

Risk factor for children in the pandemic: the use of cleaning products at home

Risikofaktor für Kinder in der Pandemie: die Verwendung von Reinigungsmitteln zu Hause

Abstract

Background: Intensified cleaning protocols to maintain a safe environment during the pandemic caused an increase in the use of disinfectants. The use of cleaning products in safer conditions by mothers is one of the important practices that will reduce the risk of household accidents.

Objective: The aim of research was determine the practices of mothers about the safe use of cleaning and disinfectant products in the COVID-19.

Methods: Data were collected by online survey among 255 mothers of the children 0-6 age from April and July 2021. Percentage, mean and chi-square tests were used to evaluate the data.

Results: It was reported that the amount of cleaning product usage (69%) increased significantly, 26.3% of the mothers store the products in a locked cabinet and 29.4% use the product in the recommended amount. It was detected 28.7% of the mothers use disinfectants close to children. It was detected that 37.6% of the families were exposed to cleaning and disinfectant products. There was not significant difference between exposure situations and maternal age, education, employment status.

Conclusions: It can be suggested that health workers should organize screening and training programs for the community about safe cleaning and disinfection practices.

Keywords: Child, Disinfectant, Mother, Pandemic, Safe use

Zusammenfassung

Zielsetzung: Intensivierte Reinigungsprotokolle zur Aufrechterhaltung einer sicheren Umgebung während der Pandemie führten zu einem Anstieg des Einsatzes von Desinfektionsmitteln. Die Verwendung von Reinigungsmitteln unter sichereren Bedingungen durch Mütter ist eine der wichtigen Praktiken, die das Risiko von Haushaltsunfällen verringern. Das Ziel der Forschung bestand darin, die Praktiken von Müttern hinsichtlich der sicheren Verwendung von Reinigungs- und Desinfektionsprodukten bei der COVID-19-Erkrankung zu ermitteln.

Methode: Die Daten wurden per Online-Umfrage unter 255 Müttern der Kinder im Alter von 0 bis 6 Jahren im April und Juli 2021 erhoben. Zur Auswertung der Daten wurden Prozent-, Mittelwert- und Chi-Quadrat-Tests verwendet.

Ergebnisse: Es wurde berichtet, dass die Menge der verwendeten Reinigungsprodukte deutlich zunahm (69 %), 26,3 % der Mütter lagerten die Produkte in einem verschlossenen Schrank und 29,4 % verwendeten das Produkt in der empfohlenen Menge. Es wurde festgestellt, dass 28,7 % der Mütter Desinfektionsmittel in der Nähe ihrer Kinder verwenden. Es wurde festgestellt, dass 37,6 % der Familien Reinigungs- und Desinfektionsmitteln ausgesetzt waren. Es gab keinen signifikanten

Emine Güdek
Seferoglu¹
Ümran Çevik Güner²

1 Kütahya Health Science
University, Faculty of Health
Science, Kütahya, Turkey

2 Gaziosmanpaşa University,
Faculty of Health Science,
Tokat, Turkey

Unterschied zwischen den Expositionssituationen und dem Alter, der Bildung und dem Beschäftigungsstatus der Mutter.

Schlussfolgerungen: Es kann vorgeschlagen werden, dass Gesundheitspersonal Screening- und Schulungsprogramme für die Gemeinde zu sicheren Reinigungs- und Desinfektionspraktiken organisieren sollte.

Schlüsselwörter: Kind, Desinfektionsmittel, Mutter, Pandemie, sichere Verwendung

Introduction

Since the home and surrounding environment are basic living area for the children between 0 and 6 years of age, home accidents are particularly important for this age group. Home accidents are ignored unless they cause an injury that requires intervention in children. However, frequent minor injuries may also address serious injuries. Majority of home accidents is preventable. Therefore, it is important to reduce the risk factors that lead to accidents in the home environment [1].

It was determined that the coronavirus disease (COVID-19) caused by the SARS-CoV-2 virus may be transmitted through droplets and by touching the mouth, nose and eyes after contact with contaminated surfaces [2], [3]. Proper and regular cleaning and frequent disinfecting of objects and surfaces in houses and community environments are recommended in order to reduce the risk of COVID-19 and other viral respiratory diseases [4]. Within this context, intensified cleaning protocols to maintain a safe environment during the pandemic caused an increase in the use of disinfectants [5], [6]. However, inadequate or excessive use of these products cause potential health risks for the users. A significant increase in calls to poison centers about exposure to cleaners and disinfectants has been reported since the onset of the COVID-19 pandemic. The Netherlands National Venome Information Center (NVIC) announced that disinfectant-induced poisoning events occurred approximately 5 times more than normal periods during the COVID-19 pandemic period, and poisoning cases among children between 0 and 4 years of age increased significantly. The National Poison Data System (NPDS) in the United States reported that the rate of calls for exposure to cleaners and disinfectants between January and March, 2020 increased by 20.4% when compared to the same period of the previous year. The NPDS data do not provide information showing a precise association between exposures and cleanup efforts during the COVID-19 pandemic; however, they do show a clear time relation with the increased use of cleaning and disinfectants [7]. The Canadian Poison Information Monitoring Center (CPIMC) reports that calls for selected cleaning and disinfectant products increased by 400% in 2020 when compared to the previous year, with the most calls (42%) related to the inappropriate use of bleach [8]. Li et al. found in their study that especially 3-year-old children, who have more hand contact and mouth movements, have consistently higher exposure than other age groups as a result of contact with disinfected surfaces [5]. The CDC has published a guideline with

general recommendations for routine cleaning and disinfection of homes during the COVID-19 [4]. Limited knowledge exists about the use or abuse of cleaning products during the COVID-19 pandemic [8]. The use of cleaning products in safer conditions by mothers is one of the important practices that will reduce the risk of household accidents (i.e. poisoning, burns). Nurses are healthcare professionals who can advise on the adequate use of cleaning and disinfection products and the frequency of cleaning and disinfection at home in order to protect the health of children, families and the community. Accordingly, it is important for nurses to determine the practices of women in the safe use and storage of cleaning and disinfectant products at home and to correct their faulty practices. There is limited number of studies about this subject, and the association with the pediatric health was not investigated. The research was planned to determine the practices of mothers of the children between 0 and 6 years of age about the safe use of cleaning and disinfectant products in the home environment during the COVID-19.

Materials and methods

Design

This is a cross-sectional and descriptive study.

Sample

The universe of the study consisted of mothers of the children between 0 and 6 years of age living in different regions of Turkey, and the sample of the study consisted of 255 mothers who volunteered to participate in the study and whose questionnaires were sent online using the snowball sampling method. It was calculated in the power analysis that 234 mothers could be included when the effect size was taken as 0.19 according to the accident rates seen in children in the literature [9], [10] the significance level was taken as 0.05, and the power size was taken as 0.85. The inclusion criteria include having a child between 0 and 6 years of age, being literate, and accepting to participate into the study. Mothers who have youngest children at and above 7 years of age were excluded.

Measures

The question form for mothers' use of home cleaning and disinfectant products during COVID-19 pandemic were used in the research.

The Question Form for Mothers' Use Of Home Cleaning And Disinfectant Products During COVID-19 Pandemic: This form which was prepared by the researchers in line with the literature [4] consists of 40 questions including five questions about the socio-demographic characteristics of the participants such as age, education, employment status, number of children, 35 questions including information sources during the COVID-19 pandemic, exposure situations, and the use of cleaning and disinfectant products at home.

Data Collection

The data of the study were collected between April and July 2021. The data collection form was transferred to the online environment through Google Forms and then the link (URL) required to access the form was sent to the people who met the criteria determined for the participants. The purpose and scope of the research were explained, the information that the rights and identities of the participants would be protected by keeping them confidential was shared, the instruction regarding the implementation process was presented, and it was stated that they could contact the researcher for questions or problems they might encounter during the application. The research complied with the Declaration of Helsinki and permission was obtained from the Ethics Committee of a university (No. 2021/04-13) for the research. Online consent was obtained from the parents with an information document stating the nature of the study, the confidentiality issues, and the voluntary participation.

Data Analysis

The data coding and evaluation was done in the computer environment with the SPSS 22 package program. Percentage, mean and chi-square tests were used to evaluate the data. Any p value below 0.05 ($p < 0.05$) was accepted as statistically significant.

Results

Demographic characteristics of the mothers was presented in Table 1. It was determined that 45.5% of the mothers participating in the study were between 31 and 40 years of age, 75.8% were university graduates, 61.7% were employed, and 80% had only one child.

Table 1: Sociodemographic characteristics of mothers

Sociodemographic characteristics	N	%
Age		
Between 18 and 30 years of age	84	32.9
31–40 years	116	45.5
41 years and older	55	21.6
Education Level		
Elementary School	16	6.3
Middle School	26	10.2
High-school	19	7.4
University	194	75.8
Employment status		
Employed	157	61.7
Unemployed	98	38.3
Number of children living in the house		
Single child	204	80.0
Two children and more	51	20.0

The information resources of the mothers about cleaning products are provided in Figure 1. It is seen that 67.8% of the mothers obtained information through internet, radio, newspaper, 67.5% of them were informed through television, 57.3% through social media, and 48.6% through health workers.

The practices of mothers about storage of cleaning products at home are given in Table 2. While 87.5% of the mothers commonly store their cleaning products in the bathroom and 71.0% in the kitchen, only a little more than a quarter (26.3%) store the products in a locked cabinet, almost all mothers prefer cleaning products that are almost all sold in closed packages (99.2%), keep such products away from foods (98.0%), store these products by closing the caps (97.3%); 9.8% of them stated that they filled the cleaning products in other containers, only a little more than half (57.6%) usually ventilate the area where they store their cleaning products.

Cleaning and disinfection practices of mothers during the pandemic are given in Table 3. Among the mothers, 65.1% stated that there was an increase in the frequency of cleaning and disinfection when compared to the pre-pandemic period, 56.5% stated that they perform cleaning 2 to 3 times a week and 19.2% clean every day; 69.0% stated that there was an increase in the amount of cleaning products used. Furthermore, two questions were asked about the quantity of the cleaning products used over the bleach sample, 64.7% of them said that they added bleach to every five liters of water while cleaning surfaces touched frequently; however, 58.0% of them said that they added bleach to each liter of water while cleaning the toilet and bathroom with random quantity. The cleaning and disinfectant products that are commonly used at home during the pandemic are given in Figure 2. It was determined that the most common products were bleach (96.9%), degreaser (89.8%), vinegar (86.3%), and sink and toilet cleaners (85.1%).

The surfaces that are commonly cleaned at home during the pandemic are provided in Figure 3. Mothers stated that the most frequently cleaned surfaces were door

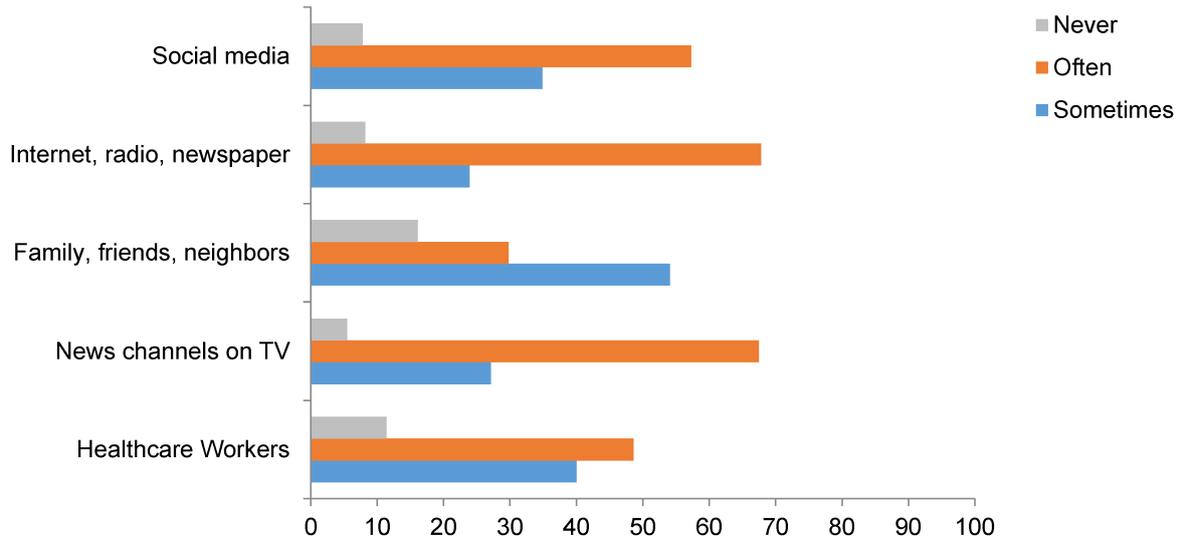


Figure 1: The information resources of the mothers about cleaning products

Table 2: The practices about storage of cleaning products at home

	n	%
The area where cleaning products are stored at home		
Bathroom	223	87.5
Kitchen	181	71.0
WC	107	42.0
Storage room	52	20.4
hallway/corridor	27	10.6
Balcony	20	7.8
The place where cleaning products are put		
On an unprotected area or ground	13	5.0
On a shelf at least 1.5 meters above the ground	80	31.4
On a shelf more than 1.5 meters above the ground	95	37.3
In a locked cabinet	67	26.3
Cleaning products preferred at home		
Cleaning products sold in wholesalers	2	0.8
Cleaning products sold in closed packages	253	99.2
Filling of cleaning products into other containers		
Never	230	90.2
Sometimes	22	8.6
Mostly	3	1.2
Keeping cleaning products away from the foods		
Yes	250	98.0
No	5	2.0
Keeping caps of the cleaning products open		
Yes	7	2.7
No	248	97.3
Ventilating the storage area of the cleaning products frequently		
Yes	147	57.6
No	108	42.4

Table 3: Cleaning and disinfection practices of mothers during the pandemic

	n	%
The change in frequency of cleaning and disinfection when compared to the period before the pandemic		
Increased	166	65.1
Decreased	6	2.4
No change	83	32.5
The prevalence of cleaning and disinfection during the pandemic		
Everyday	49	19.2
2 to 3 times in a week	144	56.5
Once a week	54	21.2
Once or more in a month	8	3.1
The change in the amount of product use during cleaning and disinfection during the pandemic		
Increased	176	69.0
Decreased	1	0.4
No change	78	30.6
The amount of bleach added to every five liters of water during cleaning of frequently touched surfaces		
Half of a tea glass	46	18.0
One water glass	21	8.2
Eyeball	165	64.7
I pour the bleach directly onto the surface or a fabric	23	9.1
The amount of bleach added to each liter of water ' during cleaning of the toilet, bathroom, toilet bowl		
Half of a tea glass	42	16.5
One water glass	8	3.1
Eyeball	148	58.0
I pour the bleach directly onto the surface or a fabric	57	22.4

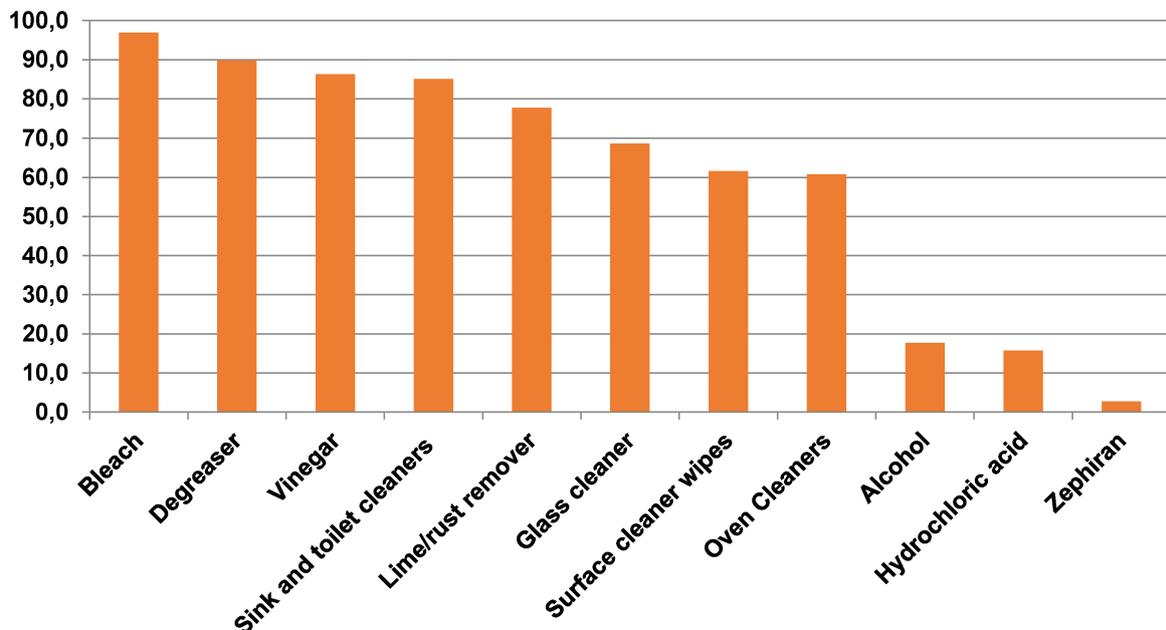


Figure 2: The cleaning and disinfectant products that are commonly used at home during the pandemic

handles (89.8%), faucets (78.4%), toilet seats, flush handles (76.5%) and mobile phones (62.7%).

The safe use of cleaning and disinfectant products by mothers during the pandemic is provided in Table 4. It was detected that only 38.4% of the mothers read the

instructions for use on the cleaning and disinfectant product, 59.6% ventilate the environment before and after using the cleaning and disinfectant product, 29.4% use the product in the recommended amount, 21.2% wear gloves during the procedure, and 2.0% use goggles.

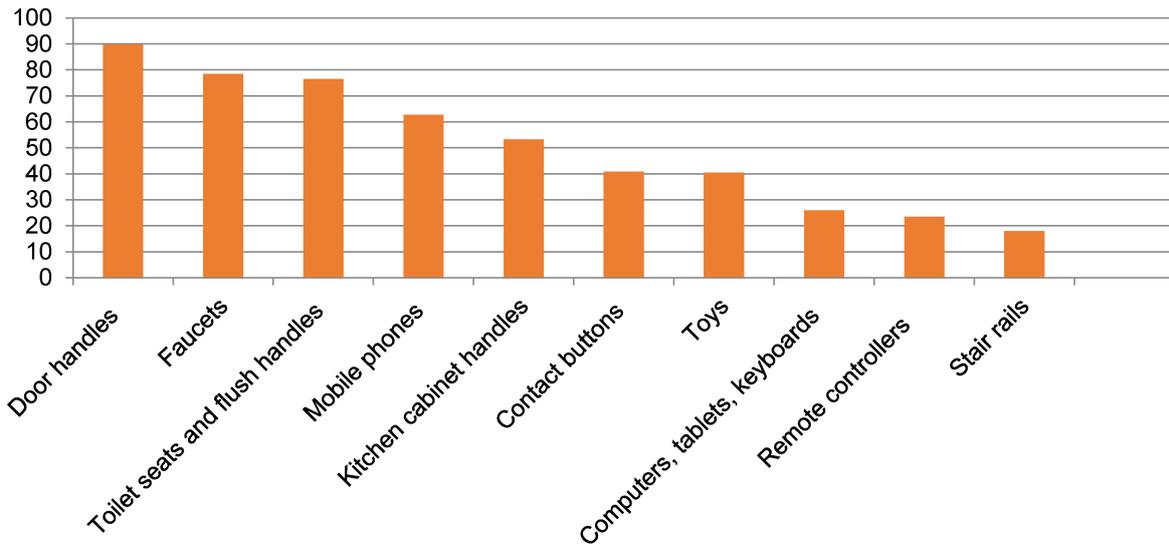


Figure 3: The surfaces that are commonly cleaned at home during the pandemic

Table 4: Safe use of home cleaning and disinfectant products

		Never	Sometimes	Always
1.	Reading the instructions for use on the cleaning and disinfectant product	12.9	48.6	38.4
2.	Ventilating the environment before and after the use of the cleaning and disinfectant product	7.5	32.9	59.6
3.	Wearing gloves when using the cleaning and disinfectant product	31.0	47.8	21.2
4.	Wearing goggles while using a cleaning and disinfectant product	84.3	13.7	2.0
5.	Using the cleaning and disinfectant product in the amount in the instructions for use	22.0	48.6	29.4
6.	Mixing cleaning and disinfectant products with each other	70.6	23.5	5.9
7.	Using hot water when preparing disinfectant water	46.3	41.2	12.5
8.	Keeping the disinfectant on the surface for at least one minute	9.8	50.2	40.0
9.	Mixing bleach with ammonia, vinegar, or another cleaner	76.9	16.5	6.7
10.	Cleaning dirty surfaces by wiping with a fabric covered with soap/detergent, then disinfecting with alcohol (at least 70%) or bleach	46.7	40.0	13.3
11.	Using the bleach prepared within 24 hours	31.0	22.7	46.3
12.	Using disinfectants close to the children	71.4	21.2	7.5
13.	Ensuring that children and adults with asthma are in another room during the use of disinfectants	25.1	19.6	55.3
14.	Washing the fruits, vegetables or other food products with bleach	91.4	5.5	3.1
15.	Using household cleaning and disinfectant products for hand and skin cleaning	61.2	20.8	18.0
16.	Inhaling the vapor of household cleaners such as bleach	75.7	20.8	3.5
17.	Drinking or gargling with a household cleaner such as water with soap, alcohol and bleach	94.9	3.9	1.2
18.	Washing hands with soap and water after using household cleaning products	13.3	21.6	65.1

Mothers expressed that they use cleaning and disinfectant products by mixing with each other during cleaning (sometimes by 23.5%; always by 5.9%), they use hot water (sometimes by 41.2%; always by 12.5%), 40.0% while

preparing the disinfected water, they leave the disinfectant on the surface for at least one minute, mix the bleach with vinegar ammonia or another cleaning product (sometimes by 16.5%; always by 6.7%), 46.7% of them

do not clean the dirty surfaces with detergent before disinfecting, and 31% stated that they do not use the prepared bleach within the recommended time. Furthermore, 28.7% of the mothers stated that they use disinfectants close to their children, and 44.7% stated that it is not necessary to remove the asthmatic child or adult from the environment during cleaning. In this study, 38.8% of the mothers used these products for hand and skin cleaning, 5.1% used them for mouthwash, and 8.6% used them for food cleaning such as adding bleach to the washing water of fruits and vegetables.

The situation of exposure to cleaning and disinfectant products at home during the pandemic is given in Table 5. Exposure to cleaning and disinfection products at home during the pandemic is 37.6%. It was also observed with the results that 80.2% of the mothers were exposed; however, one of every 8 children (0 to 2 years: 5.2%; 3 to 6 years: 7.3%) is exposed. It has been determined that approximately half of the exposure (48.9%) is caused by skin contact, and 36.5% by inhalation of the product.

The association between exposure to cleaning and disinfectant products and sociodemographic characteristics of the mothers is given in Table 6. There was not any statistically significant difference between exposure situations and maternal age, education, employment status and the number of living children.

Discussion

The present study was conducted to determine the practices of mothers of the children between 0 and 6 years of age about the safe use of cleaning and disinfectant products in the home environment during the COVID-19 pandemic. It was reported in the studies on referrals to pediatric emergency services in our country that the most common poisonings were caused by caustic/corrosive substances, and most of these cases were caused by products used in household cleaning [10], [11], [12]. Since household cleaning products are not stored in safe conditions, this plays an important role in child poisoning cases. It was detected in our study that most of the mothers keep the cleaning and disinfectant products in the kitchen and bathroom, at a reachable place by the children, unprotected or on the ground, uncompliant storage conditions for safety; however, limited number of mothers keep them in locked cabinets. The reason for this behavior of mothers may be that they want to access these products more easily while cleaning. Furthermore, almost half of the mothers reported that they do not ventilate the areas where they store their products. The review of the studies on the storage conditions of cleaning products at home revealed that women have similar behaviors [13], [14], [15], [16], [17], [18]. Since almost all of the mothers in our study reported that they keep cleaning products away from food is a positive finding in reducing the contact of products with food; however, the preference of keeping these products in the kitchen facilitates the access of children and suggests

that mothers do not have sufficient knowledge about the behaviors leading to the exposure.

Cleaning products should be stored in their own packages. In this study, 9.8% of the mothers stated that they transferred their cleaning products to different containers such as bottles and glasses. However, this may cause mixing of cleaning products with drinks and food, and poisoning of small children in particular. Silva et al. [16] and Gollu et al. [18] respectively reported in their studies that 12% and 31.3% of the participants do not store cleaning products in original containers. It may be suggested in consideration of the studies that this inaccurate practice still continues among women with a decrease when compared to previous years [13], [14], [15], [16], [17], [18], [19].

The fast transmission of the pandemic and causing death increase the health concerns of individuals, cause them to store cleaning materials and take more precautions regarding hygiene, cleaning and contact [20]. The CDC recommends that disinfection is not necessary; however, frequently touched surfaces are cleaned and disinfected every few days, unless there is a sick or positive individual at home for COVID-19 in the last 24 hours [3]. In this study, 65.1% of the mothers reported that they increased the frequency of cleaning and disinfection at home during the COVID-19 pandemic. However, mothers stated that they also increased the amount of cleaning and disinfection products used during this process. Findings of the studies conducted by Koksoy Vayisoglu & Oncu [21], Gharpura et al. [22], and Zheng et al. [6] are in line with our findings. Inaccurate, unnecessary or excessive use of cleaning agents and disinfectants may cause damage for human health due to skin, eye and respiratory tract problems, family economy and the ecosystem due to the increase in the concentration of these chemicals in wastewater [23], [24], [25].

The CDC states that disinfection of objects and surfaces that are commonly touched after cleaning is important to reduce the risk of COVID-19. In our study, almost half of the mothers stated that they did not clean the dirty surfaces with a detergent before disinfection, and this indicates that they did not perform a proper disinfection process. Furthermore, since more than half of the mothers do not consider electronic items such as toys, electric switches, keyboards, remote controls which are frequently used during the pandemic as surfaces that need to be cleaned and disinfected frequently, this may cause virus transmission through these objects. Similarly, it was detected in a study conducted in Iran during the pandemic period that most of the participants have usually disinfected surfaces such as mobile phones, kitchen, bathroom, and toilet; however, this rate was limited for computers [25].

It was detected in our study that approximately two of every five households were exposed to cleaning and disinfectant products during the pandemic, and mothers as well as their children at and below six years of age were most frequently exposed in these households. It was reported that exposure is most common by skin contact

Table 5: The situation of exposure to cleaning and disinfectant products at home during the pandemic

	n	%
Exposure situation		
Yes	96	37.6
No	159	62.4
Individuals exposed		
Mother	77	80.2
Child between 0 and 2 years of age	5	5.2
Child between 3 and 6 years of age	7	7.3
Family members at and over 65 years of age	7	7.3
Exposure type		
Swallowing the product	6	6.3
Inhaling the product	35	36.5
Skin contact	47	48.9
Eye splash	8	8.3

Table 6: The exposure situation of mothers to cleaning and disinfectant products

	Exposure situation				X ² /p
	Yes		No		
	n	%	n	%	
Age					
Between 18 and 30 years of age.	35	41.7	49	58.3	X ² =1.646 p=0.439
31–40 years	44	37.9	72	62.1	
41 years and older	17	30.9	38	69.1	
Educational Level					
Elementary School	3	18.8	13	81.2	X ² =3.166 p=0.367
Middle School	6	31.6	13	68.4	
High-school	11	42.3	15	57.7	
University	76	39.2	118	60.8	
Employment Status					
Employed	65	41.4	92	58.6	X ² =2.453 p=0.117
Unemployed	31	31.6	67	68.4	
Number of the children living at home					
Single child	80	39.2	124	60.8	X ² =1.069 p=0.301
Two children and more	16	31.4	35	68.6	

and inhalation of the product, less frequent by ingestion and eye contact. Koksoy Vayisoglu & Oncu [21] reported in their study on adults that the prevalence of health problems related to the use of cleaning products during the pandemic was 47%. It was stated in the same study that the most frequently reported problems were skin problems and shortness of breath. The use of cleaning and disinfectant products has increased to reduce the risk of infection in homes along with the onset of the COVID-19 pandemic. This has caused an increase in exposure rates. The Canadian Poison Center data suggests that calls about exposure to hand and household disinfectants in March 2020 were 4-times more when compared to the same period of the previous year, and nearly half of the calls were associated with the bleach [8].

It was determined in our study that maternal age, education, employment status and the number of children living at home did not affect the exposure. However, it is stated in the literature that exposure to corrosive substances as a home accident is more common in societies with lower education levels. Gollu et al. [18] stated that as the

education level of mothers increases, they store corrosive substances under adequate conditions and have the accurate knowledge and attitude about corrosive substance use; however, this is not affected by maternal age. Ucuncu et al. [26] also found that mothers with a higher level of education who work and have less than three children have more knowledge about home accidents, and the age of the mother does not affect the level of knowledge. In this study, most of the mothers who work could not work outside because it was compulsory to stay at home during the pandemic period. It may be considered in this respect that the employment status of the mother is not effective on exposure. However, although the majority of the mothers were university graduates, the fact that these levels of education did not have an effect on avoidance of exposure suggests that all mothers tended to different hazardous practices in order to protect and avoid the disease due to panic and fear as the threat perception posed by the pandemic increased. Behaviors such as use of cleaning products more than recommended on the label, mixing different products are

stated as hazardous behaviors. Mixing bleach with vinegar or ammonia releases chlorine and chloramine gases that may cause severe damage on the lung tissue [24]. The use of the bleach with hot water also causes appearance of this gas. The CDC recommends using water at room temperature for dilution of disinfectants unless otherwise stated on the product label, the cleaning solution including bleach within 24 hours, and leaving the disinfectant applied on the surfaces for at least one minute [4]. Assessment of our study findings in line with these recommendations of the CDC revealed that almost half of the mothers used hot water while preparing disinfectant water, and one-third mixed different disinfectants with each other. Such attitude of mothers reveals the risk of poisoning by inhalation. It was detected in our study that the mothers prepare the bleach to be used for disinfection randomly rather than accurate concentration and do not use it within the recommended time, and the disinfectant do not contact with the surface for an adequate time. These results indicate that mothers have limited knowledge about the safe preparation of cleaning and disinfectant solutions and they cannot perform an effective disinfection process. Previous studies reported that women mix different detergents during house cleaning, use more detergents than necessary and take minimum precautions [27], and 74% of the bleach is prepared with an inaccurate concentration during the pandemic period [25].

CDC recommends reading the instructions for use prior to the cleaning and disinfection, using protective equipment such as gloves and goggles, and ventilating the environment during the procedure [4]. The use of disinfectants may trigger asthma attacks in children with asthma. Therefore, it should be ensured that the child should be kept in another room while cleaning [28], [29]. It was reported that babies living in homes where cleaning products are used commonly are at higher risk of problems such as wheezing and asthma when they reach the age of three [30]. It was found in our study that most of the mothers do not follow the recommendations of CDC, mothers do not read the instructions for use on the cleaning and disinfection product, do not use the product with the recommended amount, do not wear gloves and glasses during the process, and do not ventilate the environment regularly. Furthermore, since the number of mothers who reported that disinfectant products could be used while an asthmatic child or adult is present in the environment is higher, this suggests that these mothers have insufficient knowledge about the use of cleaning and disinfectant products and have hazardous practices that would affect their health negatively, and this situation has an important role for higher exposure. Similarly, Garcia-Hidalgo et al. conducted a study in Switzerland reported that only half of the participants wear gloves when using bleach, this rate was 22% for toilet cleaner and 1% to 11% for other cleaning products [30]. On the other hand, Dindarloo et al. stated that 16.5% of the participants wear glasses during the disinfection of surfaces; however, 47.5% do not use any per-

sonal protective equipment during the pandemic [25]. In the study conducted by Gharpure et al. during the Covid pandemic, 71% of the participants stated that it is necessary to wear gloves and 64% of the participants stated that wearing glasses is necessary as personal protective equipment during the use of cleaning and disinfection products at home [22]. Silva et al. [16] reported that 55% of the participants and Göllü et al. [18] 37% of the participants do not read the labels of disinfectant products they use at home. It was detected in the study of Koksoy Vayisoglu & Öncü that half of the participants used ventilation constantly during the cleaning process; however, limited number of these use protective equipment regularly [21]. As previous studies in the literature indicate, individuals show lower compliance in reading the labels of the products and using protective equipment against the harmful effects of disinfectants both before and after pandemic.

Another hazardous behavior is the use of household cleaning products in inadequate areas. In this study, almost of the mothers used these products for hand and skin cleaning; however, a limited number of them used such products for food cleaning purposes such as gargling or adding bleach to the irrigation water of fruits and vegetables. Similarly, the previous studies conducted during the pandemic reported that these practices which have a higher risk are carried out in homes [21], [22].

Limitations

The limitations of the present study include the inability to conduct a personal survey with parents and their children, since the research was conducted in a certain time period and the pandemic continued at the time of the study. Furthermore, another limitation is that only parents with online access were able to participate in the study. Therefore, it is recommended to make arrangements to include mothers/fathers with no/limited internet access in future studies.

Conclusion and suggestions

It was detected that the knowledge of the mothers on the safe use of cleaning and disinfectant products is insufficient and they are involved in hazardous practices that will adversely affect the health of themselves, their children and other family members. Safe cleaning and disinfection practices protect the health of the children and reduce the risk of exposure, not only during the pandemic, but at all times. Accordingly, it may be suggested that healthcare workers, especially nurses, should organize training programs by using innovative strategies (web-based education, social media) and scanning the whole society about safe cleaning and disinfection practices. It is recommended that nurses working in pediatrics plan regular training on parents of children between 0 and 6

years of age about protection from home accidents and raising awareness.

Notes

Competing interests

The authors declare that they have no competing interests.

Acknowledgments

We thank the mothers who participated in this study.

Annotation

This study was presented as a oral presentation at the "International 6th Forensic Nursing Congress" (16–18 May 2022)

Ethical considerations

Approval was obtained from the Ethics Committee of the Institute of Health Sciences of a University (No. 2021/04-13).

Financial Resource

This study was not financially supported.

Authors' ORCIDs:

- Emine Güdek Seferoglu: 0000-0001-5803-0059
- Ümran Çevik Güner: 0000-0002-8677-0414

References

1. Yıldırım N, Kublay G. 1-4 yas arasi çocuklara yönelik yaralanma önleme programinin etkinliği. *Journal of Hacettepe University Faculty of Nursing*. 2016; 3(2):1-13.
2. Gwenzi W. Leaving no stone unturned in light of the COVID-19 faecal-oral hypothesis? A water, sanitation and hygiene (WASH) perspective targeting low-income countries. *Sci Total Environ*. 2021 Jan;753:141751. DOI: 10.1016/j.scitotenv.2020.141751
3. Chen T. Reducing COVID-19 transmission through cleaning and disinfecting household surfaces. Vancouver, BC: National Collaborating Centre for Environmental Health; 2020 Apr.
4. National Center for Immunization and Respiratory Diseases, Division of Viral Diseases. Cleaning and disinfection for households: interim recommendations for U.S. households with suspected or confirmed coronavirus disease 2019 (COVID-19). 2020 Jul 10. Available from: <https://stacks.cdc.gov/view/cdc/90453>
5. Li D, Sangion A, Li L. Evaluating consumer exposure to disinfecting chemicals against coronavirus disease 2019 (COVID-19) and associated health risks. *Environ Int*. 2020 Dec;145:106108. DOI: 10.1016/j.envint.2020.106108
6. Zheng G, Filippelli GM, Salamova A. Increased Indoor Exposure to Commonly Used Disinfectants during the COVID-19 Pandemic. *Environmental Science & Technology Letters*. 2020; 7(10):760–5. DOI: 10.1021/acs.estlett.0c00587
7. Chang A, Schnall AH, Law R, Bronstein AC, Marraffa JM, Spiller HA, Hays HL, Funk AR, Mercurio-Zappala M, Calello DP, Aleguas A, Borys DJ, Boehmer T, Svendsen E. Cleaning and Disinfectant Chemical Exposures and Temporal Associations with COVID-19 – National Poison Data System, United States, January 1, 2020–March 31, 2020. *MMWR Morb Mortal Wkly Rep*. 2020 Apr;69(16):496-8. DOI: 10.15585/mmwr.mm6916e1
8. Yasseen Iii A, Weiss D, Remer S, Dobbin N, MacNeill M, Bogeljic B, Leong D, Wan V, Mosher L, Bélair G, Thompson M, Button B, Hardy J, Perwaiz S, Smith A, Wootton R. Augmentation du nombre d'appels relatifs à une exposition à certains nettoyeurs et désinfectants au début de la pandémie de COVID-19 : données des centres antipoison canadiens Increases in exposure calls related to selected cleaners and disinfectants at the onset of the COVID-19 pandemic: data from Canadian poison centres. *Health Promot Chronic Dis Prev Can*. 2021 Jan;41(1):25-9. DOI: 10.24095/hpcdp.41.1.03
9. Akca SO, Cankaya T, Aydın Z. Diagnostic levels of mothers having children between the age of 0-6 years about taking precautions against home accidents and the effects of training on home accidents. *J Contemp Med*. 2017; 7(1):50-7. DOI: 10.16899/gopctd.299084
10. Yorulmaz A, Akbulut H, Yahya I, Aktas R, Emiroglu HH, Peru H. Retrospective evaluation of patients admitted to the pediatric emergency department with intoxication. *J Pediatr Emerg Intensive Care Med*. 2017; 4:96-103. DOI: 10.4274/cayd.41636
11. Bozlu G, Kuyucu N. Poisoning cases who admitted to the pediatrics emergency unit in the last five years: evaluation of 1734 cases. *The Bulletin of Legal Medicine*. 2018;23(2):106-9. DOI: 10.17986/blm.2018238625
12. Ozaslan MM, Temiz F, Acipayam C, Akkececi BNS, Dalkıran T. Demographic evaluation of patients admitted to the pediatric emergency department of Kahramanmaraş Sütçü İmam University Faculty of Medicine between January 2013 and June 2017 due to poisoning. *KSU Medical Journal*. 2021;16(2), 251-6. DOI: 10.17517/ksutfd.731856
13. Habib RR, El-Masri A, Heath RL. Women's strategies for handling household detergents. *Environ Res*. 2006 Jun;101(2):184-94. DOI: 10.1016/j.envres.2006.02.001
14. Smolinske SC, Kaufman MM. Consumer perception of household hazardous materials. *Clin Toxicol (Phila)*. 2007;45(5):522-5. DOI: 10.1080/15563650701354192
15. Kiraz E, Demirkıran F, Memis S, Ergin F, Onde M, Bilgen MA, Beser E. Ev Temizlik Malzemeleri Farkındalık Arastirmasi-Aydin [Awareness research on household cleaning substances-Aydin]. *TSK Koruyucu Hekimlik Bülteni*. 2011;10(4):451-62.
16. Silva AA, Passos RS, Simeoni LA, Neves Fde A, Carvalho Ed. Use of sanitizing products: safety practices and risk situations. *J Pediatr (Rio J)*. 2014;90(2):149-54. DOI: 10.1016/j.jped.2013.08.011
17. Tiguman GMB, Almeida MBD, Silva MT, Galvao TF. Availability and storage of hazardous products in households in the metropolitan region of manaus: a population-based survey, 2015. *Rev Paul Pediatr*. 2021;39:e2020130. DOI: 10.1590/1984-0462/2021/39/2020130
18. Gölü G, Savas N, Karaemir G, Sımsek A, Ulus R, Dikmen B, Sönmez Ö, Sahin S, Yavuz Y. Koroziv madde içimi hakkındaannelerin bilgi düzeylerinin belirlenmesi. *Mersin Üniversitesi Sağlık Bilimleri Dergisi*. 2016;9(3):138-43.
19. Karaman C, Sen S, Erkmen C, Buga O, Gumus H. The knowledge of mothers about the storage and the risks of household products. *STED*. 2005;14(9):208-11.
20. Karatas Z. COVID-19 Pandemisinin Toplumsal Etkileri, Degisim ve Güçlenme [Social impacts of COVID-19 pandemic, change and empowerment]. *Türkiye Sosyal Hizmet Arastirmalari Dergisi*. 2020;4(1):3-15.

21. Koksoy Vayisoglu S, Oncu E. The use of cleaning products and its relationship with the increasing health risks during the COVID-19 pandemic. *Int J Clin Pract.* 2021 Oct;75(10):e14534. DOI: 10.1111/ijcp.14534
22. Gharpure R, Hunter CM, Schnall AH, Barrett CE, Kirby AE, Kunz J et al. Knowledge and practices regarding safe household cleaning and disinfection for COVID-19 prevention – United States, May 2020. *American Journal of Transplantation.* 2020; 20(10):2946–50. DOI: 10.1111/ajt.16300
23. Yurtsever M. COVID-19 Pandemisinin çevre üzerindeki erken dönem etkileri. *Uludağ Üniversitesi Mühendislik Fakültesi Dergisi.* 2020;25(3):1611-36. DOI: 10.17482/uumfd.781173
24. Beyazit Üçgün A, Yavuz C. COVID-19 pandemisinin hatırlattıkları: temizlik ve dezenfeksiyon. *Sürekli Tıp Eğitimi Dergisi.* 2021;30(5):351-7. DOI: 10.17942/sted.831360
25. Dindarloo K, Aghamolaei T, Ghanbarnejad A, Turki H, Hoseinvandtabar S, Pasalari H, Ghaffari HR. Pattern of disinfectants use and their adverse effects on the consumers after COVID-19 outbreak. *J Environ Health Sci Eng.* 2020 Dec;18(2):1301-10. DOI: 10.1007/s40201-020-00548-y
26. Ucuncu M, Ucuncu M, Toprak D. The knowledge, attitude, and behavior of mothers with children aged 0-6 years on home accidents, and preventive measures. *J Ist Faculty Med.* 2019;82(4):219-28. DOI: 10.26650/IUITFD.2018.0
27. Abdelgalil M. Practices in Using and Handling Household Cleaning Products in Egypt. *Tenside Surfactants Detergents.* 2016;53(6): 576-88. DOI: 10.3139/113.110452
28. UNICEF. Cleaning and hygiene tips to help keep the COVID-19 virus out of your home. From doing laundry to preparing meals – every day measures to help protect your family. 2020 May 15 [Accessed 2020 Dec 18]. Available from: <https://www.unicef.org/turkiye/en/stories/cleaning-and-hygiene-tips-help-keep-covid-19-virus-out-your-home>
29. Sen G, Dibek Mısıroglu E. İstimli Çocuklarda COVID-19 Etkisi. *Türkiye Çocuk Hastalıkları Dergisi.* 2021;15(3): 251-5. DOI: 10.12956/tchd.856766
30. Garcia-Hidalgo E, von Goetz N, Siegrist M, Hungerbühler K. Use-patterns of personal care and household cleaning products in Switzerland. *Food Chem Toxicol.* 2017 Jan;99:24-39. DOI: 10.1016/j.fct.2016.10.030
31. Parks J, McCandless L, Dharma C, Brook J, Turvey SE, Mandhane P, Becker AB, Kozyrskyj AL, Azad MB, Moraes TJ, Lefebvre DL, Sears MR, Subbarao P, Scott J, Takaro TK. Association of use of cleaning products with respiratory health in a Canadian birth cohort. *CMAJ.* 2020 Feb;192(7):E154-E161. DOI: 10.1503/cmaj.190819

Corresponding author:

Ass. Prof. PhD RN Emine Güdek Seferoglu
Kütahya Health Science University, Faculty of Health
Science, Kütahya 43100, Turkey, Phone: +90
2742600043
emine.gudekseferoglu@ksbu.edu.tr

Please cite as

Güdek Seferoglu E, Çevik Güner Ü. Risk factor for children in the pandemic: the use of cleaning products at home. *GMS Hyg Infect Control.* 2023;18:Doc25.
DOI: 10.3205/dgkh000451, URN: urn:nbn:de:0183-dgkh0004510

This article is freely available from

<https://doi.org/10.3205/dgkh000451>

Published: 2023-10-20

Copyright

©2023 Güdek Seferoglu et al. This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 License. See license information at <http://creativecommons.org/licenses/by/4.0/>.