

## Research Article

# Prevention of menstrual toxic shock syndrome by French health professionals Running head: Toxic shock syndrome prevention

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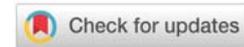
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## Abstract

**Objectives:** To appreciate the education on the use of intimate protection products and the prevention of menstrual toxic shock syndrome by French health professionals.

**Methods:** Fourteen semi-structured interviews with health professionals involved in women's health (midwives, school nurses, general practitioners, and obstetrician-gynecologists) were conducted over a period of six months (March 2019 to September 2019) in the Ile-de-France region in France. Their ages ranged from 26 to 67 years. All the interviews were recorded and typed to extract a qualitative analysis.

**Results:** The healthcare professionals interviewed surveyed report little involvement in educating their patients about intimate protection products and the prevention of menstrual toxic shock syndrome.

**Conclusion:** It would seem useful to increase the awareness of the healthcare professionals involved of the importance of educating their patients about the proper use of intimate protection products. The aim is to prevent the occurrence of infectious pathologies, particularly menstrual toxic shock syndrome the main microbiological risk identified as being associated with the misuse of internal intimate protection products.

## Abbreviations

TSS: Toxic Shock Syndrome; TSST-1: Staphylococcal Toxic Shock Toxin-1; CNR: National Reference Center; ANSES: National Agency for Food, Environmental and Occupational Health Safety

## Introduction

Toxic Shock Syndrome (TSS) is a severe infectious disease that can be caused by *Staphylococcus aureus* or superantigenic toxin-producing streptococci [1]. Half of the cases of *Staphylococcus aureus* TSS reported in the literature are associated with the use of internal intimate protection products (tampons and cups) and the production of the

staphylococcal toxic shock toxin TSST-1. This latter is then referred to as menstrual TSS [2]. The first case of menstrual TSS was described in the USA by Todd et al in 1978 [3].

TSS requires prompt diagnosis and management as delayed diagnosis and management can be fatal [4].

In France, the incidence of TSS is studied by the National Reference Center (CNR) for *Staphylococcus* in Lyon. This center has recorded an average of 20 reports of menstrual TSS per year since 2010 [5].

As stated by Santé Publique France, in its weekly epidemiological bulletin number two of 28/01/2018, the meeting of four factors seems to be necessary to see the appearance of

the disease: vaginal colonization by a toxigenic *S. aureus* strain, the production of the TSST-1 toxin, the penetration through the vaginal epithelium of a sufficient quantity of TSST-1 to cause the pathology and the absence or insufficient titer of neutralizing antibodies to this toxin [6].

Although the pathology of menstrual TSS has received significant media coverage in recent years, the ANSES emphasized in 2018, in its report entitled "Safety of intimate products" that TSS and the proper use of these protections are still largely unknown to the general public. Thus, despite the various TSS prevention measures already in place in France, misuse of periodic protection by French women persists, due to a lack of information among them (Figure 1). The misuse of internal sanitary protection is one of the main risk factors associated with the occurrence of TSS. It is thus important to strengthen prevention efforts for women in this area [7].

According to the study conducted by ANSES, women unanimously expressed a desire for information on TSS, such as knowledge of symptoms, the composition of protection, hygiene measures, and methods of use. As a source of information, health professionals (general practitioners, school nurses, midwives, and obstetricians) are considered by women as "primary and trusted sources of information" [7].

It, therefore, seems relevant to understand how these health professionals are made aware of the TSS pathology and what advice they give to their patients on the use of intimate protection.

The objective of this work was to estimate the participation of health professionals in (i) education on the use of intimate protection products and (ii) the prevention of menstrual TSS among French women.

## Methods

In this study, two hypotheses were posed to answer the research problem:

- (i) Health professionals only occasionally provide their patients with advice on the proper use of menstrual protection during consultations, and this specifically when the patient presents a high infectious risk (e.g., a patient in postpartum care or with a history of TSS).
- (ii) Health professionals only partially address the subject of TSS with women (symptoms, risk of recurrence), specifically when women request it.

## Study procedure

The method chosen for this study was to conduct semi-directive interviews with health professionals involved in gynecological follow-up: midwives, school nurses, general practitioners, and obstetrician-gynecologists to obtain qualitative answers. The interviews lasted an average of 30 minutes and were recorded to correct the notes if necessary.

## Variables studied

An interview grid (to be found in Appendix I) was developed that grouped all the variables studied and was based on the two hypotheses posed.

To avoid directing the interviewed professional in his/her answers, it was deliberately chosen to elaborate this grid in three parts:

1. To get the interviewee to talk about his or her involvement with women in prevention in the broadest

Main TSS risk factor identified :

**Misuse of internal intimate protection: Frequent / Preventable by information**

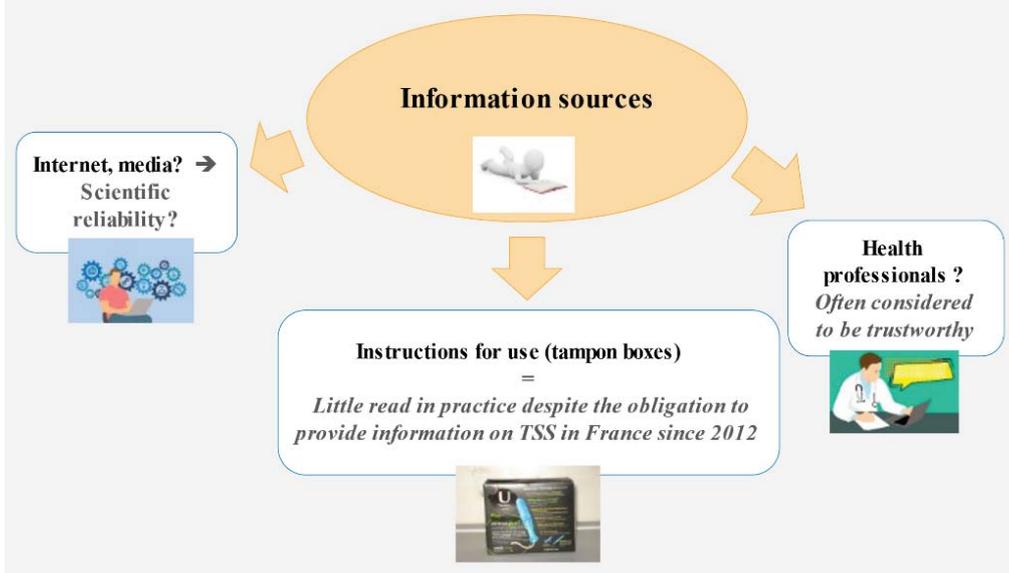


Figure 1: Illustrative Diagram of French Women's Sources of Information about TSS.

sense of the term and, in a second stage, more specifically about menstruation.

- To study the health professional's interest specifically in the type of sanitary protection used by her patients.
- To understand the provider's professional or personal experience with TSS.

### Participant inclusion criteria

The criteria for inclusion of participants were all qualified health professionals, registered with the departmental order of the profession concerned and practising in the Ile-de-France region in France. The health professionals chosen were found after a search in the Health Insurance directory or were met directly at hospital internships for French health students.

### Qualitative exclusion criteria for participants

Health professionals who did not work directly with women (health executives without clinical activity, exclusive university teachers, and retired health professionals) were excluded from the study.

### Description of health professionals who agreed to participate in the study

To carry out the study, professionals were initially contacted and then responded favorably or not to this current and innovative research topic (Figure 2).

To this end, 20 health professionals were contacted, including 9 midwives, 3 school nurses, 5 general practitioners, and 3 obstetrician-gynecologists.

Of these caregivers, 14 agreed to participate in the study, including 5 midwives, 3 school nurses, 3 general practitioners, and 3 obstetric gynecologists.

Finally, the 6 health professionals who did not respond to the solicitation emails sent were 4 midwives and 2 general practitioners.

All the professionals interviewed were female except for one general practitioner who was male.

The 14 semi-structured interviews with professionals were conducted at their workplaces between March and September 2019 in the Ile-de-France region in France. The median age was 37 years (min: 26 years; max: 67 years).

According to means and time, researchers could carry 14 interviews.

### Analysis strategies

Once the verbatim statements of the caregivers interviewed had been transcribed, the interview framework was repeated and, for each question asked, the answers given by each participant were grouped. In addition, the answers obtained were classified by hypothesis. An analysis of the feeling towards the questioning could be made (for example hesitations towards an answer, sighs, pauses, voice intonations). Finally, a correlation between the information obtained and the data in the literature was carried out.

### Ethical and regulatory considerations

An oral (by telephone) and/or written (by e-mail) explanation of the study was given to the health professionals solicited who met the inclusion criteria.

At the beginning of the interview, the participant's oral consent was requested for the audio recording, and his anonymity was assured as well as the possibility of retracting at any time during the study. If the participant wished to withdraw or wanted more information about the survey, they could contact us.

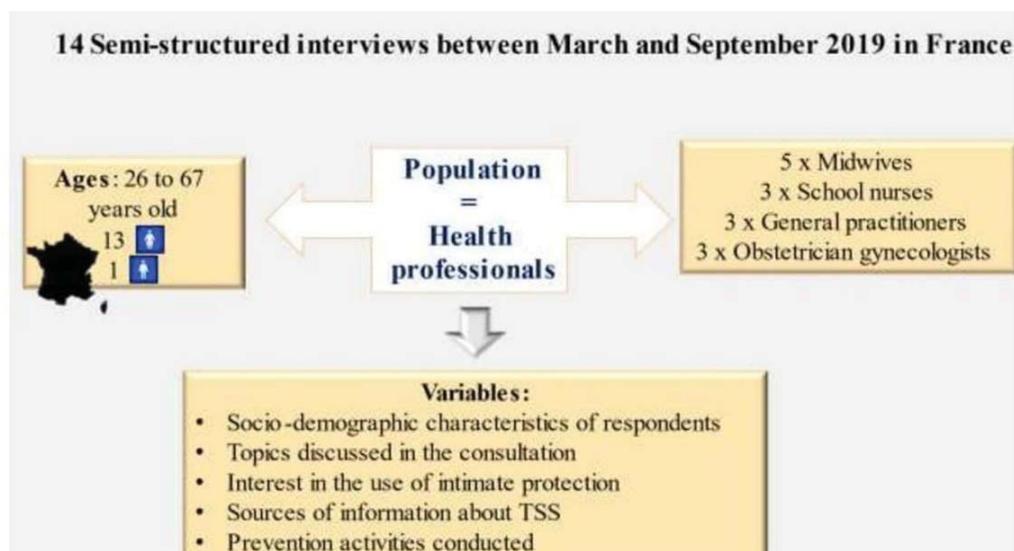


Figure 2: Integrative diagram of the qualitative study.

## Results

### (i) Involvement of professionals in providing advice on the choice and use of intimate protection products

The frequency of advice given by the professionals interviewed to women on the choice and use of intimate protection products is shown in Figure 3. It is observed that the advice given is infrequent and random. Indeed, of the 14 caregivers interviewed:

- 6 never discussed this topic in the consultation,
- 4 talked about it sometimes or often (random)
- 4 talked about it systematically (always).

### (a). Reasons given by professionals for not providing counseling

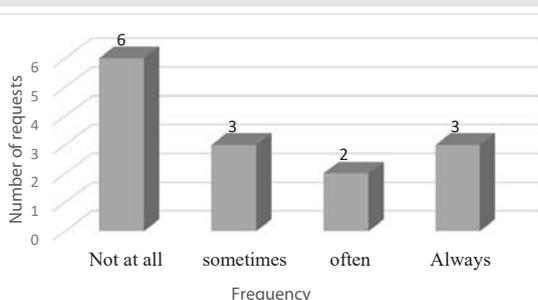
As mentioned in the bar chart above (Figure 3), some (2/14) of the professionals interviewed do not see the value of the health professional helping patients to make a free and informed choice about the choice and use of intimate hygiene products. Some (3/14) felt that they were not the best people to talk to about this topic. Others (4/14) put forward the difficulty for the professional to broach the subject because they are afraid of "shocking". Besides, some only broached the subject if the patient asked.

### (b). Reasons identified by professionals for advising on the choice and use of intimate hygiene products

Contrarily to professionals working in schools or private practice, those who work in maternity wards systematically mention the subject in the postpartum period. Indeed, certain clinical situations require special attention because of the high risk of infection, such as postpartum bleeding or bleeding after the termination of pregnancy.

Most of the professionals provide advice on the risks associated with sanitary protection, but there is a great deal of inter-individual variability in the information provided. While some professionals mainly inform about the allergic risk, others insist on the infectious risk. Still, others draw attention to the composition of these products.

We can thus conclude that the information provided by professionals varies greatly depending on the professional and is not standardized.



**Figure 3:** Frequency of advice given by professionals on the choice and use of intimate protection products.

### (c). Three obstacles identified by the professionals interviewed to the proper management of menstrual hygiene by women in France

The first obstacle identified is the "taboo" surrounding menstruation.

Health professionals have to initiate de discussion with their patients because it is delicate for women and especially young girls. Some professionals told us: "Young girls do not tell me that they are having their period, they come because they have a stomachache". Another health professional stated: "The subject of menstruation is often discussed very quickly because young girls are still very embarrassed to talk about menstruation, more so among middle school girls than high school girls, but the taboo surrounding menstruation still persists."

The second obstacle identified was economic difficulties.

On this subject, one professional reported that "patients sometimes have little financial means to have proper body hygiene, especially homeless patients. "

Finally, the third and last obstacle is: environmental difficulties, particularly those highlighted at school. One professional told us: "At school, there is not always enough to wash your hands". "The toilets are mixed and not always clean".

### (ii) Involvement of the professionals interviewed in TSS prevention

Three of the 14 health professionals interviewed said that they were involved in preventing TSS in their patients, but not on a routine basis. They were not very involved in TSS prevention for various reasons.

### (a). The reasons given by the professionals interviewed for not participating in TSS prevention

The first reason given by the professionals (9/14) was the difficulty of informing women "without alarming them". For other professionals (6/14), the "rarity of the pathology associated with the lack of time" explains the lack of information given to patients about TSS. For most professionals (9/14), the "lack of theoretical knowledge" about the disease noted by the three school nurses interviewed, as well as three midwives, one obstetrician-gynecologist, and two general practitioners, was a hindrance to the explanation given to women.

Three professionals, including a midwife, a school nurse, and a general practitioner, considered their professional setting to be unsuitable for informing patients about TSS. They sometimes considered that "the school environment is not suitable or that obstetric or general medicine consultations are not the appropriate or opportune time". In contrast, two school nurses, one midwife, and one general practitioner highlighted that they could talk about it (TSS) during gynecological prevention consultations or during interventions on emotional and sexual life. The two most appropriate times to discuss

menstruation and intimate protection are the gynecological prevention consultation and the emotional and sexual life programs carried out in secondary schools, for example, as part of the mandatory health service for health students.

The last reason mentioned is the lack of concern of women for the pathology of menstrual TSS, as opposed to other potential risks such as the presence of endocrine disruptors in certain types of protection. Thus, a very large proportion of the professionals (11/14) interviewed told us that their patients did not ask questions about menstrual TSS pathology.

**(b). Participation in TSS prevention in specific situations:** Professionals said that women using only tampons should be informed about menstrual TSS.

Another professional stated that he “does not name TSS, but always tells her patients to come and see him if something strange, abnormal or smelly appears”.

Finally, one professional considered TSS prevention to be useful in “de-dramatizing the use of internal sanitary protection”.

Although the health professionals interviewed were not very involved in the prevention of menstrual TSS, three main risks associated with tampon use were highlighted.

First, the “infectious risk” associated with menstrual TSS was the one cited most often (11/14).

Secondly, 2 professionals mentioned the risks of “redness and irritation”, especially when using sanitary protection outside of menstruation.

Thirdly, the risks associated with the composition of tampons and the “presence of endocrine disruptors” were emphasized by one professional. He recommended to his patients “to avoid plastic films and anti-odors because they are dangerous to health”.

**(c). Impact of encountering a case of TSS during his professional activity on subsequent prevention practices:** During our interviews, we met a professional who, during his medical studies, met a patient who had suffered from TSS. She had both arms and legs amputated. He confided to us that he did not participate in the prevention of TSS for women because he considered that the pathology was “rare and the pathophysiology poorly known”. It was therefore “useless to alarm women”.

Having met a case of menstrual TSS has not changed his professional practice.

**(d). Sources of information on TSS for the health professionals interviewed:** Most of the health professionals interviewed knew about TSS through the media (6/14) (television news, radio, general newspapers, etc.).

Only one had information via studies or specialized journals.

Only a few (4/14) had initial or continuous university

training. Four of them had heard about the pathology and “little information” was provided.

3/4 knew about the subject through discussions and 4/4 had read instructions for use of tampons.

## Discussion

This study shows that the health professionals surveyed have little involvement in providing advice on the choice and use of intimate protection products to their patients. The existing literature on the subject highlights that the choice of one type of intimate protection over another during menstruation depends on two main factors: personal preferences and cultural influences. Very few recent studies have looked at the criteria by which women choose sanitary protection. Concerning personal preferences, the study by Omar et al (1998) [8] indicates that women choose tampons because of their comfort, convenience, and lack of visibility. With regard to cultural influences, this study identified the influence of the family sphere during childhood and adolescence, and then of other more extended spheres from the end of adolescence on the information held by women about intimate protection [9-15].

There are difficulties in good menstrual hygiene management by French women. These difficulties should be better highlighted so that health professionals can listen to women and better advise them on menstrual hygiene. The question of menstrual insecurity is currently taken very seriously in France. Menstrual insecurity corresponds to the economic difficulty of certain women, students or even adolescents, to access sanitary protection. Unfortunately, very few studies exist today on the subject in France.

Given our results, it seems that efforts must be made to involve health professionals more in the choice and use of intimate protections. Our study shows that professionals have a key role to promote menstrual hygiene, provide young girls a clear and complete information on different types of sanitary protections so as to limit the health risks associated to misuse such as menstrual toxic shock syndrome.

In this study some health professionals mentioned the lack of interest of women in the pathology of menstrual TSS. These results highlight a contrast between the study conducted by ANSES in 2018, which observed that women were eager for information about TSS and the testimonies collected in our study. We can think that the persistent taboo around menstruation hinders communication between professionals and patients. Nevertheless, the ANSES specified in 2018 in its report on the safety of intimate products, that it was the responsibility of health professionals to inform women on the following points, among others:

- The different types of sanitary protection
- The promotion of good menstrual hygiene
- Signs to watch out for when using tampons or menstrual cups [7].

The two most appropriate times, according to the health professionals, to discuss menstruation and intimate protection are the gynecological prevention consultation and the emotional and sexual life programs carried out in secondary schools. These programs could provide an opportunity to define menstruation and to present the different types of sanitary protection, explaining their use and the risks associated with misuse [16]. The preventive gynecology consultation could be an opportunity to supplement the information received in schools by taking into account the patient's psychological, social and cultural situation and preferences, as well as his or her lifestyle, in order to have a personalized discussion with the patient.

Three risks related to the use of tampons were highlighted by the professionals interviewed: the "infectious risk", the risks of "redness and irritation" and the risks associated with the "presence of endocrine disruptors". In the scientific literature, irritation is described with the use of intimate protection products. For sanitary towels, irritation phenomena were reported as early as 1981 in a study by Friedrich entitled "tampon effects on vaginal health" [17]. These irritations are related to the contact areas, which are the external genital mucosa or the skin of the genital region, as specified in studies conducted by Farage in 2006, Stadler in 2006, and Xuemin et al. in 2011 [18–20]. Concerning the risks associated with the composition of tampons, no specific regulations are governing the composition, manufacture or use of intimate protection products. The ANSES has recommended the development of a more restrictive regulatory framework at the European level to limit the presence of these chemicals [7].

The mandatory information provided on all tampons boxes inform women of the risk of TSS associated with the misuse of internal intimate protection products. And yet, the ANSES published in 2018 that 73% of women do not know what menstrual TSS is [7].

It is therefore necessary to strengthen the information delivered on the pathology through health professionals in particular.

Most of the health professionals interviewed were aware of TSS through the media. The sources of information are often not very scientific. Indeed, the information relayed by the media does not always constitute complete information based on the data provided by scientific articles.

Initial and ongoing university training on the subject concerned only a few of the health professionals interviewed. It would therefore seem useful to develop French university training on the pathology of menstrual TSS.

The strengths of the study are first of all the novelty of this qualitative study, which aimed to explore and understand the possible practices of education in the use of intimate protection products and the prevention of menstrual TSS. Indeed, most of the studies that have been conducted on menstrual TSS are quantitative and therefore based on a questionnaire, which does not allow for a precise exploration and understanding of the practices of health professionals. The fact that we were able to record all of the interviews made it possible to obtain the

entirety of the exchanges. The choice of interviewees was made in an informed manner by trying to diversify the population as much as possible. To do this, we tried to recruit professionals of different ages and with different care activities. The 14 interviews allowed us to obtain different points of view and practices. The participants did not know the precise subject in advance, but were told that the subject of the study was "menstruation and intimate protection". This allowed for as many responses as possible with no preconceived notions, as caregivers were not able to discuss or research the topic with each other before participating.

The main limitations identified were the small size of the study and the lack of male respondents. The results are from a qualitative survey based on a panel of 14 caregivers and therefore cannot be extrapolated to all caregivers. Similarly, it was not possible to study the results according to the gender of the professionals interviewed.

Finally, the decision to stop the interviews was made when the data was saturated, i.e., when no new elements were mentioned during the interviews. This saturation is difficult to define; it was decided after transcribing and analyzing each of the interviews carried out when a redundancy in the comments without new elements appeared. However, it is impossible to say whether another element might have appeared if the interviews had continued.

This work has highlighted the need to strengthen and standardize information for patients and health care professionals on promoting education on the use of intimate protection products and prevention of menstrual TSS (Figure 4).

Among the different forms that information can take, the written word seems to be an adapted and recognized method to complement oral information in order to personalize the information given on menstrual hygiene. This is why we have chosen to produce an information leaflet for patients on our subject of study including the definition, epidemiology and signs suggestive of TSS as well as advice on the proper use of sanitary protection.

**To conclude:** health care professionals should be more

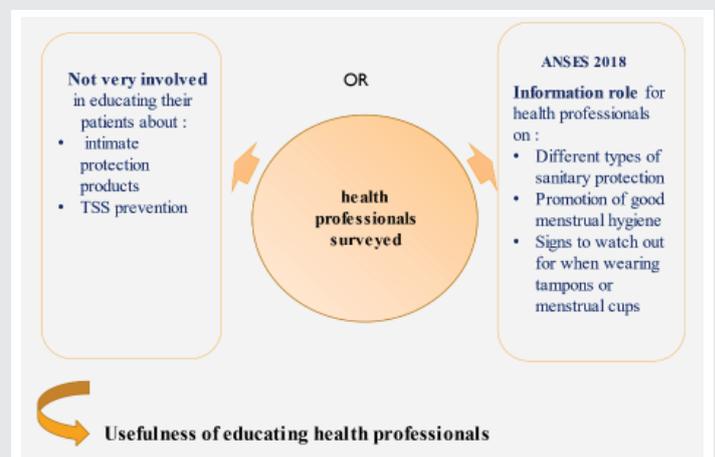


Figure 4: Summary diagram of the study.



involved in educating their patients about the proper use of intimate protection products to prevent infectious pathologies, particularly menstrual TSS, the main microbiological risk.

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