JA, ICH HABE MEINE VITILIGO AKZEPTIERT. SCHLIESSLICH HABE ICH KEINE WAHL.

65 % aller Menschen mit Vitiligo wird gesagt, ihre Erkrankung sei nicht behandelbar.[1] Noch gravierender ist, dass nahezu die Hälfte aller Betroffenen eine Behandlung überhaupt nicht mehr in Betracht zieht.[1] Wie Sie wissen, tritt Vitiligo meist im Teenageralter auf – und ohne zugelassene Therapie fühlen sich viele Betroffene in einem Zustand der Ungewissheit gefangen. Deshalb forschen wir an neuen wissenschaftlichen Ansätzen. Denn wenn wir uns alle mehr mit der Erkrankung Vitiligo befassen, haben Ihre Patientinnen und Patienten eines Tages vielleicht wieder eine Wahl.

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Date of preparation: May 2022 DE/OTHR/M/22/0002

1. Bibeau K, et al. Diagnosis and Management of Vitiligo From the Perspectives of Patients and Healthcare Professionals: Findings From the Global VALIANT Study. Maui Derm for Dermatologists. Maui, HI. January 24th–28th 2022.

Received: 27 February 2022 | Accepted: 20 December 2022

DOI: 10.1111/ddg.14993

REVIEW

Epilation and depilation in the genital area – motivation, methods, risks and recommendations from a dermatological point of view

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Summary
Pubic hair removal is a body modification practice done worldwide for different socio-cultural reasons, which is more common in women than in men, more common in younger than in older people, and more common in sexually active people than in abstinent individuals. Since there is no medical indication for genital epilation and depilation, with a few exceptions, there is only very limited evidence in the literature about the methods used and their risks. In order to provide users with guidance from a dermatological perspective on the use of different procedures and associated risks, the existing data were collected, analyzed and evaluated in a systematic literature search. For this purpose, a total of 290 articles in the English- and German-language scientific literature were identified in databases (PubMed, Google Scholar) according to defined search strategies, and 61 publications with scientific significance were identified after assessing relevance. It became clear that depilation methods (shaving, trimming, chemical depilation) are used more frequently compared to epilation methods (waxing, sugaring, mechanical epilation, electro-epilation, laser, intense pulsed light, drug epilation). The different risks and undesirable effects were analyzed in a method-associated manner and prophylactic strategies to avoid complications were developed.

KEYWORDS
body modification, depilation, epilation

INTRODUCTION

The distribution and manifestation of pubic hair vary greatly individually, sex-specifically and ethnically, and have been classified by Ferriman and Gallwey into different body hair patterns.[1] The intensity of hair growth in nine areas of the body (upper lip, chin, chest, back, loins, upper abdomen, lower abdomen, upper arm and thigh) is assessed and given a score of 0 (no hair) to 4 (maximal hair growth). The score is used especially for clinical diagnosis in women when hirsutism is suspected. The physiological significance of hair growth in the genital area is understood not only as a secondary sex characteristic but above all as an enlargement of the evaporation surface for pheromones, as a protection of the genital region against pathogenic organisms and mechanical stress due to clothing and sexual intercourse. In addition, pubic hair contributes to temperature regulation of the skin of the genital region through air convection.[2–5]

Manipulations of physiological body hair growth, especially in the pubic region, represent a kind of body modification, which is highly subject to sociocultural influences and is widespread not only in Central Europe. The main motivation given by women (70.5%) is for personal hygiene and by men (72.9%) it is the wish to meet a beauty ideal.[6–8] Different methods of epilation and depilation are used, most of

TABLE 1 Overview of methods of pubic hair removal and associated complications.

Method	Description	Complications		
Trimming	Trimming the hair with scissors or electric razor with spacer	Itching, irritation, localized eczema, cuts, ingrown hairs	Infection (bacteria, tinea, viruses), folliculitis	Epithelial dysplasia, development of carcinoma, sexually transmitted infections (STI)
Shaving	Cutting off the hair using a razor/razor blades (with or without foam) or dry with an electric shaver			
Waxing	Application of heated viscous special wax; optionally with woven or nonwoven fabric or strips	Pain, swelling, irritation, ingrown hairs, burns, hematoma		
Sugaring with halawa	Heated sugar solution and addition of citric acid to split sucrose into fructose and glucose to make invert sugar			
Chemical epilation	Denaturing of hair keratin by basic salts of thioglycolic acid in semisolid preparations (depilatory cream)	Irritation, erythema, pain, burning		
Drug epilation	Prevention of hair formation by inhibition of ornithine decarboxylase by eflornithine (more rarely by acitretin)			
Mechanical epilation	Plucking of individual hairs with tweezers or by threading		Dyspigmentation	
Electroepilation	Epilation by means of an electrical current in a probe inserted in the hair follicle by thermolysis (alternating current), electrolysis (direct current) or blend method (combined current types)	Pain, local disturbances of sensation, blistering and crusting, burns, synechia		
Laser/light	Epilation laser (for example, diode laser, alexandrite laser); intense pulsed light (IPL) including as a handheld device for self-treatment; super hair removal (SHR)			

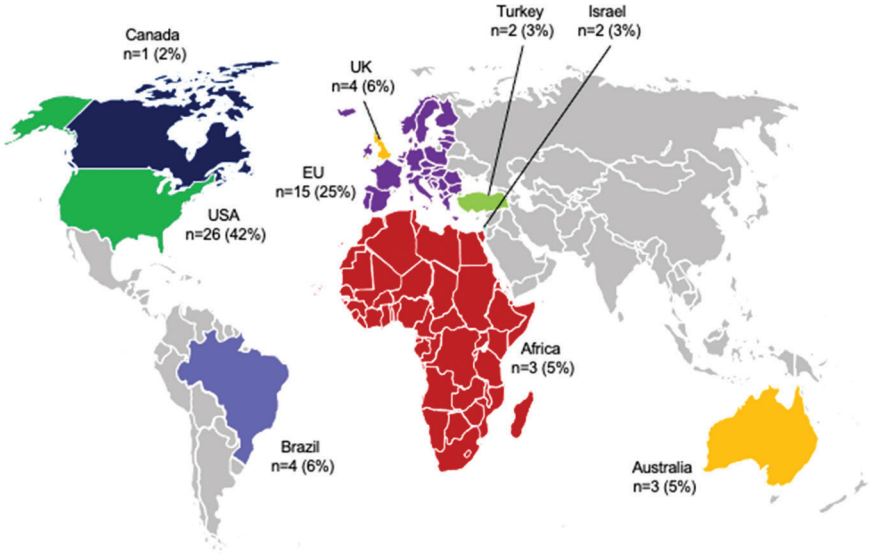
them carried out by the persons themselves (Table 1).[7,9–12] As soon as more complex technical equipment is needed, it is generally used by other persons, but not necessarily by healthcare professionals. Since there are no standardized evidence-based recommendations for non-equipment-based methods, the risk of complications is high during and after the procedure, especially in young and inexperienced users. Motivation is often generated though amateur communications within the users' personal circle or through social media, leading to self-experimentation with methods that appear practicable as regards handling and require little financial expenditure.[3–25] Instructions are presented in internet forums, combined with supposed "Tips and tricks", such as the use of shaving templates or after-shave peelings, along with material recommendations of varying quality. Medical language is often used and an advisory communication style is cultivated so as to suggest professional expertise for the statements being made. Not infrequently, this is also linked to recommendations for the use of specific preparations in connection with company sales strategies, though the quality of the advertised preparations and their concrete benefit often remain unclear. To date there have been no well-founded recommendations from the dermatological perspective. Moreover, the subject does not form part of the higher and continuing education curriculum, either for dermatologists or for nursing staff. This circumstance means that healthcare professionals fall back on non-consensus recommendations in consultation and thus cannot establish a uniform advisory culture. In addition, because of the intimate background, the topic enjoys little attention in public perception, so that the mostly young users have hardly any possibility to anonymously obtain expert information beside social media.

Against this background, relevant articles from the literature were identified in a systematic search and evaluated in order to present the available evidence on methods and complications of epilation and depilation in the genital area.

MATERIAL AND METHODS

A systematic literature search was performed to obtain data. Free-text search algorithms were defined, which were used online in the *PubMed* and *Google Scholar* databases. Search algorithm 1: (HAIR REMOVAL OR EPILATION OR HAIR SHAVING OR WAXING) AND (PUBIC HAIR OR GENITAL). Search algorithm 2: (HYGIENE PRACTICES VULVA) AND (PUBIC OR GENITAL OR BIKINI) AND (HAIR REMOVAL AND LASER). Search algorithm 3: (FEMALE INTIMATE HYGIENE) AND (PUBIC OR GENITAL OR BIKINI) AND (HAIR REMOVAL AND LASER). German- and English-language publications that appeared from 2001 to 2021 and were designed as interventional or non-interventional clinical studies or cross-sectional studies were included. Case studies and

FIGURE 1 Origin and number of identified studies on pubic hair removal.[2,6–24,26–65]



single case reports were also included. According to the defined exclusion criteria, studies that did not involve the external genitalia, reviews without original data and trans-gender studies were excluded. The hits were analyzed according to the following parameters: type and observation period of the study, study population characteristics (size, age and sex distribution, Fitzpatrick skin type, sexual orientation), studied method, self-use or third-party use, results, complications or adverse events, cosmetic agents used during or after epilation or depilation. The results were compiled, analyzed descriptively, and the percentage frequency distribution of the parameters was determined. The results of these analyses were interpreted and recommendations were made based on these results.

RESULTS

A total of 290 hits were identified, 262 hits in *PubMed* with search algorithm 1 and 28 hits from the other search algorithms. A further nine hits were found through the *Google Scholar* search. After applying the defined exclusion criteria, the total was reduced to 61 hits, which then underwent systematic analysis. 58 of these studies referred to pubic hair removal methods with their associated sociocultural background. A further four studies focused on special hygiene products for use in the external genital area before or after epilation or depilation (Figure 1).[26–29]

47% (n = 29) of the 61 studies identified as relevant were cross-sectional studies and 21% (n = 13) were interventional studies. The other data refer to case reports, retrospective analyses or experimental investigations. The observation period varied from one month to 23 years. The start of the use of epilation or depilation procedures is reported from an age of about 8 years, and in other surveys from an average of over 13.5 (±1.9) years (Figure 2a).[2,6–24,26–65]

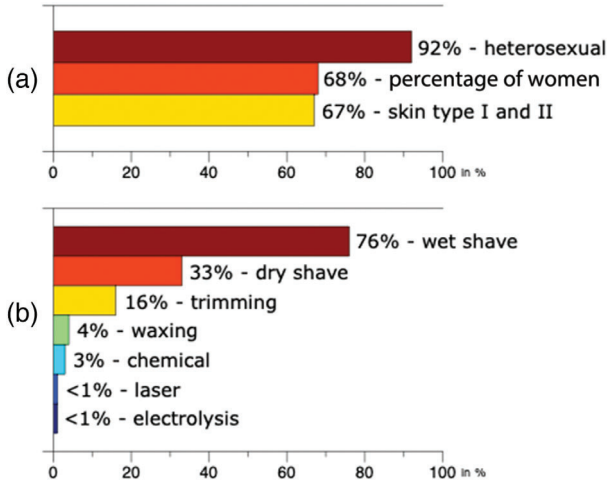


FIGURE 2 Percentage or frequency of (a) subpopulations and (b) methods and procedures used for pubic hair removal.[7,9,11,13–16,18,19,23,37,43,44,47,48,56,63]

Epilation and depilation methods

Shaving is by far the most frequently practiced method in 23,453 participants, regardless of national characteristics (Figure 2b).[7,9,11,13–16,18,19,23,37,43,44,47,48,56,63] Only in Canada, Brazil and Italy (54,442 participants) are waxing methods, especially with hot wax (44%, n = 23,898), described often and thus equally frequently as shaving (42%, n = 23,053).[4,12–14,16,19,23,24,30,34,39,45,48,51,60,61]

Complications

Various complications after the use of epilation or depilation methods with varying frequency are reported by an average of about 28% (n = 3,819) of subjects (Table 1). After shaving, nonspecific symptoms such as itching, skin

irritation and localized eczema reactions occur often, as well as cuts and ingrown hairs.[11,13,14,16,18,23] By contrast, pain, swelling, skin irritation, ingrown hairs, burns and skin bleeding are described after waxing.[24,31,66] Both shaving and trimming as well as waxing can lead to the occurrence of skin infection in the genital area, usually folliculitis or impetiginization.[2,13–15,23,34,61] In rare cases, severe soft tissue infections and, in the case of infection with exotoxin producers and corresponding host-specific conditions (for example, diabetes mellitus), even life-threatening disease have been described.[31] Shaving can also lead to dermatophyte spread, which can then present as tinea profunda.[38] Viral pathogens can also be transmitted or spread by epilation or depilation techniques. Spread of condylomata acuminata and molluscum contagiosum has been described repeatedly, especially after shaving and waxing.[15,35,39,40,67] An association with epithelial dysplasia and the development of carcinoma in the vulvar region in women who shave their pubic hair regularly has been suggested.[19] Irritant toxic contact eczema (skin irritation, erythema, pain, burning) has been described after chemical depilation using a depilatory cream, but this is often associated with improper use of the preparations.[55,61]

With the use of epilation lasers (diode laser 805 nm; long-pulsed alexandrite laser 755 nm), painful sensations, local sensation disorders, perifollicular or diffuse erythema, blistering and crusting, dyspigmentation, and more rarely, burns or synechia have been observed.[30,32,36,68,69] Dyspigmentation in particular occurs ten times more often in Afro-Americans and Asians than in light-skinned Europeans.[68] When intense pulsed light (IPL) was used, complications were reported in 67% of cases.[68] These were mainly painful sensations, transient perifollicular erythema, edema and dyspigmentation, more rarely blistering and crusting.[60,62,65] The use of electrolysis can be associated with pain and scarring.[60]

Of particular interest is the observation that sexually transmitted infections (STI) with *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Treponema pallidum*, herpesviruses, papillomaviruses or HI viruses are observed more often in persons with total pubic hair removal, regardless of the epilation or depilation method.[13,33,37] It is unclear whether this can be explained by promotion of the infection by the epilation or depilation of pubic hair in itself or by microinjuries, or by particular sexual behavior.

DISCUSSION

The collected data demonstrate firstly that epilation and depilation methods are very often used in the genital area for cosmetic reasons.[12,16,18,44,45] The epidemiological data on the precise age and sex distribution and on the methods employed are very fragmentary.[70,71] Nevertheless, it is clear from the literature search and from an unstructured look in the chatrooms of social networks that adolescents and young adults in particular often practice pubic hair removal and seek advice on this. The topic is communicated on the internet in a manner that produces social pressure, showcases the advertising interests of manufacturers of associated merchandise and in particular presents regular pubic hair shaving as an established procedure for personal hygiene. There is even information about pubic hairstyles, which is intended to generate a sense of normality in order to induce confidentiality and ultimately adherence with this subject in the reader. Regardless of the evaluation of the usefulness of pubic hair removal, from the dermatological point of view there is a responsibility to formulate well-founded recommendations in order to advise users, formulate risks and derive action recommendations (Figure 3). In addition, these instructions also apply for medically indicated pubic hair epilation or depilation in the preoperative setting or for nevoid areas with unphysiological hair growth.

From the dermatological perspective, it should first be pointed out during consultation that pubic hair removal makes no sense medically and entails significant risks depending on the employed method. Structured recommendations are particularly important for self-use. The personal integrity of the genital area is preserved especially with shaving, chemical depilation and waxing, which predestines these methods to be the first self-attempted and beginners' methods. At the same time, these entail the greatest risks for complications that arise due to improper and inexperienced handling. It appears important to plan the procedure in three steps: preparation, actual procedure and after-treatment.

For preparation, acquiring suitable materials and instruments and planning a protected spatial and temporally relaxed environment are important. Chemical epilation can be recommended as a beginner method with few complications. However, commercially available cosmetic agents should be recommended and production of one's own formulations should be strongly advised against. Especially in chatrooms on social networks, mixtures and production methods that are highly dubious and risky from a dermatological perspective are communicated. In direct consultation, recommendation of a specific preparation for chemical epilation has therefore proved successful. It is important to point out the limited duration of application and that use should be limited to the relevant area.

Before every mechanical epilation or depilation method, the area in question should be disinfected with a suitable antiseptic preparation. A commercially available alcohol-free octenidine dihydrochloride solution is suitable. Alternatively, a hydrophilic octenidine dihydrochloride 0.1% cream on a cost-price basis (according to NRF 11.145.) can also be recommended. Use of aftershave or alcoholic solution mixtures must be advised against because of the irritant effect. Use of other antiseptics like polyhexanide or chlorhexidine is also possible. However, use of suitable preparations and observation of the specific exposure time

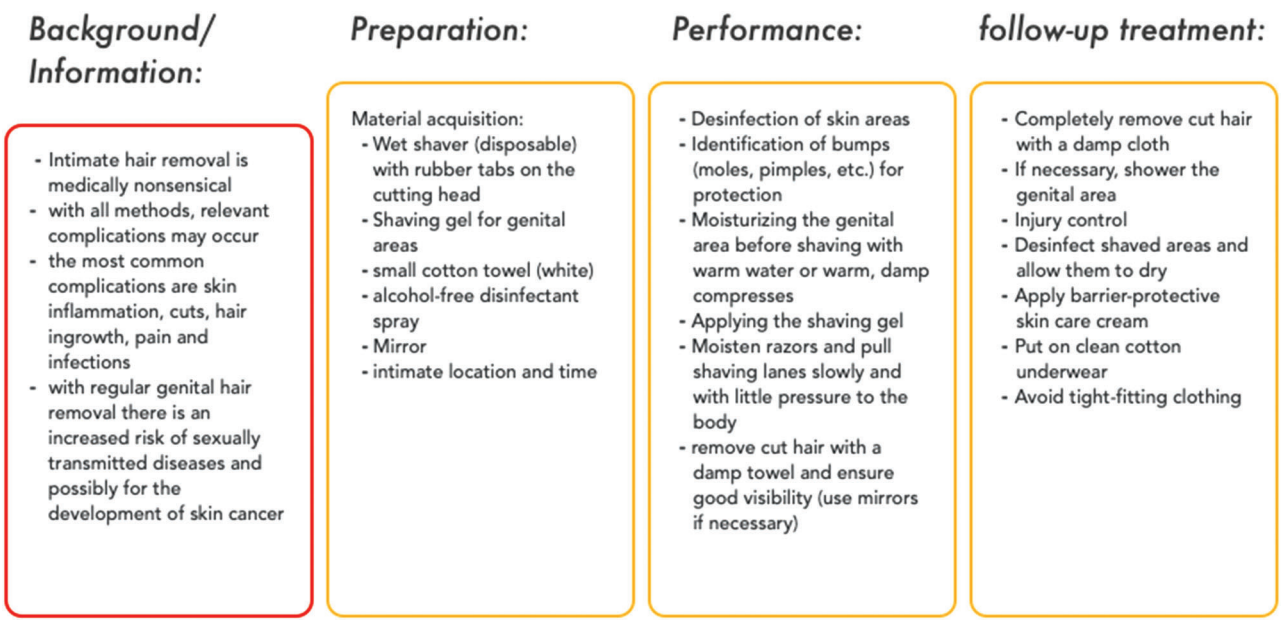


FIGURE 3 Instructions and recommendations for wet shaving of pubic hair.

to the substance should be observed. Inexperienced users should initially be advised to shave only in the region of the mons pubis or only on directly visible areas. When using freshly disinfected disposable razors with fixed blades and integrated protective rubber strips running parallel to the blades to regulate spacing there is a small risk of injury, just as with dry shaving. Use of free blades, cutthroat razors or razors with free interchangeable blades should be avoided. In addition, it should be noted that only personal instruments should be used. Before the actual shaving, longer public hair should be trimmed with blunt-ended scissors or electric clippers. Immediately before shaving, the hair-bearing areas should be alternatively moistened or ideally prepared with suitable shaving gel or foam. The razor should be passed over skin held as taut as possible and should take the relief structure of the anatomical region into account. Because of this, shaving the labia, the underside of the root of the penis and the scrotal skin is particularly difficult and risky.[34] A suitable seat and stable body position should be ensured. Sitting on a toilet bowl is unsuitable both because of hygiene considerations and because of the limited spatial freedom of action. Positioning a mirror can also be useful. However, this also results in risks due to the optical reversed mirror image. A clean damp cloth should be kept ready for removing shaved hair and to clean the shaving field. Immediately after shaving, the shaved area should be sprayed with an antiseptic solution (see above). After disinfection, the use of a low-viscosity, aqueous, urea-free protective barrier preparation of acidic pH (pH $\leq$ 5.5) is recommended. Vaginal or lubricant gels are unsuitable. Minor injuries can be treated with zinc oxide-free wound ointment, for example with added dexpanthenol, madecassoside or aloe vera.[72–75] Cosmetic agents containing substances known to have sensitizing potential should be avoided.

The use of waxing or sugaring requires somewhat more experience and practice. In addition, the principle of mechanical epilation is painful and is therefore of limited suitability for use in the genital area.[24] Various application mixtures are used (for example, hot wax, cold wax and halawa), which makes an overall evaluation from the dermatological perspective difficult. Liquid hot wax should be avoided because of the danger of thermal injury of adjacent areas of mucosal junctions or mucous membranes. The assistance of a second person is generally advisable for the use of cold wax. Pulling out the hairs causes deliberate trauma of the hair follicles, which also leads to a particular risk of complications, especially infections. Careful disinfection must therefore be ensured here in particular. However, since the microbiota of the follicles cannot be completely eradicated even with the use of low-viscosity antiseptics and a sufficiently long contact time, bacterial complications cannot be fully avoided. With sugaring, a method that is widespread in the Arab world, a mixture of an aqueous sugar solution and lemon juice (halawa) is heated (breaking down sucrose into fructose and glucose to give invert sugar), applied to the hair-bearing areas, and, after sufficient time to harden, removed with a skin spatula in the direction of hair growth.[16] The epilation produced thereby is said to be less painful than waxing. This method is also often practiced with an assistant.

There is mixed evidence for the use of equipment-based epilation methods (laser, intense pulsed light, electrolysis). The advantage of these methods is that epilation is usually long-lasting or permanent.[2,76] These methods should be used by an experienced and competent therapist.

The usefulness of the application depends on a number of factors, in particular the pigmentation of the hairs to be removed and the surrounding skin, as well as on the use of equipment with suitable physical parameters and setting options. In addition, these methods are more expensive and are therefore available only to clients in a position to pay for them.

The available drug options for epilation are subject to the approval criteria of the drugs in question and do not concern the genital region. The ornithine decarboxylase inhibitor eflornithine hydrochloride monohydrate is particularly important; this is licensed in cream form as a finished medicinal product in a concentration of 11.5% for the treatment of facial hirsutism in women.[77,78]

CONCLUSION

The following observations and recommendations are of significance from the dermatological viewpoint:

- Sex-specific pubic hair has a physiological function especially in regulation of the cutaneous microbiota in the genital region.
- There is no medical evidence to justify the benefit of epilation or depilation of pubic hair.
- Pubic hair removal is practiced with varying frequency depending on age, sex and culture, but overall by the majority of sexually active people.
- Various methods are used for epilation or depilation of pubic hair, which differ with regard to their material cost, their effect and their complication risk.
- The complication risk of the individual techniques varies greatly with the method in itself, individual factors and the experience and skill of those using them.
- Shaving and waxing methods are used most commonly.
- Recommendations have been lacking hitherto for users who seek advice.
- Careful preparation (materials, seated position, protected location), procedure (disinfection, wetting, pubic shaving gel, hair removal, damp cloth to remove cut hairs, possibly a mirror) and aftercare (disinfection, protective barrier cream) are recommended.

ACKNOWLEDGMENTS

Open access funding enabled and organized by Projekt DEAL.

FUNDING

This manuscript was produced in the project "Frauen HAUTnah-Promotionsföderung für Ärztinnen in der Dermatologie (DERMA-IN-FEM)" [Women up-close-support funding for women doctors in dermatology] and financed as part of the funding of science and research in Sachsen-Anhalt by the European Structural and Investment Fund.

CONFLICT OF INTEREST

None.

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How to cite this article: Mezin-Sarbu E, Wohlrab J. Epilation and depilation in the genital area – motivation, methods, risks and recommendations from a dermatological point of view. *JDDG: Journal der Deutschen Dermatologischen Gesellschaft*. 2023;21:455–462.
https://doi.org/10.1111/ddg.14993