a positive increasing effect on the penis size in adulthood. The more a man abstains from ejaculation during his physiological maturation, the larger his penis size in adulthood.

Strengths and Limitations

First strength, published studies about positive role of prolonged erection during body growth to penis size are limited in scope and number. Second, the study design was a cross-sectional survey pilot study using a correlational design with the intention-to-treat principle.

First limitation, the study did not measure a blood testosterone. Second, we did not measure penis flaccid length and penis flaccid girth. Third, out-of-population sample (participants came from a urological clinic), the results were self-reported, and participants recalled their past behavior several years ago. Forth, to make an analysis during the adult period, and try to correlate with the whole period of development of the male body, is difficult. Additional research needs to understand the considered relationships.

Declarations

Conflict of Interest Disclosures: The authors declare that they have no any competing interests (financial, professional, or personals) that are relevant to the manuscript. We have read and understood the journal policy on declaration of interests and have no interests to declare.

Consent for publication. All authors of the manuscript affirm that they had access to the study data and reviewed and approved the final version.

Availability of data and materials. First, the data is too large (> 3.7 GB). Secondly, we will make our data available to any investigator/reviewer on their own request, so that the personal privacy of our patients cannot be compromised.

Funding sources This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. KO is supported by the Ministry of health of the Republic of Kazakhstan, 2020-2021.

Ethics approval and consent to participate. The Ethics Committee of the National Research oncology center (phone: +7-7172-702910, +7-7172-702953; e-mail: nrocastana@gmail.com; kense.777@mail.ru) approved the study and written informed consent within the questionnaire was obtained from all patients, protocol number is #8 of 28.11.2019. Board Affiliation: Health Ministry of the Republic of Kazakhstan. This study has been reviewed and approved by all authors.

Author Contributions: *KO:* design and performance, narrative analysis and review, bibliography review, data collection, prepare questionnaire, scientific analysis and executor, draft writing, editing, and final

revision. *GK:* study design, draft writing, writing discussion, data collection, implementation of questionnaire, bibliography, and paper review. *AA:* study design, draft writing, writing results and discussion, data collection, implementation of questionnaire, and paper review. *AN:* design and performance, data collection, prepare and implementation questionnaire, scientific analysis, bibliography, and paper review. *ZZ:* preparation e-version data collection, implementation of questionnaire, bibliography and paper review, scientific analysis, writing the methods. *MG:* scientific analysis, paper scientific review, writing the methods and print. *AT:* study design, research executor, editing, and final revision.

ACKNOWLEDGMENTS

The authors thank the Republican Diagnostic Center at University Medical Center in recruiting patients and collecting data for the study, and technical assistance.

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