

## Evaluation of the Knowledge Level and Attitudes of Family Physicians Regarding Circumcision: A cross-sectional Study

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### Abstract

#### Introduction

Male circumcision is more common in countries where Islam and Judaism are widely practiced. Despite its high prevalence, misinformation and misconceptions persist. This study aimed to assess family physicians' (FPs) knowledge and attitudes regarding circumcision.

#### Methods

This descriptive-analytical cross-sectional study included 369 FPs. A 36-item questionnaire, assessed sociodemographic characteristics, attitudes, knowledge. Knowledge was evaluated using six items scored as correct (1), incorrect/undecided (0), yielding a total score of 0–6. Data were analyzed using SPSS Statistics with descriptive statistics, Pearson's chi-square, Mann-Whitney U, and Kruskal-Wallis tests.

#### Results

The mean age of participants was 38.5±9.3, 62.1% were female. Most FPs (73.3%) recommended circumcision before two years of age, while 9.9% favored circumcision during the phallic stage. Twelve percent opposed circumcision without medical indication, and 27.9% believed that anesthesia was unnecessary for newborn circumcision. Awareness of medical benefits varied: 65.9% recognized the association with reduced urinary tract infections, whereas fewer identified associations with sexually transmitted diseases (45.4%) or hydronephrosis-related indications (33.1%). The mean circumcision knowledge score was 4.04±1.24, being higher among physicians with ≥3 children and among those with circumcised sons.

#### Conclusion

Although most FPs demonstrated moderate knowledge, important misconceptions remain. Structured training programs may improve evidence-based counseling provided to parents.

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**Keywords:** family physicians, knowledge, male circumcision, pediatrics

## Introduction

Circumcision is a long-established surgical procedure involving the removal of the prepuce (foreskin) covering the glans penis. [1] Its prevalence varies geographically and is influenced by cultural and religious traditions. It is commonly practiced in the Middle East, parts of Africa, and South and Southeast Asia. In Jewish tradition, circumcision is performed on the eighth day after birth as part of the “brit milah” ceremony, typically conducted by a ritual circumciser (mohel). [2, 3] Historical evidence suggests that circumcision has been practiced for millennia; for example, ancient mummies and tomb depictions have been interpreted as showing circumcision. [4]

Although circumcision is often performed for sociocultural and religious reasons, it is also a surgical procedure with documented medical benefits and recognized risks. Potential perioperative and postoperative complications include bleeding, infection, excessive or insufficient removal of foreskin, meatal stenosis, and penile injury. [5] Complication rates are lower when the procedure is performed by trained healthcare professionals under appropriate sterile conditions. [5]

Male circumcision has been associated with reduced risks of urinary tract infections (UTI), acquisition of human immunodeficiency virus (HIV), transmission of certain sexually transmitted infections (STI), and penile cancer. [6] Physicians counseling families are expected to provide balanced, evidence-based information on both potential benefits and risks of procedure. This study aims to evaluate level of knowledge and attitudes of a family physician (FP) as role model during consultation concerning circumcision.

## Methods

### Study design and setting

This analytical cross-sectional study was conducted between 1st January 2024 and

1<sup>st</sup> April 2024 among FPs actively practicing in Istanbul, Turkey.

### Study population and eligibility criteria

The study population comprised FPs (male and female) actively practicing in Istanbul, Türkiye, during the study period (January to April 2024). Participation was voluntary, and only family physicians were eligible for inclusion.

### Sample size and sampling procedures

The sample size was calculated using G\*Power version 3.1.9.7 (Franz Faul, Germany), based on the total number of eligible FPs in Istanbul (n=4,792), with an estimated female proportion of 75%. A minimum of 356 participants was required to achieve 95% power with a 5% margin of error. In total, 369 family physicians were included.

### Data collection instruments, procedures, and quality control

A structured 36-item questionnaire was developed based on previously published studies assessing physicians' knowledge and attitudes toward circumcision. [7, 8] The questionnaire covered sociodemographic characteristics, perspectives and practices related to circumcision, and knowledge items. Data were collected via face-to-face administration and online distribution through family physician communication groups.

### Data processing, study variables, and analysis

Data analysis was performed using IBM SPSS Statistics, version 27.0. Descriptive data are presented as mean±standard deviation, median (interquartile range), and minimum–maximum values, as appropriate. Categorical variables were compared using Pearson's chi-square test. Knowledge was assessed using six items reflecting evidence-based and widely accepted medical information regarding circumcision outcomes. Each item was scored as 1 (correct) or 0 (incorrect/undecided), yielding the Circumcision Knowledge Score (CKS; range 0–6). Knowledge levels were categorized as

low (0–2), moderate (3–4), and high (5–6). Items related to surgical considerations or contraindications (e.g., hypospadias) were analyzed separately as perspective/attitude variables. Associations between CKS and sociodemographic variables were analyzed using the Mann–Whitney U test and Kruskal–Wallis test. A p-value <0.05 was considered statistically significant.

### Ethical considerations

Ethics approval was obtained from the Sağlık Bilimleri University Şişli Hamidiye Etfal Training and Research Hospital Health Application and Research Center Clinical Research Ethics Committee (Decision no. 4213; 19.12.2023). Institutional permission to conduct the study was granted.

## Results

### Sociodemographic Characteristics of the Participants

A total of 369 participants, including 140 men (37.9%) and 229 women (62.1%), were included. The mean age was 38.53±9.298 years, and mean professional experience was 13.38±9.364 years. Most participants (n=354; 95.9%) resided in urban areas, and 349 (94.6%) lived in nuclear families. Overall, 150 respondents (40.7%) reported having no children (Table 1).

**Table 1. Distribution of sociodemographic characteristics of the participants**

| Variables                                 | Mean±SD              | Median (IQR)          |
|---|----------------------|-----------------------|
| <b>Age</b>                                | 38.53±9.298          | 37 (24-65)            |
| <b>Years of Working in the Profession</b> | 13.38±9.364          | 11 (0-40)             |
|   | <b>Frequency (n)</b> | <b>Percentage (%)</b> |
| <b>Gender</b>                             | Male                 | 140<br>37,9           |
|   | Female               | 229<br>62.1           |
| <b>Place of Residence</b>                 | Urban                | 354<br>95.9           |
|   | Rural                | 15<br>4.1             |
| <b>Family Structure</b>                   | Nuclear Family       | 349<br>94.6           |
|   | Extended Family      | 20<br>5.4             |
| <b>Number of Children</b>                 | 0                    | 150<br>40.7           |
|   | 1                    | 107<br>29.0           |
|   | 2                    | 89<br>24.1            |
|   | 3 and above          | 23<br>6.2             |

### Attitudes and practices regarding circumcision

Half of the respondents (n=185; 50.3%) stated that the family physician should decide regarding circumcision, while 155 (42.1%) favored parental decision-making; 17 (4.6%) believed the individual should decide in adulthood. Regarding the purpose of circumcision, 182 participants (49.3%) selected “all reasons” (religious, social, and health). Forty-five participants (12.2%) stated that circumcision should not be performed.

The demographic characteristics proved no statistical significance amongst the groups that recommend circumcision and those that did not (p>0.05). It has been determined that 84.4% of FPs (18 men (47.4%), 20 women (52.6%) who say circumcision should not be performed have not circumcised their own children. A total of 252 (68.3%) participants stated that circumcision should be performed by a urologist and pediatric surgeon.

Among participants who had circumcised children, 45 (39.13%) preferred pediatric surgeons, 45 (39.13%) preferred urologists, 12 (10.44%) preferred general surgeons, and 13 (11.3%) preferred general practitioners. When asked about the preferred method of circumcision, 248 (67.2%) participants favored performing it in the hospital under local anesthesia. A total of 113 (30.6%) participants believed that surgery should be performed in the operating room under general anesthesia and 152 (41.2%) of the FPs believed that newborns' circumcisions should have been performed with anesthesia. Protection against potential infections is possible with proper surgical asepsis rule application during the circumcision procedure according to 352 (98.1%) of the FPs who participated in our study and 97.8% of the FPs recommended performing circumcision operations in hospitals. Of the participants who had a circumcised child, 95.6% stated that their child was circumcised in a hospital.

Most participants (73.3%) recommended circumcision before two years of age, whereas 33 participants (9.9%) recommended circumcision between 2–6 years. Among 118 participants with circumcised children, 32 (43.2%) reported circumcision within the first two years and 10 (13.6%) between ages 2–6.

The most frequently cited determinant of preferred timing was that the child would be unaware of and unlikely to remember the procedure (n=232; 62.9%).

Among the participants, 12 (3.3%) believed that circumcision is necessary for reproductive capability, whereas 167 (45.4%) believed that STI and penile cancer are less common among circumcised individuals (Table 2). Additionally, 168 (45.5%) stated that circumcision is unnecessary for disease prevention if adequate penile hygiene is maintained. Furthermore, 122 (33.1%) considered circumcision necessary without waiting for a specific age in cases of hydronephrosis, and 246 (66.7%) believed that circumcision should be performed without waiting for a specific age in cases of hypospadias.

**Knowledge levels on circumcision**

The items used to calculate the CKS are presented in Table 2. The mean CKS was 4.04±1.24. In categorical terms, 40 participants (10.8%) had low knowledge (0–2 points), 188 (51.0%) had moderate knowledge (3–4 points), and 141 (38.2%) had high knowledge (5–6 points).

**Table 2. Distribution of responses to knowledge items included in the circumcision knowledge score**

| Statements  | Correct |      | Incorrect |      | Undecided |      |
|---|---------|------|-----------|------|-----------|------|
|   | n       | %    | n         | %    | n         | %    |
| 1-Circumcision is not necessary for a child to acquire reproductive capability.           | 336     | 91,1 | 12        | 3,3  | 21        | 5,7  |
| 2-Urinary tract infections are less common in circumcised individuals.                    | 243     | 65,9 | 80        | 21,7 | 46        | 12,5 |
| 3-Sexually transmitted diseases are less common.  | 167     | 45,4 | 148       | 40,2 | 53        | 14,4 |
| 4-Penile cancer incidence decreases.  | 167     | 45,3 | 99        | 26,8 | 103       | 27,9 |
| 5-Circumcision effectively prevents premature ejaculation by reducing penile sensitivity. | 135     | 36,6 | 90        | 24,4 | 144       | 39   |
| 6-The most common undesirable outcome after circumcision is bleeding.                     | 279     | 75,6 | 22        | 6,0  | 68        | 18,4 |

**Factors associated with knowledge scores**

No statistically significant differences in CKS were observed by age, gender, or years of professional experience ( $p > 0.05$ ). Physicians with three or more children and those with circumcised children had significantly higher CKS values ( $p = 0.001$ ) (Table 3).

CKS values were statistically higher among FPs who stated that circumcision should be performed ( $p < 0.001$ ). FPs who reported that parents should decide on the age of circumcision had statistically higher CKS than those who stated that the individual should decide upon reaching adulthood ( $p = 0.014$ ).

CKS was statistically higher among those citing religious reasons than among those citing traditional reasons ( $p < 0.001$ ).

FPs recommend circumcision at home with local anesthesia had statistically higher CKS than those preferring circumcision in an operating room with general anesthesia ( $p = 0.026$ ). FPs recommend circumcision under two years of age had statistically higher CKS than those recommend circumcision after six years of age ( $p = 0.009$ ). FPs recommend circumcision under two years of age due to less pain during infancy had statistically higher CKS than those citing other reasons ( $p < 0.001$ ) (Table 3).

**Table 3. Factors associated with the knowledge score**

| Variables                                     | N   | %   | Mean Rank | p value |                  |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|---|---|-----|-----------|---------|------------------|---|---|-----|------|--------|------------------|--------------------------|-----|------|--------|--------------------------|---------------------------|------|--------|-------------------|-------------|--------------|--------|---|--------|---|---------|--------------------------------|-------------------------------------|---|--------------|--------------|------------------|--------------|---|--------------------------|-----------|-------------------------------|--------|--------------------------|--------------|---------------------------------------|--------|----------|-----------|---|---|-----------|-------------------|-------------------------------------|---|----------|---|--------|------------------|---------------------------------------|-------------------------------------|---|------------------|--------------|--------------------------|------------------|--------------------------|-------------------------------|--------|----------|--------------------------|---------------------------------------|--------|-----------|----------|-------------------------------------|---|--------------------------------|-----------|--------|--------------|----------|--------------------------------|------------------|--------------|---------------------------------------|-----------------|------------------|--------------|-------------------------------|--------------|----------|-------------------------------|---------------------------------------|--------|---------|---------------------------------------|-------------------------------------|---|--------|-------------------------------------|---|--------------|----------|--------|--------------|----------|---------------------------------------|-----------------|--------|---------------------------------------|-----------------|--------|--------------|----------|--------------|----------|------|--------|---------|---------|
| <b>Should Circumcision Be Performed?</b>      | Yes   | 323 | 87.8      | 195.88  | <b>&lt;0.001</b> |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | No  | 45  | 12.2      |         |                  | 102.80  | <b>Do You Have Circumcised Children?</b>  | Yes | 118  | 32     | 205.76           | <b>0.007</b>             | No  | 251  | 68     | 174.46                   | <b>Number of Children</b> | 0    | 150    | 40.7              | 182.42      | <b>0.001</b> | 1      | 107                                     | 29.0   | 160.44  | 2       | 89                             | 24.1                                | 196.94  | 3 and above  | 23           | 6.2              | 251.69       | <b>Primary Person Requesting Circumcision</b> | Parents                  | 155       | 42.1                          | 199.31 | <b>0.014</b>             | Grandparents | 11                                    | 3      | 146.64   | Physician | 185                                     | 50.3  | 178.63    | Decide on his own | 17                                  | 4.6   | 126.74   | Being too young to remember or be aware | 232    | 62.9             | 187.99                                | <b>Reason for Preference of Age</b> | Being at an age where he can gain a sense of control physically and psychologically | 78               | 21.1         | 147.28                   | <b>&lt;0.001</b> | Less pain during infancy | 39                            | 10.6   | 230.46   | Parent's economic status | 20                                    | 5.4    | 197.73    | Religion | 19                                  | 5.1   | 189.79                         | Tradition | 14     | 3.8          | 95.21    | <b>Reason for Circumcision</b> | Health           | 109          | 29.5                                  | 144.88          | <b>&lt;0.001</b> | All of these | 182                           | 49.3         | 174.56   | At home with local anesthesia | 8                                     | 2.2    | 233.00  | With local anesthesia in the hospital | 248                                 | 67.2  | 192.81 | <b>Request for Clinical Setting</b> | With general anesthesia in the operating room | 113          | 30.6     | 163.61 | <b>0.026</b> | <2 years | 244                                   | 73.3            | 175.18 | <b>Preferred Age for Circumcision</b> | Between 2 and 6 | 33     | 9.9          | 165.59   | <b>0.009</b> | >6 years | 49   | 14.7   | 125.22  | Any age |
| <b>Do You Have Circumcised Children?</b>      | Yes   | 118 | 32        | 205.76  | <b>0.007</b>     |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | No  | 251 | 68        | 174.46  |                  | <b>Number of Children</b>                     | 0   | 150 | 40.7 | 182.42 | <b>0.001</b>     | 1                        | 107 | 29.0 | 160.44 | 2                        |                           | 89   | 24.1   | 196.94            | 3 and above |              | 23     | 6.2                                     | 251.69 | <b>Primary Person Requesting Circumcision</b> | Parents | 155                            | 42.1                                | 199.31  | <b>0.014</b> | Grandparents | 11               | 3            |   | 146.64                   | Physician | 185                           | 50.3   |                          | 178.63       | Decide on his own                     | 17     | 4.6      | 126.74    | Being too young to remember or be aware | 232   | 62.9      | 187.99            | <b>Reason for Preference of Age</b> | Being at an age where he can gain a sense of control physically and psychologically | 78       | 21.1                                    | 147.28 | <b>&lt;0.001</b> | Less pain during infancy              |                                     | 39  | 10.6             | 230.46       | Parent's economic status |                  | 20                       | 5.4                           | 197.73 | Religion | 19                       | 5.1                                   | 189.79 | Tradition | 14       | 3.8                                 | 95.21   | <b>Reason for Circumcision</b> | Health    | 109    | 29.5         | 144.88   |                                | <b>&lt;0.001</b> | All of these | 182                                   | 49.3            |                  | 174.56       | At home with local anesthesia | 8            | 2.2      | 233.00                        | With local anesthesia in the hospital | 248    | 67.2    | 192.81                                | <b>Request for Clinical Setting</b> | With general anesthesia in the operating room | 113    | 30.6                                | 163.61  | <b>0.026</b> | <2 years | 244    | 73.3         | 175.18   | <b>Preferred Age for Circumcision</b> | Between 2 and 6 | 33     |                                       | 9.9             | 165.59 | <b>0.009</b> | >6 years |              | 49       | 14.7 | 125.22 | Any age | 7       |
| <b>Number of Children</b>                     | 0   | 150 | 40.7      | 182.42  | <b>0.001</b>     |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | 1   | 107 | 29.0      | 160.44  |                  |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | 2   | 89  | 24.1      | 196.94  |                  |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | 3 and above   | 23  | 6.2       | 251.69  |                  | <b>Primary Person Requesting Circumcision</b> | Parents   | 155 | 42.1 | 199.31 | <b>0.014</b>     | Grandparents             | 11  | 3    | 146.64 | Physician                | 185                       | 50.3 | 178.63 | Decide on his own | 17          | 4.6          | 126.74 | Being too young to remember or be aware | 232    |   | 62.9    | 187.99                         | <b>Reason for Preference of Age</b> | Being at an age where he can gain a sense of control physically and psychologically |              | 78           | 21.1             | 147.28       | <b>&lt;0.001</b>                              | Less pain during infancy | 39        | 10.6                          | 230.46 | Parent's economic status | 20           | 5.4                                   | 197.73 | Religion | 19        | 5.1                                     | 189.79  | Tradition | 14                |                                     | 3.8   | 95.21    | <b>Reason for Circumcision</b>          | Health |                  | 109                                   | 29.5                                | 144.88  | <b>&lt;0.001</b> | All of these | 182                      | 49.3             | 174.56                   | At home with local anesthesia | 8      | 2.2      | 233.00                   | With local anesthesia in the hospital | 248    | 67.2      | 192.81   | <b>Request for Clinical Setting</b> | With general anesthesia in the operating room | 113                            | 30.6      | 163.61 | <b>0.026</b> | <2 years | 244                            | 73.3             | 175.18       | <b>Preferred Age for Circumcision</b> | Between 2 and 6 | 33               | 9.9          | 165.59                        | <b>0.009</b> | >6 years | 49                            | 14.7                                  | 125.22 | Any age | 7                                     | 2.1                                 | 151.21  |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
| <b>Primary Person Requesting Circumcision</b> | Parents   | 155 | 42.1      | 199.31  | <b>0.014</b>     |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | Grandparents  | 11  | 3         | 146.64  |                  |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | Physician   | 185 | 50.3      | 178.63  |                  |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | Decide on his own   | 17  | 4.6       | 126.74  |                  |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | Being too young to remember or be aware   | 232 | 62.9      | 187.99  |                  | <b>Reason for Preference of Age</b>           | Being at an age where he can gain a sense of control physically and psychologically | 78  | 21.1 | 147.28 | <b>&lt;0.001</b> | Less pain during infancy | 39  | 10.6 | 230.46 | Parent's economic status | 20                        | 5.4  | 197.73 | Religion          | 19          | 5.1          | 189.79 | Tradition                               | 14     | 3.8   | 95.21   | <b>Reason for Circumcision</b> | Health                              | 109   | 29.5         | 144.88       | <b>&lt;0.001</b> | All of these | 182   | 49.3                     | 174.56    | At home with local anesthesia | 8      | 2.2                      | 233.00       | With local anesthesia in the hospital | 248    | 67.2     | 192.81    | <b>Request for Clinical Setting</b>     | With general anesthesia in the operating room | 113       | 30.6              | 163.61                              | <b>0.026</b>  | <2 years | 244                                     | 73.3   | 175.18           | <b>Preferred Age for Circumcision</b> | Between 2 and 6                     | 33  | 9.9              | 165.59       | <b>0.009</b>             | >6 years         | 49                       | 14.7                          | 125.22 | Any age  | 7                        | 2.1                                   | 151.21 |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
| <b>Reason for Preference of Age</b>           | Being at an age where he can gain a sense of control physically and psychologically | 78  | 21.1      | 147.28  | <b>&lt;0.001</b> |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | Less pain during infancy  | 39  | 10.6      | 230.46  |                  |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | Parent's economic status  | 20  | 5.4       | 197.73  |                  |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | Religion  | 19  | 5.1       | 189.79  |                  |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | Tradition   | 14  | 3.8       | 95.21   |                  |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
| <b>Reason for Circumcision</b>                | Health  | 109 | 29.5      | 144.88  | <b>&lt;0.001</b> |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | All of these  | 182 | 49.3      | 174.56  |                  |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | At home with local anesthesia   | 8   | 2.2       | 233.00  |                  |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | With local anesthesia in the hospital   | 248 | 67.2      | 192.81  |                  |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
| <b>Request for Clinical Setting</b>           | With general anesthesia in the operating room                                       | 113 | 30.6      | 163.61  | <b>0.026</b>     |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | <2 years  | 244 | 73.3      | 175.18  |                  |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
| <b>Preferred Age for Circumcision</b>         | Between 2 and 6   | 33  | 9.9       | 165.59  | <b>0.009</b>     |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | >6 years  | 49  | 14.7      | 125.22  |                  |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |
|   | Any age   | 7   | 2.1       | 151.21  |                  |   |   |     |      |        |                  |                          |     |      |        |                          |                           |      |        |                   |             |              |        |   |        |   |         |                                |                                     |   |              |              |                  |              |   |                          |           |                               |        |                          |              |                                       |        |          |           |   |   |           |                   |                                     |   |          |   |        |                  |                                       |                                     |   |                  |              |                          |                  |                          |                               |        |          |                          |                                       |        |           |          |                                     |   |                                |           |        |              |          |                                |                  |              |                                       |                 |                  |              |                               |              |          |                               |                                       |        |         |                                       |                                     |   |        |                                     |   |              |          |        |              |          |                                       |                 |        |                                       |                 |        |              |          |              |          |      |        |         |         |

<sup>1</sup> Mann Whitney U Test 2 Kruskal Wallis

## Discussion

The decision to perform circumcision is typically shaped by a combination of religious beliefs, health considerations, cultural norms, and social factors. The aim of this study is to evaluate the knowledge levels and attitudes of FPs, the majority of whom are middle-aged and have been practicing for an average of more than 10 years, regarding circumcision, a procedure widely performed in Turkey for religious, social, and health-related reasons. The CKS values of FPs who stated that "circumcision should be performed" were statistically higher than those of FPs who were against circumcision ( $p < 0.001$ ). Habits still play an important role in the timing of circumcision and by whom and why it is performed in Turkey. Only 12.2% of FPs declared that circumcision should not be performed unless there is a medical condition. Although 50.3% of participants thought that the decision to circumcise should be made according to physician recommendation, 42.1% thought that the family's choice was sufficient. However, it should not be forgotten that this may be a negative situation for some cultural situations. In addition, after female circumcision was considered a human rights violation, discussions about male circumcision also began.[9]

In recent years, the notion that families alone should be the sole decision-makers for surgically performed procedures in children for cultural reasons, except in cases of medical necessity, has begun to be debated worldwide from human rights and ethical perspectives. It has unfortunately been observed that, in contexts where only families are considered competent decision-makers, cultural differences may lead to harmful medical practices analogous to female genital mutilation. According to Peterson, "no person has the right to surgically inflict their religious, sexual, or cosmetic preferences on another person. Parents must protect their children from harmful practices, and no tradition should be enforced by the permanent alteration or disfigurement of the body of an individual

who is legally incapable of providing informed consent." [10] In our study, only 4.6% of participants left the decision about circumcision to their child. This finding may be related to the cultural context of a Muslim-majority society where circumcision is widely practiced.

The probability of the retraction ratio of the prepuce increases as the child grows; thus there is no need for treatment for physiological physiognomies.[11,12] It is better not to intervene in the prepuce due to the protection it has on the glans penis as long as this does not cause urination problems. Increased bacterial colonization can be detected between the glans penis and foreskin and around the periurethral area. Since this condition disappears with circumcision, it is known that circumcision in boys significantly reduces the risk of urinary tract infection (UTI).[12,13] It is important to protect patients from UTIs after the detection of hydronephrosis. It has been stated that female gender, uncircumcised boys, and high-grade hydronephrosis are risk factors for febrile UTIs in patients diagnosed with antenatal hydronephrosis. [14,15] Early circumcision of male infants plays an important role in preventing parenchymal damage that may develop in the kidney by reducing the frequency of UTIs and indirectly contributing positively to growth in these patients.[16] Almost two-thirds of the FPs (65.9%) in our study were aware of UTIs issues.

Three randomized trials conducted in Africa reported that adult male circumcision reduced heterosexual HIV acquisition in men by approximately 51%–60% in high-prevalence settings.[17] However, the generalizability of these findings may vary by epidemiological context.

Three randomized trials conducted in Africa indicated that adult male circumcision decreased HIV acquisition in men by 51% to 60%. Furthermore, long-term follow-up of the participants showed that the protective efficacy of male circumcision increases over time post-surgery.[5,18,19]

In addition, childhood/adolescent circumcision is protective against invasive penile cancer. This effect could be mediated partly through an effect on phimosis.[20] Almost half of the FPs (45.3%) knew/were aware that circumcision decreases penile cancer incidence. Male circumcision does not appear to adversely affect penile sexual function/sensitivity or sexual satisfaction. [6,21,22] In Y.Hassan's study, only 32.37% of parents knew about the medical benefits of circumcision, whereas all of the study participants considered circumcision to be a religious necessity.[23] While all FPs were expected to be knowledgeable about these diseases, only approximately half of the FPs knew that circumcision reduces the incidence of penile cancer (45.3%) and STD (45.4%). These distributions indicate that while most FPs demonstrated at least moderate knowledge, substantial knowledge gaps persist regarding medical indications and sexual outcomes of circumcision.

It is more appropriate to avoid circumcising patients with external genital anomalies such as hypospadias or micro penis, which may require corrective operations with the use of foreskin.[13] In our study, only 18.2% of our FPs were aware that circumcision should not be performed in cases of hypospadias. Additionally, 13.6-35% of the FPs stated that they had no opinion on questions regarding the indications for circumcision. Based on these findings, we believe that increasing family physicians' awareness of genital pathologies is necessary. Enhancing such awareness may help prevent delayed diagnosis of conditions such as inguinal hernia, varicocele, and undescended testes, in addition to hypospadias, during routine pediatric genital examinations.

Approximately two-thirds of participants (n=248; 67.2%) recommended hospital-based circumcision under local anesthesia, and 152 (41.2%) stated that newborn circumcision should be performed with anesthesia. As circumcision is painful, adequate anesthesia and postoperative analgesia are essential. In infancy, local anesthesia is effective in reducing or

almost eliminating pain during and after circumcision. According to the literature anesthesia applied during circumcision, such as penile nerve block, loco-regional anesthesia, general anesthesia, tracheal intubation, or ritual circumcision, varies. [24-28] For adult males over the age of 16 in sub-Saharan Africa, concern about possible pain was "the major barrier" to agreeing to be circumcised.[17] Ideally, tolerable pain control is important during and after circumcision, and throughout life. The specific anesthesia technique should be determined by the anesthesiologists training and practice with surgeon's choice. In our study, FPs who preferred in-home circumcision with local anesthesia had higher CKS scores compared to other groups. We believe that the reason for this unpredictable result stems from the inadequacy of the group distribution (2.2% vs 67.2%). The FPs in our study may have considered performing circumcision in the patient's own social environment so that circumcision would not cause trauma. However, almost all the FPs (98.1%) in our study, agreed that "proper surgical asepsis rule application during the circumcision" is the most important point. The main factor of complications is insufficient hygiene during surgery.[29] The most common complications are bleeding and infection. [6] Research has documented cases in the literature of blood transfusion or death after circumcision operations.[18,30] Incomplete circumcision is also a common postoperative complaint, and some patients may even need to undergo reoperation for this reason. [17,28,29] Therefore, 97.8% of the FPs recommended performing circumcision operations in hospitals.

In this study, most participants (73.3%) recommended circumcision before two years of age. Previous studies have suggested potential advantages of circumcision during infancy with respect to wound healing, pain management, and psychosocial considerations.[6,24] Nevertheless, infants with a family history suggestive of bleeding disorders should undergo appropriate evaluation before the procedure.

In our study, 33 participants (9.9%) preferred circumcision between 2–6 years of age. In a study, 14.8% were circumcised before 1 year of age, 35.9% between the phallic stage, and 41.6% after six years of age. Those older than 7 years have ambivalent counteracting feelings: a strong desire to be circumcised despite intense fears.[31] Öztürk reported that castration related fears are associated with circumcision during the latency stage (6-11 years) at least as frequently as during the phallic stage.[32] Various psychological conditions, such as hyperreactivity, defensiveness, inability, and posttraumatic stress disorder (PTSD), can be observed after circumcision.[33,34] In Ramos and Boyle's study, it was stated that variables such as age at circumcision and time elapsed after circumcision were not predictive of the diagnosis of PTSD.[35] In Muslim society there is no fixed age for circumcision. Almost all men are circumcised, mostly in late childhood. The literature suggests that circumcision in infancy avoids any embarrassment of having it done later, as well as anxiety about pain, complications, and adverse sexual effects, even though these effects are minimal or not supported by evidence. It also avoids arguments over potential adverse psychological effects of circumcision conducted later in childhood. [36] The optimal age for circumcision is still controversial. We believe that it would be more appropriate to evaluate each patient individually according to the patient's condition.

### **Study limitation**

This study included a relatively large sample of 369 family physicians in Istanbul, which enhances precision and supports generalizability within this setting. The use of a structured questionnaire and a standardized knowledge score also strengthened internal consistency. Nevertheless, several limitations should be acknowledged. The study was conducted only among family physicians working in Istanbul; therefore, the results may not be generalizable to other regions. Despite moderate mean knowledge scores, the persistence of critical misconceptions,

particularly regarding anesthesia use and contraindications, suggests that overall scores may mask clinically significant knowledge gaps. The relatively small number of questions used to calculate the CKS may not fully reflect physicians' overall knowledge.

### **Conclusion**

This study identified knowledge gaps and variability in attitudes among family physicians regarding circumcision. Primary care providers should offer parents objective, evidence-based information on potential benefits, risks, and complications. Structured continuing medical education and closer coordination with urology and pediatric surgery services may improve counseling quality and promote safe practice.

### **Author contributions**

Conceptualization, MY; methodology, GZÖ; software, MY; validation, YDB and MY; formal analysis, MY and YDB; investigation, MY; resources, YDB; data curation, MY; writing—original draft preparation, MY and YDB; writing—review and editing, MY and YDB; visualization, MY; supervision, G.Z.Ö. All authors have read and agreed to the published version of the manuscript.

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### **Conflicts of interest**

The authors declare no conflicts of interest.

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