

## REVIEW

# Prevalence, attitude and practice of self-medication among adolescents and the paradigm of dysmenorrhea self-care management in different countries

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**Summary.** Self-medication (SM) is an important worldwide public health issue affecting children and adolescents. The pattern of SM varies in different communities, affected by factors such as age, sex, income, expense, self-care orientation, educational level and medical knowledge. It is a fairly common practice: for minor health problems, it often provides cheap, rapid, and convenient solutions, outside of the health care system of many countries. Painkillers, antipyretics, cough medicines, cold preparations, dermatological products, nutritional supplements and antibiotics are the drugs most frequently used. Potential risks include incorrect self-diagnosis, improper dosage, inappropriate choice of therapy, masking of severe disease and drug interactions. Lack of awareness of warnings and precautions, storage conditions, the recommended shelf-life and adverse reactions increase the risk of side effects. Little is known about the SM of dysmenorrhea by adolescent girls. Attitudes towards treatment are influenced by cultural, ethnic, and religious factors. Some girls discuss dysmenorrhea with family and friends, and the majority may not seek medical advice. As dysmenorrhea is a common problem for adolescents, it is essential that these girls be aware of the normal and abnormal symptoms of menstruation. In the light of these findings, the roles of family, school, health professionals and health authorities are of utmost importance for the implementation of measures to approach this health problem in a more efficient way. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Key words:** self-medication, adolescents, potential risks, dysmenorrhea, health problem

## Background and definitions

Self-medication (SM) is widely practiced in both developed and developing countries. The WHO defines SM as the selection and use of medicines by individuals to treat self-recognized illnesses or symptoms (1) and cites SM as a common problem leading to incorrect use of medicine (2). It also includes the use of a wide range of complementary and alternative medicines (CAM), such as herbal medicines (herbs or herbal preparations), nutritional supplements, traditional products, and home remedies (3).

Medicines that require a doctor's prescription are called prescription products (Rx products). Medicines for SM are often called "non-prescription" or "over the counter" (OTC), and are available without a doctor's prescription through pharmacies. In most countries OTC products are also available in supermarkets and other outlets (4,5).

Responsible self-medication requires that: a) medicines used are of proven safety, quality and efficacy; b) medicines used are those indicated for conditions that are self-recognisable and for some chronic or recurrent conditions (following initial medical diagno-

sis). In all cases, such products should be supported by information which describes: i) how to take or use the medicines; ii) the effects and possible side-effects; iii) how the effects of the medicine should be monitored; iv) possible interactions; v) precautions and warnings; vi) the duration of use and vii) when to seek professional advice (5).

SM is normally used for the prevention or treatment of minor ailments or symptoms which do not justify medical consultation. In some chronic or recurring illnesses, after initial diagnosis and prescription, SM is possible with the doctor retaining an advisory role (5-8).

Responsible SM has been defined as the health-care assumed by the patient where he or she has a greater degree of responsibility in the management of a symptom or illness, using a pharmaceutical product available OTC (4, 5). In this context, pharmacists have an important role to play because they are the most trusted and easily accessible healthcare professionals available to the public as compared to other healthcare professionals. Whenever necessary and appropriate, the pharmacist should refer the patient to a physician (9, 10).

Factors influencing SM include socio-economic status, lifestyle, ready access to drugs, patient satisfaction with the health care provider(s), cost of the drugs, exposure to advertisements, internet access and skill of its use, family influence, educational level, age and gender, pharmacists, previous prescribed drug, or suggestions from an advertisement in newspapers or popular magazines (4, 11-13). Moreover, those with previous experience of using SM and with mild illness are more likely to practice SM (13).

Several studies have reported that SM starts with the onset of adolescence and increases with age (10-12), and is influenced by peers and parents (14-16). Therefore, the issue of SM among adolescents represents an emerging topic in scientific research. The present mini-review aims to describe the prevalence, attitude and practices of SM among adolescents and report how adolescent girls with dysmenorrhea self-manage pain in their daily life.

In the past years, SM has been studied in many countries and several articles have been published on its use in the general population of adolescents, adults,

and university students, and in individuals with different health problems. In adolescents the prevalence of SM ranges widely from 2 to 92% (17-21).

A study investigated in 477 students (aged 14-16 years, mean 15.2 years; 53.8% were girls), attending Junior Lyceums in Malta (representing 33.3% of the total adolescents in that age range): (a) the prevalence of self-reported health complaints, (b) the consumption of commonly used medicines, including SM, and (c) the sources of medicines that had been accessed during the preceding 3 months (22).

The most prevalent health complaints experienced by the study population were ear problems, hay fever, cold, cough, headache and skin complaints. One hundred and fifty two girls (59.6% of the total female population) reported menstrual pain. With regard to the overall use of medicines, a total of 428 students (90.3%) had used between 1 to 9 types of medicines including those used for menstrual pain during the preceding 3 months (mean: 2.5 medicines). There was a statistically significant positive correlation between the number of physical health complaints and number of medicines used ( $r: 0.623, p < 0.001$  for boys and  $r: 0.573, p < 0.001$  for girls) (22).

The great majority of the students obtained their medicines from a community pharmacy, during the preceding 3 months. However, the source that was mostly accessed by students who had complained of headache and menstrual pain was the home medicine cabinet (53.9% and 60.0% respectively). Antibiotic SM was reported by 9.9% of the students.

In most cases, the participants had obtained medicines with adult guidance. Nevertheless, 104 (24.3%) students had taken at least 1 medicine from friends/young relatives or from the home medicine cabinet without guidance during the same period of time (22).

The prevalence of SM among children aged 0-17 years was studied by Du and Knopf in Germany (23). All cases of last-week medicine use were recorded among 17,450 children, aged 0-17 years.

25.2% of participants had used SM, including drugs acting on the respiratory system (32.1%), alimentary tract and metabolism (21.6%), skin (14.2%), nervous system (11.3%), and homeopathic preparations (8.6%). Overall, girls showed a significantly higher level of self-medication use vs. boys (26.0% vs. 24.4%;

$p < 0.05$ ). Among adolescents, aged 11–17 years, boys used significantly more vitamin and mineral supplements than girls, whereas girls used significantly more analgesics (aspirin and paracetamol) than boys. Girls aged 3–13 years used significantly more skin products before puberty than boys, and girls aged 14–17 years used significantly more musculoskeletal system drugs during puberty than boys (23).

However, the study did not separate SM taken by teenagers themselves from those given to them by their parents and did not collect information concerning teenagers sharing medicines with each other, rendering it unfeasible to explore the possible motives of self-medication (23).

Of the 4,294 children and adolescents on SM, 1,309 (30.4%) used prescription medicines concomitantly, and 1,001 (23.6%) used two or more SM simultaneously (ranging from two to seven medicines). The prevalence of multiple medicine use was 5.9% (95% CI 5.3, 6.6) for two or more self-medications, 7.4% for one SM plus at least one prescription medicine and 11.5% for overall (23).

In another recent study (20), of 2,849 self-medicated adolescents, 1,892 adolescents (66.4%) self-medicated one drug, 457 (16%) self-medicated two drugs, 291 (10.2%) self-medicated three drugs, and 209 (7.3%) self-medicated four or more drugs in the past year.

Use of SM was closely associated with the age of adolescents (14 to 17 years), children with poor health status, no immigration background, families with a higher household income and with mothers with a middle to high educational level (23).

The higher use of analgesics by girls than boys (>10 years old) was consistently observed in many other studies (24–28). An international survey of self-reported medicine use among adolescents in 28 countries, including Germany, reported that from 21.1% to 49.9% of boys, and from 28.3% to 65.9% of girls, had used medicines for headache or dysmenorrhea in the previous month (24).

An anonymous self-administered questionnaire was distributed to 1,110 secondary school students in 10 government schools of Kuwait (19). Their mean age was 16.2 years, 601 were males and 509 females. Sixty-five percent of medicines used were for pain relief, 54%

for respiratory conditions, 39% for allergic conditions, 37% for dermatological conditions; 23% were nutritional products and vitamins, 21% were gastrointestinal products, 17% were antidandruff products, 15% were hair products, 13% were medicines for migraine and 8% were athlete's foot products. Four hundred and ninety-nine (74%) of the female students indicated that they used medications to manage menstrual discomfort: 224 (45%) used paracetamol, 92 (18%) herbs, 76 (15%) mefenamic acid, 69 (14%) hyoscine preparations, 41 (8%) aspirin, 30 (6%) ibuprofen, while 56 (11%) used other products (19). Few adolescents consulted pharmacists. Female students were more likely to seek advice from parents while male students were more likely to seek advice from a doctor ( $p = 0.01$ ). SM use tended to increase with age and differed between male and female students.

Three hundred and two (64%) of the male students reported use of SM for muscular pain: 151 (32%) used various creams for rubbing, 140 (30%) paracetamol, 56 (12%) aspirin, 18 (4%) ibuprofen, 16 (3%) diclofenac, and 22 (5%) used other medications (19).

The most common source of general information regarding SM was parents. For the use of SM during acute illness 57% of respondents stated that they would seek advice for medications from a doctor, 36% from their parents, 6% would follow their own instincts while only 1% would seek the advice of a pharmacist. Female students were more likely to seek advice from parents while male students were more likely to seek advice from a doctor ( $p: 0.01$ ). A total of 701 (64%) stated that they would like to receive more information on the medication they used (19). Patient's education and awareness campaigns were recommended by the authors.

Three systematic reviews of global trends and factors influencing SM practices among adolescents were published between 2010 and 2015 (29–31).

Pfaffenbach et al. (29) screened 403 articles, including 12,013 children and adolescents. The SM frequency varied from 7.0% (24) to 67.7%. The most consumed pharmacological groups were analgesics/anti-inflammatory drugs, followed by antibiotics and estrogens/progestogens.

An additional database search was done by Shehnaz et al. (30) on adolescents aged 13–18 years,

between January 2000 and December 2013. One hundred and sixty-three publications met the inclusion criteria. SM prevalence, in different countries, ranged from 2% to 92%. Headache, allergies, and fever were the most common reported self-medicated health complaints. Female gender, older age, maternal education, and familial practices were associated with increased SM among adolescents (30). The primary sources of drug information, recommendation, and procurement were pharmacists, parents, and friends. High-risk practices, such as diversion of prescription medicines and utilization of previous prescriptions were also reported. Few adverse drug reactions were reported, probably because of lack of awareness about the potential harmful effects of medicines (30).

Gualano et al. (31) selected 15 articles, published from January 1990 until January 2014, involving 143,213 adolescents aged from 13 to 18 years. Overall, 50% of adolescents took drugs without consulting a physician. Only one study reported the possible adverse effects related to the inappropriate use of drugs, which were experienced by 31.1% of the females and 19.6% of the males. Several teenagers, especially girls, aged 11-15 years, admitted to taking different types of drugs, especially painkillers. The major reasons supporting SM were the ease of acquiring, and the affordability of drugs. Furthermore, teenagers did not know how to use drugs and need more information about this topic to prevent side effects (31).

In 2016, a national representative sample of 6,226 students from 99 primary, middle, and high schools in Taiwan completed an online self-administered questionnaire (20). The prevalence of self-medication among the adolescents surveyed was 45.8%. The most common health complaints for SM reported by the participants were cough or cold (75.2%), followed by headache (59.7%), fever (45.8%), stomach disorder (31.6%), intestinal disorder (22.9%), allergy (22.6%), eye disease (14.6%), and dysmenorrhea (17.7%, female). The most frequently used drugs for SM were nonsteroidal anti-inflammatory drugs or pain relievers (31.1%), cold and cough medicines (21.6%), analgesics (19.3%), and antacids (17.3%). The main sources of information for the drugs used for SM were pharmacists (82.9%) and parents (60.2%) (20). Multivariate analysis indicated that adolescents with lower medica-

tion knowledge, lower self-esteem, and substance users were more likely to engage in inappropriate SM.

We can conclude that SM is a worldwide phenomenon, the prevalence of which differs depending on the population, the method and the recall period employed for the study. Understanding the interaction between various factors promoting SM can be helpful in promoting strategies to reduce drug-related health risks among adolescents. Parents are the most important source of information for the use of SM. The prevalence of SM was higher in female adolescents in most countries. Therefore, information from professionals should be made available and addressed to adolescents and parents with the aim of creating awareness in the general population on the potential risks of using drugs without proper information and consultation.

### **Inappropriate practice of self-medication and potential risks**

Although benefits are linked to appropriate SM, the increased access to medication for the treatment of "minor health conditions" raises the possibility of non-responsible SM. This includes: incorrect self-diagnosis, delays in seeking medical advice when needed, infrequent but severe adverse reactions, dangerous drug interactions, incorrect manner of administration, improper dosage, wrong choice of therapy, lack of awareness of warnings and precautions, inadequate storage conditions and ignorance of the recommended shelf-life, polypharmacy, and drug abuse (20, 32). Furthermore, many diseases have similar symptoms, and a person relying on previous experience to use SM may be exposed to the dangers of misdiagnosis and consequently improper treatment (13).

Low health literacy was also associated with inappropriate SM (33), less adherence to self-care regimens (34), more medication errors (35), and higher risk of hospitalization (36). In addition, a study showed that frequent alcohol drinking was a risk factor for increased SM among adolescents (37).

The potential benefits and risks of SM at the individual and community level are reported in Table 1.

**Table 1.** Potential benefits and risks of self-medication at individual and community level (From Ref. 4)

Potential benefits at individual level	Potential risks at individual level
<ul style="list-style-type: none"> <li>• Active role of adolescents in health care</li> <li>• Self-reliance in preventing or relieving minor symptoms or conditions</li> <li>• Convenience</li> <li>• Economy, since medical consultations will be reduced or avoided.</li> </ul>	<ul style="list-style-type: none"> <li>• Incorrect self-diagnosis</li> <li>• Failure to seek appropriate medical advice promptly</li> <li>• Incorrect choice of therapy</li> <li>• Failure to recognize special pharmacological risks</li> <li>• Rare but severe adverse effects</li> <li>• Failure to recognize or self-diagnosis of contraindications, interactions, warnings and precautions</li> <li>• Failure to recognize that the same active substance is already being taken under a different name</li> <li>• Failure to report current self-medication to the prescribing physician (double medication/ harmful interaction)</li> <li>• Failure to recognize or report adverse drug reactions</li> <li>• Incorrect route of administration</li> <li>• Inadequate or excessive dosage</li> <li>• Excessively prolonged use</li> <li>• Risk of dependence and abuse</li> <li>• Food and drug interaction</li> <li>• Storage in incorrect conditions or beyond the recommended shelf life</li> <li>• Drug-to-drug interactions</li> </ul>
Potential benefits at community level	Potential risks at community level
<ul style="list-style-type: none"> <li>• Alleviate medical resources from being wasted on minor conditions</li> <li>• Lowering the costs of community funded health care programs</li> <li>• Reducing absenteeism from school due to minor symptoms</li> <li>• Increasing the availability of health care to populations living in rural or remote areas.</li> </ul>	<p>Improper self-medication could result in an increase in drug induced disease and in wasteful public expenditure.</p>

### Adverse drug reactions

Despite numerous studies on adverse drug reactions (ADRs) related to SM in hospitalized patients (38,39), there are few available data related to the rate and severity of ADRs in SM.

Goldsworthy and Mayhorn (40) interviewed 594 adolescents throughout the United States. One in five reported sharing prescription medication. Of these, less than half received instructions, many delayed professional care, few informed providers, and a third reported experiencing side effects.

A self-completion questionnaire was designed and used by Westerlund et al. (41) in 245 Swedish students (138 females and 107 males; median age of 17 years) in order to identify their experience about drug-related problems (DRPs). DRPs had been experienced by 31.1% of females and 19.6% of males. The most common DRP was therapy failure in 46.5% of the girls

and 38.1% of the boys. Physicians solved the problems in 41.4% of the cases.

Among people who practice SM, adolescents were at higher risk for inappropriate use, particularly with antibiotics (42,43). Misuse and overuse of antibiotics lead to numerous individual and societal problems, among which antimicrobial resistance (AMR) that is currently a major worldwide concern (42, 43). Therefore, WHO has stressed the need to raise awareness about the proper use of antibiotics and the threat of AMR in the general population (44)

A large European survey has shown that adolescents and young adults (aged 15-24 years) are the highest users of antibiotics (43) and are more likely than other age groups to take them for upper respiratory tract infections (URTIs). Penicillins are the antibiotics most used for upper respiratory tract infections, supposedly to provide a quick relief from illness. Parents have an advisory role, acting to limit or encourage use (45).

Most adolescents perceive that antibiotics are specifically for bacterial infections and some feel they are no different from other medications such as painkillers. There was some misunderstanding about the difference between viral and bacterial infections. In general, the majority of adolescents have poor understanding of AMR. Comparison with data from other countries confirms similar findings, but in countries where antibiotics are available “over the counter” without prescription the reported overuse of antibiotics is higher (43).

Drug-to-drug interaction is another potential danger associated with SM. In a study among U.S. adolescents, most girls used one analgesic or anti-inflammatory drug, whereas one-third of them reported using two to three analgesics for dysmenorrhea (not concurrently) (46). Nearly all used at least one medication, 31% reported using two, and 15% used three medications (not concurrently). In another population, SM practices were also inappropriate, regarding appropriate drug choice, therapeutic doses, and associated side effects, in a substantial proportion of young adult women with primary dysmenorrhea (47).

In summary, studies suggest that SM is influenced by many factors such as education, family, society, law, availability of drugs, exposure to advertisements and others. Parents and adolescents should be aware of the principles of proper/improper use of medicines, their potential side effects, and the strict regulations on non-prescription antibiotics and painkillers. An important aspect to be considered for the use of anti-inflammatory drugs is related to their safety, especially for long-term use.

### **The paradigm of self-medication among adolescent girls with dysmenorrhea**

Despite a plethora of worldwide studies on dysmenorrhea, there are few studies on self-care strategies for dysmenorrhea (DS) in young girls. DS is commonly categorized into two types; primary and secondary. Primary dysmenorrhea (PD) is defined as painful menses with cramping sensation in the lower abdomen that is often accompanied by other symptoms, such as headache, nausea, vomiting, diarrhea, backache, and leg pain. All these symptoms occur just before or during the

menses in women with normal pelvic anatomy. Several studies suggest that severe menstrual pain is associated with absenteeism from school or work and limitation of other daily activities. One-third to one-half of females with PD miss school or work at least once per cycle, and more frequently in 5% to 14% of them (48). Dysmenorrhea may be also secondary to pelvic organ pathology such as endometriosis, pelvic inflammatory disease, IUDs, ovarian cysts, adenomyosis, uterine polyps.

Wong and Khoo (49) performed a cross-sectional study in 1,092 Asian girls from 15 public secondary schools. 76.1% of the participants believed that dysmenorrhea was a normal part of the female menstrual cycle and only 14.8% sought medical treatment. Similar results were reported in female nursing school students in Taiwan (50).

We performed a systematic search, using PubMed and Google Scholar, in order to identify publications on the self-care strategies of adolescents for managing DS. The following keywords were included: “self medication, adolescent, self prescription, over the counter preparations, self care, self administration and dysmenorrhea”. All papers written in English, French, Portuguese, Spanish and Italian were considered, resulting in review of 226 papers.

Davis et al. (51) collected via interview the self-treatment patterns among 76 adolescents with moderate or severe DS. The mean age was 16.8 years (range 11-19). Dysmenorrhea was moderate in 42% and severe in 58%. Subjects reported numerous coping strategies for DS. These included discussing their pain with someone, including their mother (84%), friend (67%), doctor (37%) or nurse (22%). Those with severe DS were not more likely to seek medical care than those with moderate pain ( $p: 0.7$ ). Nearly all subjects used non-pharmacological remedies, 84% stayed in bed or slept, 75% took a hot bath, 50% used a heating pad, 47% watched television or tried to distract themselves, and 30% did exercise.

Ninety percent reported using OTC medication, and 21% reported using prescription medication. The most common OTC medications used were ibuprofen (54%), acetaminophen (41%), Midol (28%), and naproxen (17%). Thirty-nine percent of subjects reported using two types of OTC medication, and 16% used three types (but not simultaneously). Most subjects

were doubtful of the dose used (53%) and took fewer than the recommended number of pills for pain.

A total of 1,231 college girls with PD, aged between 16 and 23 years, in Changsha (China), completed a questionnaire, including their sociodemographic characteristics, anthropometric measurements and maternal history of DS (51). Most girls with PD changed their lifestyles to avoid inducing or aggravating menstrual pain and other discomfort. For example, 94.6% of the girls with PD (n:1,165) reported that they would reduce physical activity by avoiding heavy personal cleaning or housework or increasing time for rest. Additionally, 56.5% (n: 695) reported that they would use complementary therapies, mainly

heat therapy (51). Friends or classmates and mothers were the most important persons to whom girls turned to for answers regarding methods for dealing with PD (52).

The results of additional studies, collected from 2009 to 2019 in adolescents and young adults, are summarized in Table 2. The limitation of these studies was that they did not distinguish between PD and secondary dysmenorrhea.

In summary, treatment for DS varies across different populations worldwide. Despite its frequency and severity, most adolescents do not seek medical treatment for dysmenorrhea or consult health care professionals. They consider painful periods as normal

**Table 2.** Persons consulted and self-care management of dysmenorrhea in adolescents living in different countries

Study	Country	Design	Sample size	Person consulted (%)	Self-care (%)
Ortiz MI et al. Int J Gynecol Obstet. 2009; 107: 240-243.	Mexico	Q	1,152 high school students. Age: NA	NR	<b>Pharmacological:</b> Combination paracetamol, pamabrom and pyrilamine maleate; NSAID alone or with butylhioscine.
Nwankwo et al. J Pediatr Adolesc Gynecol. 2010; 23:358-63.	Nigeria	CSS	Postmenarcheal adolescent school girls, aged 10-19 yrs.	16% of adolescent girls sought medical advice regarding DS	<b>NA</b>
Wong LP et al. Aust J Rural Health 2011; 19:218 -223.	Malaysia	CSS	1,295 adolescent girls, aged 13-19 yrs.	Mothers: 62.3% Peers: 52.9%.	<b>Pharmacological:</b> The majority were worried about dependence and side effects. <b>Non-pharmacological:</b> Heat therapy and traditional Chinese medicine.
Chia CF et al. Hong Kong Med J 2013; 19:222-228	Hong Kong	CSS	128 medical and 112 non-medical students. Mean age 20.1± 1.4 yrs.	Medical advice: 6%.	<b>Pharmacological:</b> Paracetamol (56 %) NSAID (100 %) TCM (93%) <b>Non-pharmacological:</b> Warm beverage (50 %) Sleeping (64 %) Postural adjustments (58 %) Warm water bag (77 %) Exercise (51%) Chocolate (47%) Dietary/nutritional supplements (92 %)
Wijesiri HS et al. Nurs Health Sci. 2013; 15: 58-64	Sri Lanka	CSS	168 students, from 17 to 18 yrs of age, suffering from DS.	Mother: 92.8 % Friends: 20.5 % Mass media: 8.7 %, teachers: 5.1 %, sisters: 5.9 %, father: 4.1 %, healthcare providers 0.8 %.	<b>Pharmacological:</b> Medications: 55% <b>Non-pharmacological:</b> Rest: 64% Hot fomentation:20% Exercise: 5% Yoga: 3%

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**Table 2** (continued). Persons consulted and self-care management of dysmenorrhea in adolescents living in different countries

Study	Country	Design	Sample size	Person consulted (%)	Self-care (%)
Farotimi AA et al. J Basic Clin Reprod Sci 2015; 4: 33-38.	Nigeria	Q	315 students, aged 18-23 yrs; mean age of 19.1 ± 0.95 yrs.	Friends: 65.2% Mother/Sisters:4% Doctors: 23.0% Healthcare provider: 7.9 % Teacher: 4.4%	<b>Non-pharmacological:</b> Herbal medicine (69.1%) and home remedies, such as cinnamon and anise tea.
Aktaş D. Pain Manag Nurs. 2015; 16:534-543.	Turkey		200 female students; mean age was 20.85 ± 2.15 yrs.	1/4 of the students with DS consulted a physician.	<b>Pharmacological:</b> Analgesics (69%) <b>Non-pharmacological:</b> Heat application (56.5%) and rest (71.4%).
Omidvar S et al. Glob J Health Sci. 2016 Aug 1;8 (8):53632. doi: 10.5539/gjhs.v8n8p135.	South India	CSS	1000 healthy females aged 11-28 yrs; 47.8% < 18 yrs.	Only 14.2% had sought medical advice	<b>Pharmacological:</b> In ~ 25.5% of subjects <b>Non-pharmacological:</b> In 83.2% of subjects.
Subasinghe AK et al. Aust Fam Physician. 2016;45:829-834.	Australia	Q	247 females, aged 16-25 yrs.	Approximately 86% had information from internet, social media, magazines, family members and friends	<b>Pharmacological:</b> Paracetamol, aspirin, mefenamic acid and ibuprofen (58%). <b>Non-pharmacological:</b> Heat packs: 54% Hot baths: 37% Meditation: 7% Exercise: 2%.
Kamel DM et al. J Pain Res. 2017;10; 1079-1085	Egypt	CSS	269 female college students. Mean age 20.4 ± 1.7 yrs.	Most students (91.2%) did not seek medical consultation for DS.	<b>Pharmacological:</b> 62.4 % used analgesics. <b>Non-pharmacological:</b> Drink hot liquids:56.6% Rest:50% Hot application:34.1% Massage: 15.0% Exercise: 14.2% Herbs: 9.7% None:15.9%.
Oksuz E et al. Konuralp Tıp Dergisi 2017;9:37-45	Turkey	CSS	190 female university students; mean age 20 yrs.	Sources of information were: 59.0% mother: 26.8%; a health professional; 5.7%; a family member other than the mother: 3.5%; friends and 5.0% teacher.	<b>Pharmacological:</b> In 44.7% of females, the analgesic used was proposed by a physician and in 29.8% by someone in the family. 53.8% female students were using more than one analgesic in a day: the time between two analgesics was 1-2 hrs.
Saeed AA. Iraq. Med J Babylon 2018;15:150-154.	Iraq	CSS	300 adolescent students with DS, aged between 10 and 21 yrs.	NR	<b>Pharmacological:</b> Medications:10.6% <b>Non-pharmacological:</b> Herbal treatment:9.3%, sweet or spicy foods (48,0%), chocolate and massages (17.2%, for each), Sleeping: 17%

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**Table 2** (continued). Persons consulted and self-care management of dysmenorrhea in adolescents living in different countries

Study	Country	Design	Sample size	Person consulted (%)	Self-care (%)
Acheampong K et al. <i>Obstet Gynecol Int.</i> 2019 May 20; 2019:5834159. doi: 10.1155/2019/5834159	Ghana	CSS	760 healthy adolescents aged 12-19 yrs.	56.6% ignored their menstrual pain. Few (19.4%) of them consulted a physician.	<b>Pharmacological:</b> SM: 34.6%, <b>Non-pharmacological:</b> Relaxation: 25.7%, hot application: 11.4%, herbs: 6.7%, physical exercise: 14.9%.
Chen L et al. <i>BMJ Open</i> 2019;9:e026813. doi:10.1136/bmjopen-2018-026813	China	CSS	2,555 college girls, aged between 16 and 23 yrs.	Friends or classmates and mothers: 89.3% Medical advice: 27.4%	<b>Non-pharmacological:</b> Lifestyle changes: 56.5% SM: 34.8%, with 15.6% taking Western medicine, 8.6% taking traditional Chinese medicine and 10.6% taking both.
Kizilirmak A et al. <i>Med Sci</i> , 2019; doi: 10.5455/medscience.2018.07.8937	Turkey	Q	3,526 girl students, aged 20.5 ± 1.7 yrs.	Friends (13.8 %) Doctor (38.7 %) Midwife/Nurse (3.1 %) Family members (22.3 %) Pharmacy (22.0 %) Blogs or internet (1.9 %)	<b>Pharmacological:</b> 63.2% used analgesic: Paracetamol (41.4 %), NSAID (64.2 %) Relaxant (2.0%) Antispasmodic (5.6 %).
De Sanctis V. 2019; personal observations.	Italy	CSS	74 adolescents, aged 16.2 ± 2.1 yrs. with moderate or severe DS were interviewed	Family members (60.8 %); a health professional: 13.5%; internet, social media, friends, magazines (25.6%)	<b>Pharmacological:</b> Paracetamol: 35.1% NSAIDs: 39.1% Antispasmodic: 4.0%. <b>Non-pharmacological:</b> Rest/sleeping: 14.8% Heat application: 6.7%.

*Legend:* **Q:** Questionnaire; **CSS:** Cross-sectional survey; **DS:** dysmenorrhea; **NSAID:** non-steroidal anti-inflammatory drugs; **TCM:** traditional Chinese medicine

conditions that they can handle using different self-care methods (53). This may be also related to the fact that they have more opportunities to obtain “medical” advice from their parents, friends, pharmacist, newspapers or popular magazines and internet. However, few studies have been performed on SM of DS in adolescents living in developed countries. It would be advisable to give more attention to this public health concern and to promote initiatives in order to promote citizen awareness about the risks related to the consumption of drugs without medical consultation, and to educate adolescents and young women to seek professional healthcare when they experience moderate-severe DS.

## Conclusions

SM is an important economic, social and health issue throughout the world. Numerous studies have

been conducted in many countries to investigate SM practice among different groups of the population including adolescents. For minor illnesses and common symptoms, SM often provides a cheap, rapid, and convenient solution, which considerably lessens the burden on the health care system of any country. The pattern of self-treatment varies in different communities and is affected by several factors such as: age, sex, income, expense, self-care orientation, education level, medical knowledge, satisfaction, and perception of disease. The negative aspect of SM is that most people are not aware of the side effects and proper dosage of the drug to be used, or of drug interactions. The World Health Organization found that SM in individuals with lower medication knowledge may result in several potential risks.

The high prevalence rate of self-medication with analgesics is consistent with our observation of “head-

aches”, fever and DS as the most common indications behind SM.

Strategies to control and minimize the risks of SM should involve monitoring systems, promotion of education, spread of sound information, and encouraging a partnership between patients, physicians and pharmacists (54,55). Appropriate counselling and management should be available to female students to help them cope with the challenges of DS. The reluctance of girls to seek medical advice suggests that girls have incomplete or incorrect knowledge about DS and consequently suffer unnecessary pain. Health education about pain due to potential secondary dysmenorrhea is also urgently suggested (56).

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