

# FRAGRANCED HOUSEHOLD AND PERSONAL CARE PRODUCTS: SOCIETAL CONSUMING HABITS AND AWARENESS ABOUT HEALTH EFFECTS

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**Abstract.** Fragranced consumer products, such as cleaning supplies, air fresheners and personal care products, can emit a range of air pollutants and trigger adverse health effects. Some fragrance substances have the potential to cause skin and airway sensitisation. The purpose of the study was to analyse the societal consuming habits and awareness of potential health effects of fragranced household and personal care products. The results revealed that one third of the respondents and their family members had respiratory or skin allergies. The majority of the respondents are consuming both scented and fragrance-free household and personal care products. The majority are aware that fragranced household and personal care products can cause respiratory and skin allergies, though don't know which fragrant substances are estimated as potential skin and respiratory allergens. The majority of the respondents indicated that fragrance-free household and personal care products are available at the markets, one fourth that fragrance-free personal care products are available at pharmacies. The supply of unscented household products is sufficient for more than half of the respondents. The supply of unscented personal care products is insufficient for more than half of the respondents. All respondents are motivated to use only fragrance-free products in case of their own or family member's skin or respiratory allergy. In case of close friend's, study or job colleague's sensitivity the motivation was significantly lower.

**Keywords:** fragrance sensitivity; skin and respiratory allergy; perfume allergens; health effects

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## INTRODUCTION

Around 16% of eczema patients in the European population are sensitised to fragrance ingredients. From studies performed on sectors of the population it can be estimated that the frequency of contact allergy to fragrance ingredients in the general population in Europe is 1-3% (Scientific Committee on Consumer Safety, 2012). One in three adults claim to have experienced health problems caused by fragranced products, whether perfumes, cosmetics, laundry detergents or soap. The fragrance sensitivity can cause migraines, watery eyes and respiratory issues (Steinemann, 2019). The main 26 fragrance allergens are limonene, linalool, citral, eugenol, cinnamal, isoeugenol, citronellol, Hydroxyisohexyl 3-cyclohexene carboxaldehyde, hydroxyl citronellol, cinnamyl alcohol, geraniol, farnesol, coumarin, hexyl cinnamal, butylphenyl methylpropional, alpha-isomethyl ionone, everniafurfuracea lichen extract, everniaprunastri lichen extract, amyl cinnamal, and others. The presence of these fragrances must be indicated in the list of ingredients when it's concentration exceeds the 0.001% in leave-on products and 0.01% in rinse-off products (Scientific Committee on Consumer Safety, 2012). The most common perfume allergens are limonene, linalool, benzyl alcohol, citronellol, cinnamaldehyde, and eugenol. Linalool and limonene were found in more than a half of the fragrance products (Bartsch, Uhde, & Salthammer, 2016). Contact allergy to fragrance ingredients may develop following skin contact with a sufficient amount of these substances, often through the use of cosmetic products. More than 4,300 people from the UK, the US, Australia and Sweden were enrolled in the study which results indicate that 64.3% of asthmatics report one or more types of adverse health effects from fragranced products, including respiratory problems, migraine headaches and asthma attacks. In particular, 41.0% of asthmatics report health problems from air fresheners or deodorizers, 28.9% from scented laundry products coming from a dryer vent, 42.3% from being in a room cleaned with scented products, and 46.2% from being near someone wearing a fragranced product. 35.4% of asthmatics have lost workdays or a job due to fragranced product exposure in the workplace (Steinemann, 2018). State policy, educational and technical assistance interventions are needed to reduce fragrance triggers in public and private and improve the control of skin and respiratory allergies.

**The object of the study:** societal consuming habits of fragranced household and personal care products and awareness about health effects.

**Objective of the study:** to analyse the societal consuming habits of fragranced household and personal care products and awareness about health effects.

**Tasks of the study:**

1. To evaluate rates of respiratory and skin allergic conditions among respondents and their family members.
2. To assess consuming rates of scented and fragrance-free household and personal care products.

3. To evaluate awareness about fragrances known as skin and respiratory allergens and health effects they can cause.
4. To investigate the availability of fragrance-free household and personal care products.
5. To identify the motivation to use fragrance-free household and personal care products.

## THE RESEARCH METHOD

The research was quantitative. The questionnaire was prepared after analysing scientific literature, in order to collect data about respondent’s household chemistry and personal care product’s consuming habits in Lithuania and to assess the awareness about potential hazards to health. It should be noted that the topic have not been investigated in Lithuania, so the questionnaire was mainly based on findings and results of the foreign authors. The survey was conducted in May - September 2022. The survey involved 118 respondents, adult people. Respondents were randomly selected and interviewed anonymously on Lithuanian Facebook groupes. 118 questionnaires were collected, 2 were excluded as filled not properly. The data were obtained and analysed from 116 questionnaires. The data were evaluated and processed using the Microsoft Office Excel program.

## THE RESULTS AND DISCUSSION

The data of the survey were obtained and analysed from 116 questionnaires. 87 respondents were female, 29 were male. The majority of respondents ( 75%) were females. More than half of respondents (52%) were young adults ( see Figure 1):

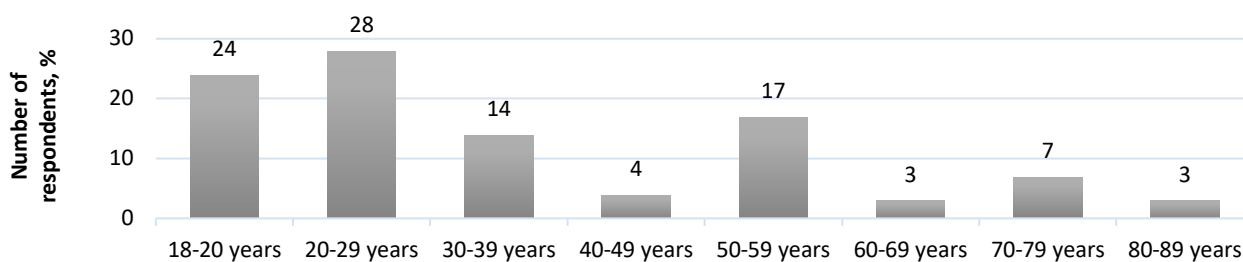


Figure 1. The age

Analysing educational attainment the results revealed that less than half of respondents had master or bachelor degree (see Figure 2):

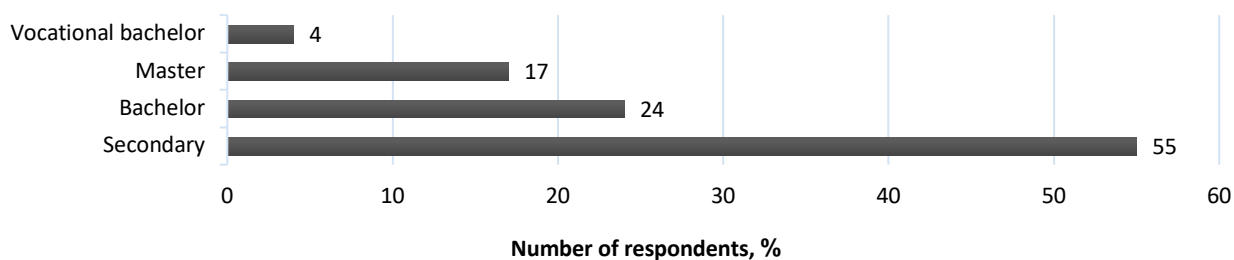


Figure 2. The education

As more than half of the respondents were young people, almost half were students, one third were employees (see Figure 3):



Figure 3. **The occupation**

Fragrance contact allergy prevention is possible if the environment is modified by reducing concentrations of allergens, then disease frequency and severity will decrease. Ingredient information is a cornerstone in the prevention of allergic contact dermatitis, as knowledge about the allergens which a patient has been exposed to is crucial for including the right substances in the allergy test, and for subsequent information on avoidance of re-exposure. Skin and respiratory allergy can be detected by skin patch testing, when European series patch tests, particularly, Fragrance Mix I or Fragrance Mix II are used. Fragrance Mix I contains amyl cinnamal, cinnamyl alcohol, cinnamal, eugenol, geraniol, hydroxycitronellal, isoeugenol, Oak moss natural extract, sorbitan sesquioleate. Fragrance Mix II contains citronellol, citral, coumarin, hydroxyisohexyl 3-cyclohexene carboxaldehyde (HICC), Farnesol, alpha-Hexyl-cinnamic aldehyde (Scientific Committee on Consumer Safety, 2012). The European Dermato-Epidemiology Network (EDEN) consortium published the results of a large epidemiological survey of the general population in six European regions. A random sample of individuals was patch tested to Fragrance Mix I and II. Sensitivity rates of 2.6% for FM I and 1.9% for FM II were found (Diepgen et al., 2015). Up to 85% of fragrance-allergic patients may be detected using Fragrance Mix I; 32% of patients undetected by Mix I are positive to Mix II, indicating the need for both mixes (Arribas, Soro, & Silvestre, 2013). It was reported that 4.7% of allergic contact dermatitis patients in Lithuania were sensitive to Fragrance Mix I (Linauskienė, Malinauskienė, & Blažienė, 2017). Patch tests for cosmetic ingredients were positive in (49.4%) patients, with sensitivity to methylisothiazolinone (25.0%), **Myroxylon Pereirae** balsam (23.8%), formaldehyde 2.0 % aq. (23.8%), methylchloroisothiazolinone and MI mixture (21.4%) and fragrance mix I (16.7%). In Lithuania 10 (22.2%) patients out of 45 tested with their own cosmetics were positive. Half the patients with suspected allergic contact dermatitis had contact sensitization to cosmetic ingredients, particularly preservatives and fragrances. While rarely positive, patch testing with patients' own cosmetics is of the highest clinical relevance if positive (Malinauskienė et al., 2020). Fragrances may cause or exacerbate allergic rhinitis (Wang, Wang, & Yu, 2018).

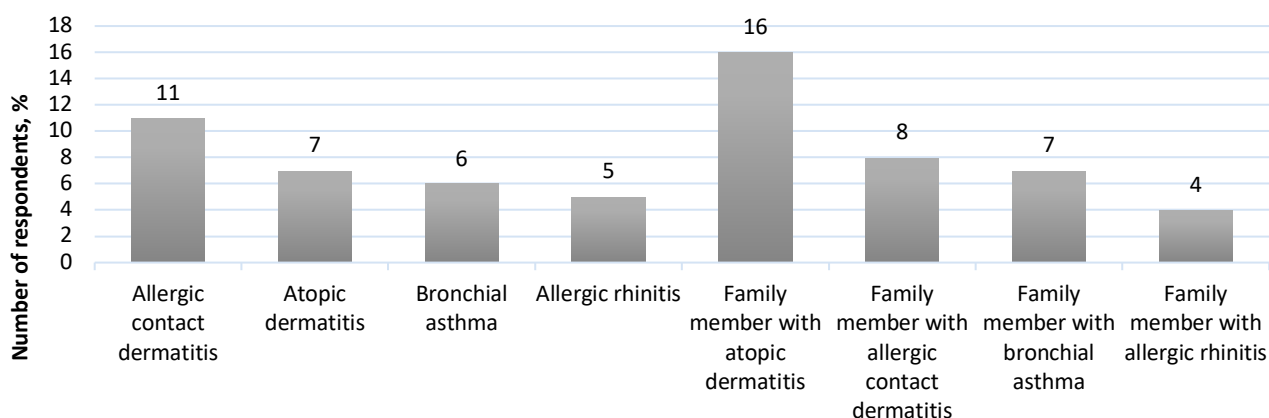


Figure 4. **The morbidity**

Individuals with perfume contact allergy and/or hand eczema, as opposed to those without, have more frequent and more severe eye or airway symptoms after exposure to volatile fragrance products. Having hand eczema has the greatest impact on reporting eye and airway symptoms elicited by fragrance products (Elberling et al., 2004). Assessing the morbidity, associated with skin and respiratory allergy of the respondents and their family members revealed that one third of participants and their family members had skin or respiratory allergies, allergic contact dermatitis (eczema) was more common for respondents and atopic

dermatitis was more common for their family members. However the potential sensitivity to fragrances has not been clinically tested or proven (see Fig. 4).

Many odours and fragrances are so commonplace that people encounter them every day, using air fresheners, chlorine and bleach, cleaning supplies, laundry products, insecticides, personal care products (colognes and perfumes, deodorants, nail polish and remover, feminine scented hygiene pads, hairstyle products) and scented candles (Bartsch et al., 2016). The results of the study revealed that one to seven of respondents are consuming only scented household chemicals, one to four of respondents reported using only odourless household chemicals and more than half of respondents use both scented and odourless household chemistry. 7% of respondents use only odourless cosmetics and hygiene products. The majority of respondents consume both scented and odourless personal care products (see Figure 5).

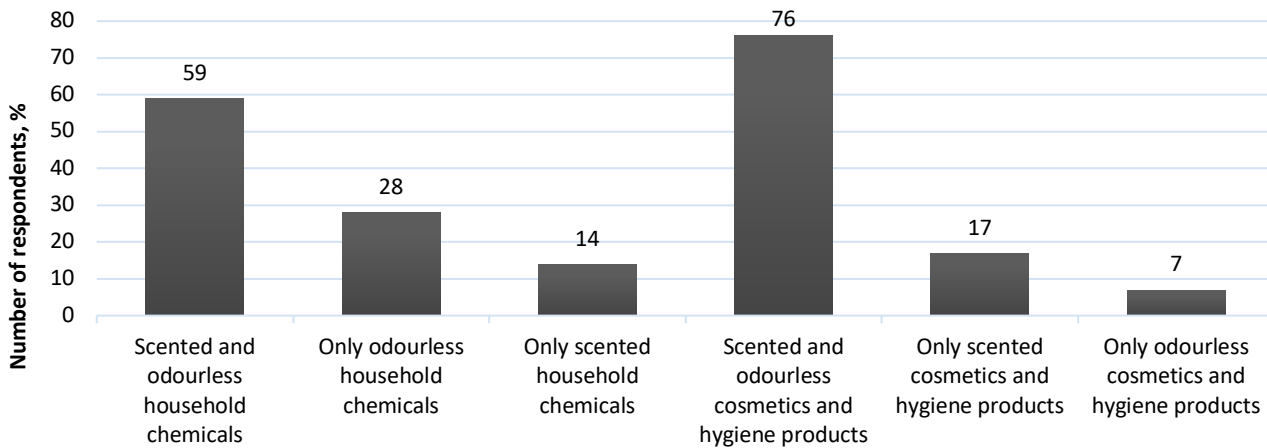


Figure 5. The consumption habits

It was estimated that 41.0% of asthmatics suffered health problems from air fresheners or deodorizers, 28.9% from scented laundry products coming from a dryer vent, 42.3% from being in a room cleaned with scented products, and 46.2% from being near someone wearing a fragranced product (Steinemann, Wheeler, & Larcombe, 2018). The limitation of our study is that this research relied on self-reported data. Though the detail guide was supplied in the survey, it is difficult to expect all participants reported data consistently. Further analysis of consumption habits in Lithuania figured out that the majority of respondents are wearing perfume, one to four use a lot of perfume, less than half use air fresheners and scented candles at home, more than half use car air fresheners. Less than half of respondents are aware that air fresheners in public may affect allergic people, but the majority of respondents accept air fresheners in public spaces (see Figure 6):

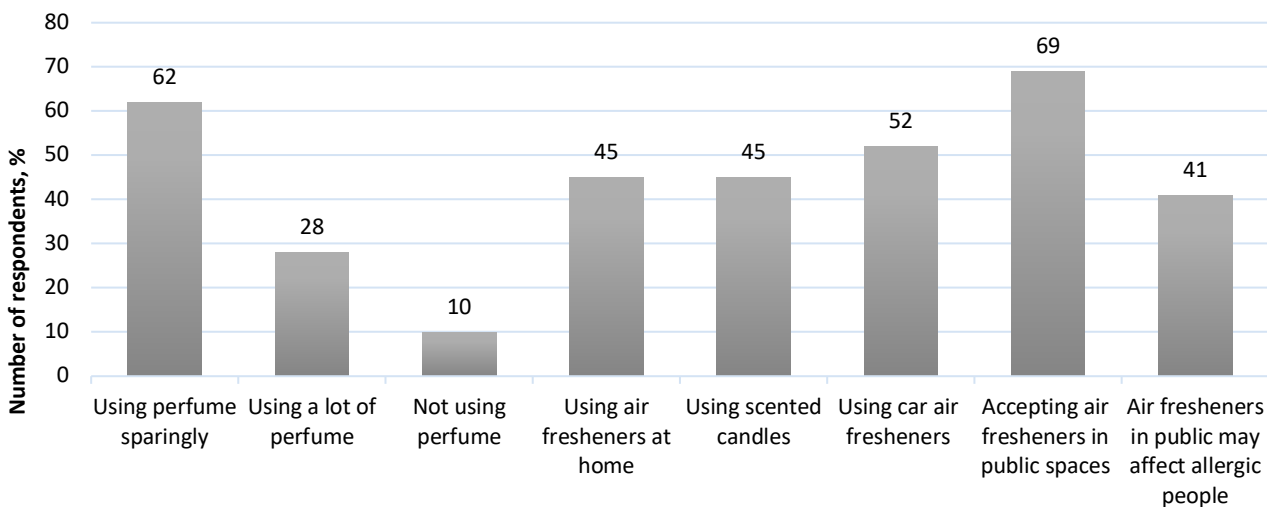


Figure 6. The consumption of home and personal fragrances

Fragrances are volatile and therefore, in addition to skin exposure, a perfume also exposes the eyes and naso-respiratory tract. It is estimated that 2–4% of the adult population is affected by respiratory or eye symptoms by such an exposure (Elberling et al., 2005). It is known that exposure to fragrances may cause or

exacerbate pre-existing asthma (Weinberg, Flattery, & Harrison, 2017). It was estimated that 64.3% of asthmatics report one or more types of adverse health effects from fragranced products, including respiratory problems (43.3%), migraine headaches (28.2%), and (27.9%) asthma attacks (Steinemann, 2018). The results of the survey revealed that the majority of respondents are aware about potential health effects of fragranced household and personal care products (see Figure 7):

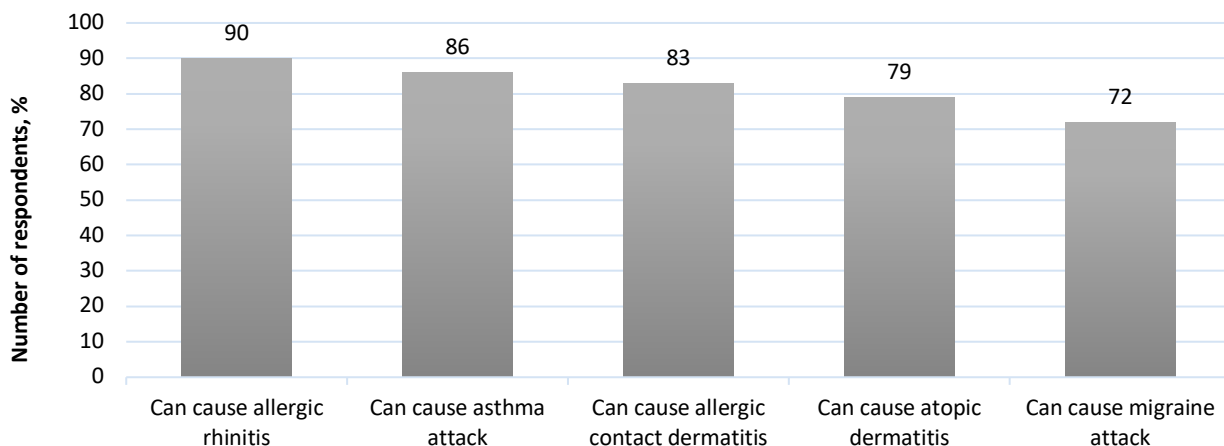


Figure 7. The potential fragrance health effects

Fragrances are ubiquitous in indoor air. They are emitted from numerous consumer and cleaning products, the most common being limonene, alpha-pinene, beta-pinene, and other terpenes (Steinemann, 2015). Benzyl alcohol, cinnamaldehyde, citronellol, eugenol, linalool and limonene were the prevalently detected allergens. Particularly linalool and limonene were observed in over 50% of the products. In addition, eugenol appeared to be one of the most frequently detected compounds in trace-level concentrations in the candle emissions (Bartsch et al., 2016). It is estimated that coumarin, citral, cinammal, eugenol, geraniol are main contact allergens and can cause skin allergic reactions. Information on the presence of all these substances in cosmetic products is important in order to enable aimed testing of patients with contact dermatitis and to diagnose fragrance allergy without delay. This information is important to the sensitised consumers as it will enable them to avoid cosmetic products, which they may not tolerate (Scientific Committee on Consumer Safety, 2012). Linalool and linolyl can cause respiratory allergic reaction (Hagvall & Christensson, 2016). The partial skin exposure to respiratory allergens can also lead to sensitization of the respiratory tract, so skin contact with such allergens can stimulate the quality of immune response needed for efficient sensitization of the airways (Wang et al., 2018). The results of the study indicate that the majority of participants are unaware about fragrances most commonly causing skin and respiratory allergy (see Figure 8).

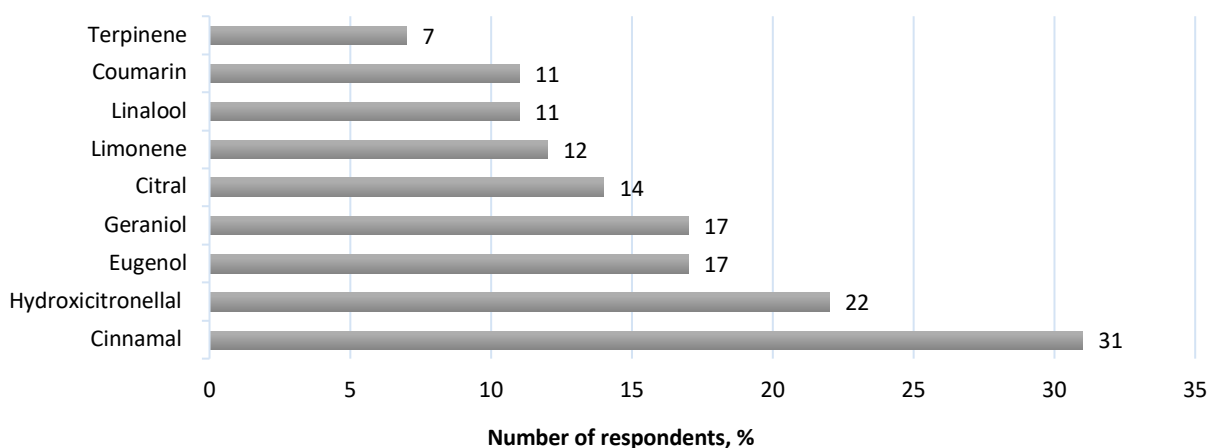


Figure 8. The potential skin and respiratory allergens

Consuming of fragrance-free household and personal care products is closely related to the availability and assortment. The majority of respondents reported that odourless household chemicals are available at the markets. More than half of respondents stated that the supply and assortment are sufficient. The majority of respondents reported that fragrance-free personal care products are available at the markets,

one to four indicated that these products are available at farmacies. More than half of respondents reported that odourless cosmetic and hygiene product’s assortment and supply is insufficient (see Figure 9).

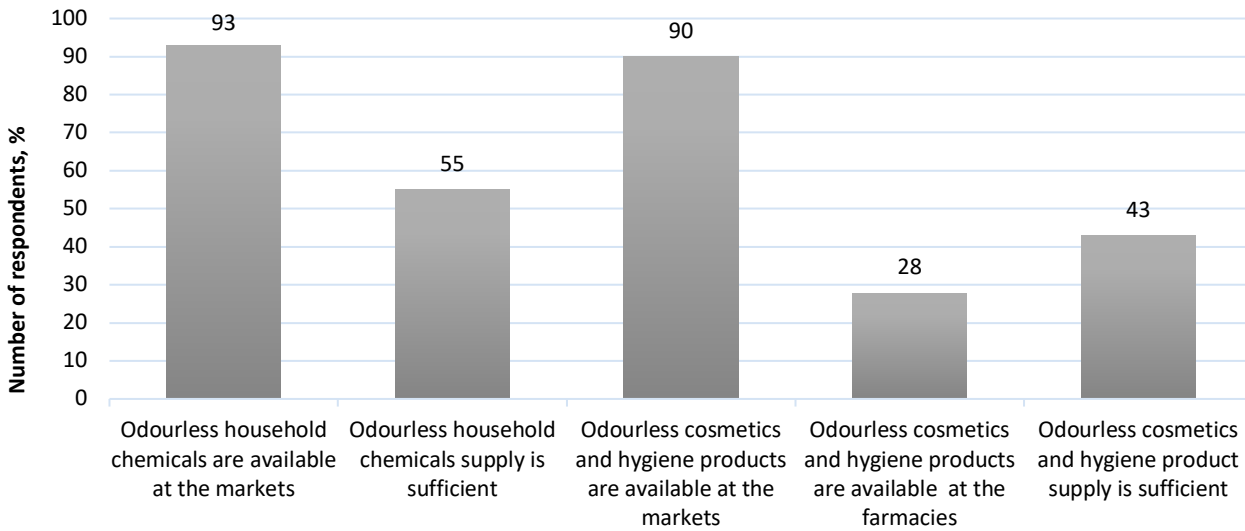


Figure 9. The availability of odourless products

Fragrance-free policies receive a strong majority of support in USA. Among asthmatics, 66.2% would be supportive of a fragrance-free policy in the workplace. Among non-asthmatics, 48.3% would support a fragrance-free workplace and among the general population, 53.1% would support a fragrance-free workplace. Thus, regardless of population, fragrance-free workplaces receive more than twice as many in support as not (Stainemann, 2018). The respondents of this study were of different age, education, social status or morbidity, but their motivation to use fragrance-free products was great. All respondents in Lithuania indicated that in case of skin or respiratory fragrance sensitivity of their own or family member they should use fragrance-free household and personal care products, two to three respondents should use fragrance-free products to protect their fragrance-sensitive friend or study, job colleague (see Figure 10):

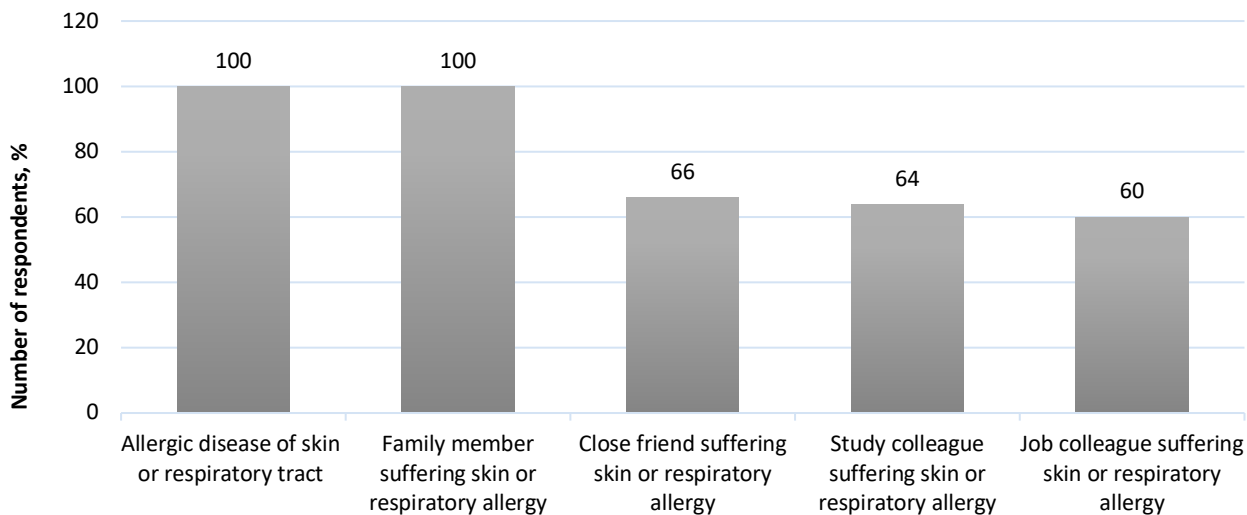


Figure 10. The motivation to use fragrance-free products

Due to COVID-19 pandemics and numerous lockdowns patients suffering skin and respiratory allergies had and still have difficulties to consult secondary and tertiary level dermatologists and allergists, to test and detect fragrance allergies and are unaware about the particular triggers of their allergic contact dermatitis, rhinitis, atopic dermatitis (eczema) or asthma. Fragrance sensitivity is a healthcare epidemic of which we don’t yet know the scale. Understanding why these products are associated with a range of health problems is a critical topic that requires further research. The main aim of public health is the primary prevention of disease in population. Allergic skin and respiratory conditions have a significant impact on quality of life, including effects on fitness for work. Moreover, it is a common phenomenon and therefore

prevention or reduction of exposure to potential fragrance allergens must be an objective of effective public health measures, such as prohibition by regulatory measures or other means; restriction by regulatory measures or other means of the maximum permissible concentration of a substance; labelling so that the consumer may make an informed choice to avoid exposure to a particular ingredient.

## CONCLUSIONS

1. One third of the respondents or their family members had respiratory and skin allergies.
2. The majority of the respondents are consuming both scented and fragrance-free household and personal care products.
3. The majority of the respondents are aware that fragranced household and personal care products can cause respiratory and skin allergies, though don't know which fragrant substances are estimated as potential skin and respiratory allergens.
4. The majority of the respondents indicated that fragrance-free household and personal care products are available at the markets, one fourth that fragrance-free personal care products are available at pharmacies. The supply of unscented household products is sufficient for more than half of the respondents. The supply of unscented personal care products is insufficient for more than half of the respondents.
5. All respondents are motivated to use only fragrance-free products in case of their own or family member's allergic skin or respiratory allergy. In case of close friend's, study or job colleague's sensitivity respondent's motivation was significantly lower.

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