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# Phenol for pilonidal sinus disease: a nationwide survey of practice patterns and safety gaps among surgeons in Türkiye

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## Abstract

**Background** Phenol is widely used as a minimally invasive treatment for pilonidal sinus disease (PSD); however, its clinical application is characterized by substantial heterogeneity in indications, technique, dosing, and safety practices. Despite its routine use in outpatient settings, standardized safety frameworks addressing occupational exposure, environmental controls, and dose documentation are lacking. These gaps may have important implications for both patient outcomes and workplace safety. This nationwide survey aimed to characterize real-world phenol practice patterns among surgeons in Türkiye, with a particular focus on safety infrastructure, exposure control measures, and clinical decision-making.

**Methods** A nationwide, internet-based, cross-sectional survey of surgeons managing PSD in Türkiye (July 8–August 15, 2025), aligned with CHERRIES. The 38-item instrument captured demographics; workload/experience; environmental controls (ventilation), institutional exposure-prevention policies, and personal protective equipment (PPE); patient-side protection strategies; phenol procurement, formulation/concentration, and dosing; treatment planning; and outcomes/perceptions. Descriptive statistics summarized item-level responses.

**Results** A total of 132 surgeons provided responses. 81.1% evaluated more than 30 PSD patients annually, and 48.5% conducted more than 30 phenol procedures per year. Surgeons frequently procured phenol from external pharmacies (36.4%); crystalline phenol predominated (77.3%); 50.8% did not know the concentration (most reported 99.9%); and only 7.6% measured dose per procedure. The majority of surgeons performed 2 to 3 sessions (69.0%) at intervals of 2 to 3 weeks (38.6%). Key safety gaps were identified: only 34.8% reported dedicated ventilation, 53.0% reported none, and 62.1% had no institutional exposure-prevention policy. Routine mask use was reported by 53.8% (primarily surgical masks); additional PPE beyond mask and gloves was used by 22.0% (gowns 51.7%, eye protection 48.3% among those reporting). Patient-side skin protection was common (81.3%). Adverse events in patients were recorded at a rate of 20.5%, with skin burns being the most prevalent, while operator adverse effects occurred at a rate of 5.3%. Despite these gaps, perceived safety was relatively high (patients 83.3%, operators 68.9%), and 89.4% would personally choose phenol if affected.

**Conclusions** Findings support a safety-first national framework specifying permissible formulations/concentrations, mandating dose documentation and skin-protection protocols, and implementing a core safety bundle (effective

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ventilation, written exposure-control policies/checklists, and PPE including eye protection). Prospective exposure monitoring with standardized outcomes is warranted.

**Keywords** Pilonidal sinus disease, Phenol, Safety, Survey, Occupational exposure, Practice patterns

## Introduction

Pilonidal sinus disease (PSD) is a common condition of the natal cleft that predominantly affects young adults and imposes a substantial clinical and socioeconomic burden. Although multiple treatment options exist, management strategies are not interchangeable, and outcomes vary considerably between techniques. Contemporary European guidelines acknowledge the absence of universally accepted care pathways and emphasize that treatment selection should be guided by disease phenotype, expected outcomes, and risk profiles rather than convenience or tradition. Importantly, comparative evidence has demonstrated that certain techniques are consistently associated with inferior outcomes and are increasingly being abandoned in contemporary practice, while others have gained prominence.Nevertheless, marked heterogeneity in clinical practice persists across institutions and health systems [1]. The problem is compounded upstream: classification systems for PSD have not been uniformly adopted into routine practice, limiting consistent stratification and comparability across studies and clinical services [2, 3]. Although several classification systems have been proposed, none has achieved universal acceptance; however, recent work by the PITSTOP group suggests that the International Pilonidal Sinus (IPS, also referred to as the Berlin) classification demonstrates promising reliability and applicability, indicating that structured stratification may be feasible despite the absence of guideline-endorsed frameworks [4].

Within this heterogeneous therapeutic landscape, minimally invasive approaches—including phenol application—have gained popularity due to their simplicity, outpatient feasibility, and perceived patient acceptability. However, increased use does not equate to uniform evidence quality or safety assurance, and international guidance on phenol use remains inconsistent. While some guidelines list phenol as a potential option for selected patients, others restrict or prohibit its use due to concerns regarding toxicity and occupational exposure. As a result, phenol represents a paradigmatic example of a widely used intervention for which clear evidence-based indications, standardized techniques, and enforceable safety safeguards remain incompletely defined [5]. The 2024 European Society of Coloproctology (ESCP) guideline's algorithm lists phenol among options that may be offered for selected patients alongside pit-picking, laser, and endoscopic techniques, and emphasizes off-midline closure when excision is chosen [1]. By contrast, the German National Guideline highlights safety concerns and notes that, despite favorable outcomes in trials, human use of phenol for PSD is prohibited on toxicity grounds [6]. Complementing these perspectives, the Turkish Delphi consensus reports no single minimally invasive modality as clearly preferable, supports the role of repeated applications in improving healing, and—critically—finds no consensus on the safety of phenol due to insufficiently characterized toxicity in PSD [7]. Together, these statements illustrate how evidence gaps rather than clinical equivalence, combined with differing policy environments produce divergent practice conditions for the same modality.

Within Türkiye, phenol application is widely practiced in routine PSD care. Yet, granular aspects of technique and safety are not consistently standardized in international guidance and remain variably implemented in practice [1]. This variability can affect outcomes, patient and provider safety, and training fidelity, particularly in high-volume settings where residents and early-career surgeons perform the bulk of PSD procedures.

Therefore, we conducted a national, cross-sectional survey of Turkish surgeons for determine real-world approaches to phenol therapy for PSD, including indications and patient selection, procedural details, safety measures and perceptions of safety and effectiveness. Our objective is to align practice patterns with current guidelines and identify discrepancies, so providing evidence to support the development of national recommendations that prioritize safety and are coherent with practice in Türkiye.

## Methods

We conducted a nationwide, cross-sectional, internet-based survey of surgeons in Türkiye on the use of phenol for PSD. The protocol was approved by the ethics committee (approval no: 732; 19 June 2025). Participation was voluntary; electronic informed consent was obtained on the survey's first page prior to any study items.

Eligible participants were surgeons (attendings, fellows, and residents) who manage PSD in routine practice in Türkiye. We conducted a closed, society-based, internet survey. The survey invitation and access link were distributed exclusively by e-mail to approximately 700 registered members of the Turkish Society of Colorectal Surgery. In addition, the study was promoted through the Society's official WhatsApp group, which includes the same member base, with reminders encouraging members to check their e-mail and participate. The invitation

described the study aims, estimated completion time, and the survey closing date. Participation was voluntary, and no incentives were offered.

To prevent duplicate or ineligible entries and to enable follow-up if necessary, the opening items recorded name, e-mail, and consent; these identifiers were used exclusively for de-duplication and were removed before analysis. The survey was delivered on a single page with progress controls, allowing respondents to review and amend responses prior to submission. Unique submissions were logged at the device level, duplicate records were excluded, and the collection period ran from 8 July to 15 August 2025.

A 10-year scoping of the literature (PubMed, Embase, Web of Science, MEDLINE, Cochrane Library) informed item generation, with an emphasis on content validity and harmonization with prior Turkish PSD survey structures. The survey was developed by the steering committee for this particular study (Supplementary file 1). The instrument followed key elements of the *Checklist for Reporting Results of Internet e-Surveys (CHERRIES)* and underwent pilot testing for clarity, flow, and technical functionality before launch [8]. During instrument development, the steering committee iteratively reviewed all items for clinical relevance, completeness, and alignment with the study objectives, thereby ensuring face and content validity. No formal psychometric validation was planned, as the survey aimed to descriptively map current practice rather than to construct or test latent scales. Pilot testing focused on item clarity, interpretability, response options, and survey flow; feedback resulted in minor wording refinements prior to final deployment.The final questionnaire (Google Forms) comprised 38 items and required ~ 10 min to complete.

The questionnaire comprised 38 items organized into five thematic domains. First, respondent characteristics—including demographics, consent, practice setting, and seniority (Q1–Q7). Second, we recorded workload and experience, covering annual PSD cases, number of phenol procedures per year, duration of phenol practice, and institutional context (Q8–Q11). Third, we assessed safety infrastructure and policies, personal protective equipment, and patient-side protections (Q12–Q18). Fourth, we explored phenol procurement and technique (Q19–Q23). Finally, we covered treatment planning, postoperative care, and perceptions (Q24–Q38).

The primary outcome was a descriptive map of practice patterns for phenol therapy in Türkiye. Key secondary outcomes were (i) safety measures, (ii) per-operative management protocols, (iii) self-reported complications in patients and exposure events among operators, and (iv) surgeons' perceptions of safety and personal preference for phenol.

**Table 1** Demographics of the participants

| | *n* | % |
|---|---|---|
| Q4: Age | | |
| 25–35 | 81 | 61.4 |
| 36–46 | 33 | 25 |
| 47–57 | 13 | 9.8 |
| 58–68 | 5 | 3.8 |
| Q5: Gender | | |
| Male | 104 | 78.8 |
| Female | 27 | 20.5 |
| Other | 1 | 0.8 |
| Q6: Setting | | |
| University hospital | 27 | 20.5 |
| Training and research hospital | 66 | 50 |
| State hospital | 27 | 20.5 |
| Private hospital | 7 | 5.3 |
| Private office | 5 | 3.8 |
| Q7: Position | | |
| Surgery resident | 48 | 36.4 |
| Surgeon | 51 | 38.6 |
| Academic surgeon | 33 | 25 |

### Statistical analysis

All analyses were descriptive. Categorical variables were summarized as counts and percentages using item-level denominators. For multi-response items, each option was treated as a separate binary variable, and its frequency and proportion were reported against the number of respondents to that item. Ordinal variables (e.g., age bands, annual case and phenol volumes, years of phenol use, number of sessions, and inter-session intervals) were presented as category distributions without inferential testing. Responses of "I do not know" and "Other" were tabulated explicitly and retained in denominators as applicable. No imputation was performed; available-case denominators were used for all summaries. All statistical analyses were performed using IBM SPSS Statistics (version 26.0; IBM Corp., Armonk, NY, USA).

## Results

### Demographic characteristics

A total of 132 surgeons completed the survey. Based on an estimated reach of approximately 700 surgeons through the dissemination channel, this corresponds to an approximate response 18.9%. Most respondents were between 25 and 35 years old (61.4%) and male (78.8%). Participants predominantly worked in training and research hospitals (50.0%), attending surgeons constituted 38.6 (Table 1).

### Case volume, experience, and setting

A large majority (81.1%) reported evaluating > 30 PSD patients annually, and 48.5% performed > 30 phenol procedures per year. Duration of experience with phenol

was 0–3 years in 43.2% (Table 2). Phenol procedure was most commonly performed in an intervention or minor procedure room located in the outpatient clinic (71.2%) (Table 3).

#### Institutional safety measures and PPE

A specialized ventilation system was reported by 34.8% of respondents, while 53.0% indicated none (Table 3). Ventilation availability differed by procedural setting, with dedicated systems reported more frequently in operating rooms than in intervention rooms (76.5% vs. 29.0%). Institutional measures to prevent phenol exposure were absent in 62.1% (Table 3). Regarding masks, 53.8% routinely used a surgical mask. Additional PPE beyond mask and gloves was reported by 22.0%; among these, gowns (51.7%) and goggles/eyewear (48.3%) were most frequent (Table 4).

#### Patient-side protective measures

Most surgeons implemented at least one patient-side precaution during phenol application. Skin-protective creams were reported by 81.3%. Among those, selections most often included antibiotic creams (73.7) (Table 5).

#### Phenol characteristics and dosing practices

Phenol was most commonly obtained from an external pharmacy by the surgeon (36.4%). The crystalline form was predominated as 77.3%. Among concentration responses, 50.8% reported not knowing the concentration; stated concentrations included 99.9% (32.6%). Only 7.6% measured the amount of the used per procedure (typically with a calibrated syringe, 75.0% of those who measured) (Table 6).

#### Treatment planning and postoperative care

Indications for phenol favored simple/uncomplicated PSD (37.7%). Combination therapy was reported by 22.0% (e.g., excision, unroofing, laser, EPSIT). Most surgeons preferred 2–3 sessions (69.0%) at 2–3-week intervals (38.6%). Healing was most commonly determined by pit closure (38.2%) and ≥1 month without symptoms (34.4%). Wound dressing was recommended routinely by 50.0% (Table 7).

#### Adverse events

Patient-level adverse events were reported by 20.5% of respondents, most frequently skin burns (36.4%). Operator experienced adverse effects were less common (5.3%), including eye or skin burns, headache/dizziness, and respiratory symptoms (Table 8).

#### Perceptions of safety and personal preference

Overall, 68.9% of the participants considered phenol safe for performers. Perceived safety for patients was higher

**Table 2** Surgeon's experience

| | *n* | % |
|---|---|---|
| Q8: On average, how many patients with pilonidal sinus disease do you evaluate per year? | | |
| 1–10 | 8 | 6.1 |
| 11–20 | 4 | 3 |
| 21–30 | 13 | 9.8 |
| > 30 | 107 | 81.1 |
| Q9: On average, how many phenol applications do you perform per year? | | |
| 1–10 | 31 | 23.5 |
| 11–30 | 37 | 28 |
| > 30 | 64 | 48.5 |
| Q10: For how long have you been performing phenol treatment? | | |
| 0–3 | 57 | 43.2 |
| 4–6 | 40 | 30.3 |
| 7–10 | 22 | 16.6 |
| > 10 | 13 | 9.9 |

**Table 3** Procedure's location

| | *n* | % |
|---|---|---|
| Q11: In which setting do you most frequently apply phenol? | | |
| Outpatient examination room | 20 | 15.2 |
| Intervention room | 94 | 71.2 |
| Operating room | 18 | 13.6 |
| Q12: Is there a dedicated ventilation system in the setting where you perform phenol treatment? | | |
| Yes | 46 | 34.8 |
| No | 70 | 53 |
| I do not know | 16 | 12.1 |
| Q13: Does your institution implement measures to prevent phenol exposure? | | |
| Yes | 22 | 16.7 |
| No | 82 | 62.1 |
| I do not know | 28 | 21.2 |

**Table 4** Personal protective equipment (PPE)

| | *n* | % |
|---|---|---|
| Q14: Do you wear a mask while applying phenol, and if so, which type? | | |
| Yes, normal surgical mask | 71 | 53.8 |
| Yes, N95 mask | 2 | 1.5 |
| I do not wear a mask | 59 | 44.7 |
| Q15: Beyond a mask and gloves, do you use any additional personal protective equipment during phenol application? | | |
| Yes | 29 | 22 |
| No | 103 | 78 |
| Q16: Please specify which additional personal protective equipment you use. | | |
| Gown | 15 | 51.7 |
| Glasses | 14 | 48.3 |

**Table 5** Patients' perioperative precautions

| | *n* | % |
|---|---|---|
| Q17: Do you implement any patient-side protective measures during phenol application? (Select all that apply) | | |
| I recommend the patient use a mask | 6 | 4.3 |
| Skin protective barrier cream | 113 | 81.3 |
| I recommend nothing | 14 | 10.1 |
| Other | 6 | 4.3 |
| Q18: If you chose a skin protective cream in the previous question, can you specify which one? | | |
| Antibiotic creams | 87 | 73.7 |
| Regenerative creams | 9 | 7.6 |
| Moisturizing creams | 19 | 16.1 |
| Other | 3 | 2.6 |

Q18 was answered only by respondents who selected "skin protective barrier cream" in Q17 ($n=113$); because multiple cream types could be selected, the total number of responses exceeds the number of respondents

**Table 6** Phenol characteristics

| | *n* | % |
|---|---|---|
| Q19: How do you obtain phenol for clinical use? | | |
| From the institution's pharmacy | 30 | 22.7 |
| Supplied by the institution from an external pharmacy | 11 | 8.3 |
| I personally purchase from an external pharmacy | 48 | 36.4 |
| I personally purchase from a non-pharmacy source (e.g., internet, distributor/warehouse) | 35 | 26.5 |
| Other | 8 | 6.1 |
| Q20: In which form do you use phenol? | | |
| Liquid | 11 | 8.3 |
| Crystallized | 102 | 77.3 |
| Both | 19 | 14.4 |
| Q21: At what concentration do you apply phenol? | | |
| 30 | 5 | 3.8 |
| 40 | 3 | 2.3 |
| 80 | 13 | 9.8 |
| 99.9 (pure) | 44 | 33.4 |
| I do not know | 67 | 50.8 |
| Q22: Do you measure the amount of phenol used during the procedure? | | |
| Yes | 10 | 7.6 |
| No | 122 | 92.4 |
| Q23: If you answered 'Yes' to Question 22, please specify your measurement method. | | |
| With the injector | 6 | 75 |

**Table 7** Surgeon's preferences

| | *n* | % |
|---|---|---|
| Q24: For which disease stages or clinical scenarios do you prefer to use phenol treatment? (Select all that apply.) | | |
| Asymptomatic pits | 53 | 16.9 |
| Pilonidal abscess | 29 | 9.3 |
| Simple pilonidal disease | 118 | 37.7 |
| Complex pilonidal disease | 44 | 14.1 |
| Recurrent pilonidal disease | 65 | 20.7 |
| Other | 4 | 1.3 |
| Q25: Do you combine phenol treatment with other procedures (e.g., EPSIT, excision, laser, unroofing)? | | |
| Yes | 29 | 22 |
| No, only sinus cleaning before phenol application | 103 | 78 |
| Q26: If you answered "Yes" to Question 25, please specify which procedures you combine with phenol. | | |
| Excision | 14 | 35.9 |
| EPSIT | 1 | 2.6 |
| Laser | 8 | 20.5 |
| Unroofing | 11 | 28.2 |
| Other | 5 | 12.8 |
| Q27: In patients treated with phenol, how many sessions are usually required? | | |
| 1 | 23 | 17.4 |
| 2–3 | 91 | 69 |
| 4–5 | 18 | 13.6 |
| 6–10 | 0 | 0 |
| > 10 | 0 | 0 |
| Q28: What is the usual interval between phenol sessions? | | |
| < 1 week | 9 | 6.8 |
| 1–2 weeks | 38 | 28.8 |
| 2–3 weeks | 51 | 38.6 |
| > 3 weeks | 34 | 25.8 |
| Q29: By which criteria do you define complete healing? (Select all that apply.) | | |
| Discharge cessation | 66 | 25.8 |
| Epithelization of the pits | 98 | 38.2 |
| At least 4 weeks without symptoms | 88 | 34.4 |
| Other | 4 | 1.6 |
| Q30: Do you recommend wound care/dressing after the procedure? | | |
| Yes | 66 | 50 |
| No | 66 | 50 |

(83.3%). If participants personally affected by PSD, 89.4% would choose phenol. Concern that performing phenol could harm one's own health was low (9.8%) (Table 9).

## Discussion

This national survey shows that phenol therapy is widely practiced across Türkiye, with high case volumes and generally favorable clinician perceptions. Notably, a substantial proportion of respondents reported managing more than 30 PSD cases annually, a factor that has been associated with improved long-term outcomes and lower recurrence rates in cross-study analyses [9]. However, technique and safety infrastructure are heterogeneous, including frequent use of crystallized phenol, limited concentration awareness, and rare dose measurement. These findings align with broader reports that minimally invasive options are increasingly implemented while comparative evidence remains constrained and recommendations vary across authorities [1, 6].

Current guidelines reflect this ambiguity. The ESCP guideline recognizes phenol as a treatment option but emphasizes low certainty of evidence and heterogeneous protocols, calling for larger, well-stratified trials

**Table 8** Phenol side effects

| | *n* | % |
|---|---|---|
| Q31: Have you observed any adverse events in your patients during or after phenol application? | | |
| Yes | 27 | 20.5 |
| No | 105 | 79.5 |
| Q32: If you answered "Yes" to Q31, please describe the adverse event(s) observed. | | |
| Skin burn | 12 | 36.4 |
| Abscess | 5 | 15.1 |
| Contact dermatitis | 2 | 6.1 |
| Localized skin color change | 3 | 9.1 |
| Pain | 3 | 9.1 |
| Other | 8 | 24.2 |
| Q33: Have you personally experienced any adverse effects during or after performing phenol application? | | |
| Yes | 7 | 5.3 |
| No | 125 | 94.7 |
| Q34: If you answered "Yes" to Q33, please describe the adverse effect(s) you experienced. | | |
| Headache | 1 | 12.5 |
| Shortness of breath | 1 | 12.5 |
| Eye burn | 2 | 25 |
| Skin burn | 2 | 25 |
| Other | 2 | 25 |

**Table 9** Perceptions of safety and personal preference

| | *n* | % |
|---|---|---|
| Q35: In your opinion, is phenol application safe for surgeons? | | |
| Yes | 91 | 68.9 |
| No | 12 | 9.1 |
| I am not sure | 29 | 22 |
| Q36: In your opinion, is phenol application safe for patients? | | |
| Yes | 110 | 83.3 |
| No | 3 | 2.3 |
| I am not sure | 19 | 14.4 |
| Q37: If you personally had pilonidal disease, would you prefer to be treated with phenol? | | |
| Yes | 118 | 89.4 |
| No | 7 | 5.3 |
| I am not sure | 7 | 5.3 |
| Q38: Are you concerned that performing phenol applications could negatively affect your health? | | |
| Yes | 13 | 9.8 |
| No | 86 | 65.2 |
| I am not sure | 33 | 25 |

General note: Q17 and Q29 are multi-response items; percentages are calculated using the number of respondents to each question as the denominator.

before endorsing phenol over alternatives [1]. The German guideline has pointed out that its use is prohibited in Germany on safety grounds, despite favorable outcomes reported in trials [6]. The Turkish Delphi consensus similarly found no consensus on phenol safety while noting that repeated applications improve healing rates [7]. Against this backdrop, the diverse clinical approaches in our cohort - spanning indications, session counts, inter-session intervals, and "healing" criteria - likely reflect discordant recommendations and the absence of a consensus in the literature.

Effectiveness signals for phenol remain promising but heterogeneous. Meta-analyses and comparative studies report advantages over excisional surgery in procedure time, length of stay and recovery, with fewer wound-related complications in pooled estimates, yet concentrations, preparations, and application protocols vary substantially across studies [7]. In our survey, most surgeons used crystallized phenol (77.3%), were uncertain about concentration (50.8%), and only a minority measured dose precisely (7.6%) - practices that plausibly amplify variability in outcomes and risk. A striking paradox emerges from these data: despite limited awareness of phenol concentration and rare dose measurement, nearly nine out of ten respondents (89.4%) reported that they would personally prefer phenol treatment. This discrepancy suggests that perceived simplicity, familiarity, and outpatient feasibility may outweigh objective safety considerations in clinical decision-making.

Safety warrants particular emphasis. Although local complications are well recognized, systemic risks in PSD remain insufficiently characterized, sustaining international caution [1, 7]. Beyond the contect of PSD, multiple studies have associated environmental and occupational phenol exposure with a wide spectrum of outcomes, including infertility, low birth weight, myelotoxic effects, endometriosis, and ototoxicity [10–14]. Notably, these studies are heterogeneous with respect to the specific phenolic compounds assessed, measurement matrices and timing, exposure routes, and monitoring intervals [15–17]. In several industrial sectors, routine urinary monitoring for phenol exposure is conducted—typically immediately after the end of a work shift—reflecting an established paradigm for exposure surveillance [13]. By contrast, in surgical practice key questions remain unanswered: during phenol application, to what extent are the surgeon and the patient exposed, and by which primary route (inhalational versus transdermal)? How should exposure be detected (urinary phenol and metabolites versus blood biomarkers), how can cumulative burden be quantified, and does repeat exposure yield additive or cumulative effects beyond acute toxicity? These unresolved questions underscore the clinical relevance of our findings and highlight critical gaps between widespread use and limited safety standardization in current practice. While further exposure-focused research will be necessary to address these uncertainties, the present survey provides the first nationwide, practice-based mapping of phenol use and safety infrastructure, offering a robust

empirical foundation for evidence-informed policy and guideline development.

Our data also reveal gaps in exposure control: limited access to dedicated ventilation, inconsistent PPE use beyond gloves, and low uptake of formal institutional protocols. This might be an outcome of most surgeon doing procedures in minor intervention rooms. Operating rooms were far more likely to have dedicated ventilation than intervention rooms (76.5% vs. 29.0%), supporting the view that environmental infrastructure shapes safety behavior. These findings should also be interpreted in light of the predominantly early-career respondent profile, as junior surgeons may differ in risk perception, reporting behavior, and adherence to safety protocols compared with more experienced practitioners. Moreover, frequent personal procurement of phenol by surgeons and the rarity of dose measurement suggest that practice is not yet anchored to institutional standards or protocols. Taken together, these observations argue for a pragmatic safety bundle: specialized ventilation, written protocols/checklists, and core PPE. Concurrently, future studies should define toxicity, dose–response relationships, and surgeon exposure risks to inform a coherent national framework.

Beyond surgeon exposure, patient effects merit attention. While severe systemic toxicity has been reported after transdermal application over large surface areas [18], such reactions would not be expected with the limited fields typically treated in pilonidal sinus disease. In this survey, long-term adverse effects could not be ascertained; accordingly, we focused on early complications and found skin burn to be the most frequent adverse event (36.4%). These observations reinforce the need to prioritize skin protection within standardized protocols.

Finally, although respondents most often used phenol for simple disease, it was applied across the spectrum. Its limited use in acute abscess is consistent with prior national data in a Turkish abscess survey [19]. Despite guideline recommendations against treatment for asymptomatic disease, 16.9% of participants reported applying phenol in that setting, reflecting a gap between guidance and real-world practice. In our survey, 20% of surgeons reported using phenol for recurrent disease. High-quality comparative analyses have demonstrated that phenol application is associated with the highest long-term recurrence rates among commonly analyzed treatments for pilonidal sinus disease. Accordingly, phenol should not be interpreted as an outcome-superior intervention when compared with excisional or flap-based surgery. Nevertheless, its continued use in recurrent disease appears to be driven by pragmatic considerations—such as technical simplicity, repeatability, low immediate procedural burden, and outpatient feasibility—rather than comparative effectiveness [20, 21]. In a 20-year cohort of previously operated recurrent pilonidal sinus disease, Kargın et al. reported a mean follow-up of 45.8 months with an overall treatment success of 71.5% [22]. These findings illustrate that phenol can achieve acceptable outcomes in selected recurrent cases, but do not outweigh the higher recurrence risk observed in comparative analyses.

This study has several limitations. First, the approximate response rate of 18.9% introduces the possibility of non-response bias, as surgeons with greater interest or experience in phenol treatment may have been more likely to participate. Because the survey was distributed to all Society members regardless of whether they actively perform phenol treatment, the proportion of surgeons who routinely use phenol among non-responders is unknown. Consequently, the true response rate among phenol users cannot be determined, and the findings may not fully represent the practices and perceptions of all surgeons managing PSD in Türkiye. Secondly, its cross-sectional, self-reported design precludes causal inference and introduces potential selection and recall bias. Third, the respondent cohort was predominantly composed of younger and early-career surgeons, which may have influenced perceptions of safety, adherence to standardized protocols, and reporting of complications, thereby affecting external validity. Some endpoints were infrequent, reducing statistical power for multivariable modelling and yielding wide confidence intervals. In addition, the absence of objective exposure metrics prevented quantitative linkage of safety outcomes to environmental conditions. Generalizability may be constrained by uneven representation across institution types and regions, and operational definitions may have been interpreted variably between centers. Future studies should employ prospective designs with standardized definitions and measurements, incorporate objective exposure assessments, and include long-term follow-up to strengthen inference.

## Conclusion

Phenol therapy remains widely used in the management of pilonidal sinus disease, applied across a broad range of indications despite the absence of clearly defined, evidence-based selection criteria. Our findings demonstrate marked heterogeneity in clinical practice, substantial gaps in occupational and patient safety measures, and limited alignment between real-world use and long-term outcome data, particularly regarding recurrence. Workplace safety emerges as a central concern, given inconsistent ventilation infrastructure, limited use of personal protective equipment, and poor standardization of phenol concentration and dosing practices. Together, these findings underscore the need for safety-focused, practice-congruent standards that define acceptable indications,

mandate dose documentation and session intervals, and require a core safety bundle for phenol application. Prospective registries with standardized outcome and exposure metrics are needed to clarify effectiveness and toxicity and to better align everyday practice with contemporary guideline recommendations.

## Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12913-026-14234-6.

Supplementary Material 1

### Author contributions

GS, ET, EE, NCA, SB designed the study; NCA, EE, GC, SB, ET and DY did the literature review, prepared the protocol and survey; EE and CA analyzed and interpreted the results; EE, CA, and DY wrote the paper. All authors read and approved the final manuscript.

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### Data availability

Study data are available on reasonable request.

## Declarations

### Ethical approval

The study was approved by the Istanbul Medipol University National Ethics Committee (approval no: 732; 19 June 2025) in accordance with the Declaration of Helsinki.

### Informed consent

Informed consent was obtained from all participants.

### Consent for publication

Not applicable.

### Competing interests

The authors declare no competing interests.

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