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Knowledge, Attitude & Practices Study on Hand Hygiene among the Children Aged 12-17 Years.

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ABSTRACT

Introduction: The COVID-19 pandemic has demonstrated that good hand hygiene practices are crucial in controlling infections. Handwashing is one of the ways through which children can be kept safe from infections.

Objective: The primary objective of the research study was to determine the hand hygiene knowledge, attitude, and practices (KAP) of the respondents aged 12-17 years of the Maharashtra region. The study focused on comparing gender to understand who had a better knowledge regarding hand hygiene and comparing their attitudes.(1)

Method: A randomized survey was conducted among children aged 12 to 17 years old. A total of 108 respondents participated in the research study. A well-defined questionnaire determined respondents' KAP regarding hand hygiene. Statistical methods like the Chi-square test and Pearson Correlation test were performed to assess respondents' knowledge, attitude, and practices.

Results: Respondents had adequate hand hygiene knowledge, and COVID-19 has positively impacted respondents' attitude toward hand hygiene (P-value 0.30945509). However, respondents had a misconception regarding proper hand hygiene steps and practices. When correlating knowledge and practice, Pearson Correlation gave a value of -0.8842, indicating the correlation between Knowledge and Practices followed by the respondents was negative.

Conclusion: There was an adequate amount of knowledge about hand hygiene among respondents. The Chi-square analysis also indicated that girls' knowledge, attitude, and practices were better than boys. However, there was still a need to increase respondents' understanding of proper hand hygiene practices and procedures. On the positive side, COVID-19 has made respondents more aware of their hand hygiene practice.

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1. INTRODUCTION

India on 30th January 2020, reported the first case of COVID-19 in an Indian student who had travelled from Wuhan. Later, On March 12th, 2020, the first death due to COVID-19 was reported(2). Because of the dense population, even during the early stages, India reported 694 confirmed cases and 17 deaths due to COVID-19. (Jahan et al. 2021). According to literature, Diabetes Mellitus and Hypertension increased the risk of death in Coronavirus patients irrespective of age (Gupta et al., n.d.). So, to prevent the fast spread of COVID-19, a national lockdown was announced on 24th March, as due to low levels of testing, the precise locations of disease hotspots were unknown till then. In 2020, India ranked third globally with 3,34,608 COVID-19 related deaths (Dong et al., 2020). Like most countries affected by the COVID-19 pandemic, India too implemented different measures and actions to avoid the spread of the virus.(1) The government of India initiated a phase-wise lockdown where schools, colleges, and offices were closed to stop the spread of the virus. 'Ministry of Health and Family Welfare (MoHFW)' released an estimate on 6th April 2020 which revealed that people of age group below 40 years accounted 47% and above 60 years accounted for 19% out of the total number of confirmed cases(3,4). Moreover, out of the total deaths, 86% people had certain comorbidities, such as hypertension, diabetes mellitus, cardiovascular and kidney disease (Pal & Yadav, 2020). India has faced five variants of concern in the last two years - Alpha, Beta, Gamma, Delta, and Omicron. According to the

Government of India website, Maharashtra reported 78,67,916 cases and a 1.83% death ratio. (MyGov.in, 2020)as of March 2022(5). The case-fatality rates in 3 age groups, namely, less than 40 years was 0.40%, between 40 to 60 years was 2.36%, and greater than 60 years was 8.89%. (6)

As lockdown cannot be a permanent solution to fight against Coronavirus, on 16th January 2021, vaccination against COVID-19 began in India, initially providing the vaccination first to front-line professionals and senior citizens (60 years and above). Also, according to 'World Health Organisation (WHO)', vaccinating children was not a priority initially because children were at a lower risk of getting infected than older adults(7). The vaccination process for the 12-17 years old children started in January 2022. Before this, hand hygiene was one way of protecting them from the risk of getting infected with COVID-19, particularly in the light of Omicron.

Though handwashing was an effective and easy way to prevent the viruses from spreading, less awareness about the correct handwashing practices can be a cause leading to the spread of many illnesses, including COVID-19(8). Coronavirus mainly spreads through contact by touching contaminated objects or surfaces and close contact with infected people. WHO in March 2020 stated that to prevent COVID-19 from spreading, the practice of handwashing at regular intervals was an effective method, along with other COVID-appropriate behaviours like wearing masks and social distancing? Health professionals promoted hand hygiene as an effective method of

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protection against COVID-19. According to United Nations Children's Fund (UNICEF), Hand hygiene could be part of the most critical measures that can help to stop the spread of infectious diseases, including diarrheal diseases and respiratory diseases, such as COVID-19. Police and volunteers could check whether people used masks and maintained social distancing. However, there was no control over the hand hygiene practices of people as it depended upon the people's knowledge and attitude.(9)

The children aged 12-17 years were selected because the research had begun in September 2021. At that time, the government had not started the vaccination process for the children. Along with wearing masks and maintaining social distance, handwashing was essential to protect them from COVID-19. Also, Hand hygiene knowledge, children's attitude towards hand hygiene, and its practice can help prevent infections and diseases like the common cold, influenza, chickenpox, meningitis, and hepatitis A(10). Thus, accordingly, the aim of the present study was to analyse the awareness regarding proper handwashing and hygiene methods, and practices in children aged 12-17 years. The objective was to 1) understand whether children had adequate hand hygiene knowledge. 2) understand their attitude towards hand hygiene, 3) investigate the correlation between knowledge and practices followed by children regarding hand hygiene, 4) carry out a comparison between gender to understand among the surveyed girls and boys, who had a better knowledge regarding hand hygiene.

2. MATERIAL AND METHODOLOGY

Method:

As per the Government of India website report for tracking COVID-19, Maharashtra was affected by COVID-19 with 78,67,916 cases (*MyGov.in*, 2020), with the highest cases in Mumbai and Pune(10). The research study began during the COVID-19 pandemic's lockdown period. The methodology used was a cross-sectional study conducted through an online Google form survey link with the help of a random sampling method to correlate KAP regarding hand hygiene among children aged 12-17 years(11,12). Responses from 108 children were collected and used for the study. Thus, the term 'respondent' instead of 'children' has been preferred in the study and will be used henceforth.

As an innovative step, a certificate to congratulate the respondents on completing the questionnaire was given. Also, at the end of the questionnaire, correct answers with an explanation for all hand hygiene knowledge and practice-related questions were provided to improve respondents' daily hand hygiene routine and spread awareness among them.(13)

Tool:

Content validation and content reliability

The authors of this paper developed a well-structured questionnaire after carrying out the literature review regarding proper hand hygiene and how respondents' hand hygiene was affected by their KAP(14). With help of experts, content validation was carried out, who evaluated the entire questionnaire in the following

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three aspects: how essential, relevant, and clear was the questionnaire for respondents. The three experts, two educationists, and a medical professional were willing to evaluate the questionnaire model regarding hand hygiene and all the

statements present in the questionnaire to ensure that the questionnaire was reliable.

Using a three-pointer Likert Scale, the evaluators independently checked to assess the statements clarity, its relevance, and its essentiality.

Table 1: Represents the 3-point Likert Scale to evaluate the questionnaire.

Degree of Relevance Scale	Degree of Clarity Scale	Degree of Essentiality
1: Not Relevant	1: Not Clear	1: Not Essential
2: Somewhat Relevant	2: Questions need revision	2: Useful but not Essential
3: Very relevant	3: Very Clear	3: Essential

The validity of the questionnaire statements was assessed through Content Validity Index (CVI), with a rating of two or three that indicated the statements were valid. Thus, a questionnaire evaluation form was made and given to the evaluators to make it easy for them to evaluate the content validity of the entire questionnaire, and to assess if all the statements were clear, and easy for the respondents to understand and respond to it.

The CVR (Critical) was 1.66, 0.70 for the CVI for essentiality and relevancy, and 0.846 for CVI for clarity.

Questionnaire

The questionnaire was adapted and made after studying various hand hygiene questionnaires. A questionnaire to determine the KAP among the respondents aged 12-17 years was used to carry out the present survey. The questionnaire was

segregated in to five sections:

- 1) Personal information
- 2) Demographics.
- 3) Knowledge in regard to hand hygiene.
- 4) Attitude towards hand hygiene.
- 5) Practices of hand hygiene.

The authors selected questions to address the respondent's hand hygiene knowledge, their attitudes towards hygiene before and after COVID-19, and their practices.

The authors took consent from the parents at the start of the survey as the respondent were below 18 years old. The consent covered and cleared that participation was entirely voluntary in this study; with no foreseeable risks associated with this project, the responses obtained for this survey would be strictly confidential and reported only in the aggregate.

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Also, the parents were requested to help their children understand the questions if they faced any problems. After the consent, the respondent could proceed to fill out the survey.

Personal Information

The first section included questions regarding the child's name, their parent's consent, and city name.

Demographics

The second section contained questions regarding the respondent's age, gender, and standard. The following information was required to understand and analyse who among the selected age group and gender had better hand hygiene knowledge and attitude and followed better practices

Knowledge

The third section consisted of questions to assess respondents' hand hygiene knowledge. The section contained six questions; each being scored depending on how difficult it was for the respondent to answer. The correct answer was given 1 point and 2 points depending on the question's difficulty level, while 0 points for the wrong answer.

Attitude

The 4th section contained five questions to analyse respondent's attitude regarding hand hygiene and the changes they implemented after COVID-19. These questions were not given any score, as the answers depend upon the respondent's perception.

Practices

The 5th section consisted of the six questions regarding hand hygiene practices to understand respondents' views. The age-wise distribution of respondents was as follows,

regarding hand hygiene practices and procedures. The correct answer was given 1 point and 2 points depending on the question's difficulty level, while 0 points for the wrong answer.

Data organization and analysis:

Data obtained through the survey regarding hand hygiene KAP were presented on an excel-sheet and converted into percentages and frequencies distribution tables for analysis.

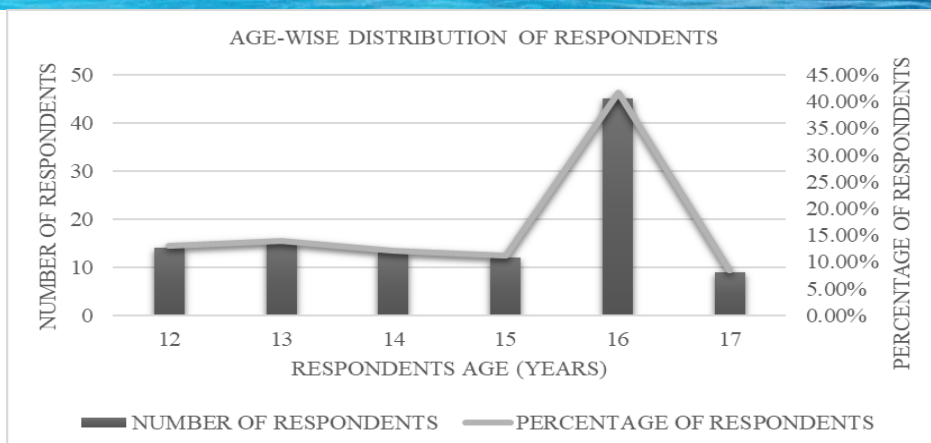
If the respondent's percentage was lesser than 50%, they had insufficient KAP levels. 50 to 70 %, for an average percentage of KAP levels, whereas if the percentage was greater than 70%, the respondent had high level of knowledge, a good attitude, and followed the hand hygiene practices well. (15)

Similarly, a comparison was made between the respondents to understand and compare their KAP(16). The statistical method, such as the chi-square test, was performed to understand the significant difference between respondents' gender and their agreement regarding the KAP questions. Less than 0.05 (<0.05) was considered a significant P-value. Also, the Pearson correlation coefficient test was applied to statistically determine the correlation between the respondents' knowledge in regard to hand hygiene and their practices.

3. RESULTS

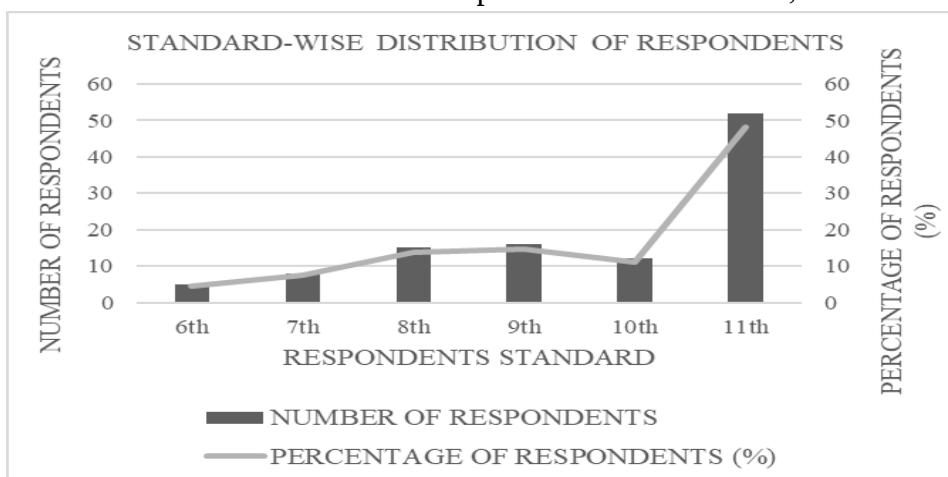
The survey included responses from 108 respondents, of which 75 were female respondents (69.44%), and 33 were male respondents (30.56%).

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(FIGURE.1: Represents age-wise distribution of respondents)

The standard-wise distribution of respondents was as follows,



(FIGURE.2: Represents standard-wise distribution of respondents)

Table 2: Represents the statistical analysis related to the gender-wise demographic characteristics.

Gender	Female	Frequency (%)	Male	Frequency (%)	Total	Total frequency (%)	P-value
	75	69.44%	33	30.56%	108	100.00%	
Age group							
12	6	42.86%	8	57.14%	14	12.96%	p-value-0.03 Chi-square value-12.306
13	10	66.67%	5	33.33%	15	13.89%	

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14	8	61.54%	5	38.46%	13	12.04%	
15	6	50.00%	6	50.00%	12	11.11%	
16	38	84.44%	7	15.56%	45	41.67%	
17	7	77.78%	2	22.22%	9	8.33%	
Standard							p-value-0.005
6	1	20.00%	4	80.00%	5	4.63%	Chi-square test-16.384
7	4	50.00%	4	50.00%	8	7.41%	
8	11	73.33%	4	26.67%	15	13.89%	
9	9	56.25%	7	43.75%	16	14.81%	
10	6	50.00%	6	50.00%	12	11.11%	
11	44	84.62%	8	15.38%	52	48.15%	

Knowledge:

The study focused on understanding respondents' knowledge regarding hand hygiene. Analysis of the hand hygiene knowledge questions showed that about 34.26% (37) of respondents knew the basic water requirements to wash hands. There was no significant difference between respondents' gender and their agreement on what temperature water was better to wash hands. 61.1% of the respondents (66) knew it's necessary to wash hands for at least twenty seconds. Among the 66 respondents, 68.18% were girls, and 31.82% were boys. There was no significant difference between respondents' gender and their agreement on how long one should wash their hands. 70.37% of respondents knew that all soaps

are not antibacterial, and only 13.89% knew that any form of soap and water could be suitable for washing hands. 94.44% of respondents agreed that drying hands should be as important as washing them, and according to 71.30% of the respondent, handwashing was a 2-step process, which was incorrect.

The knowledge section thus proved that among the respondent who answered correctly, girls had better knowledge of hand hygiene than boys. However, there are still misconceptions regarding the basic hand hygiene process, such as the temperature of the water and the total number of steps involved in the proper handwashing process.

Table 3: Represents the statistical analysis of the Knowledge-related questions.

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	Knowledge related questions	Female	Frequency(%)	Male	Frequency(%)	Total	Total frequency (%)	P-value
1	Is it better to wash your hands with cold water or hot?							
	A. Cold	9	60.00%	6	40.00%	15	13.89%	p-value-0.33142049
	B.Hot	12	70.59%	5	29.41%	17	15.74%	Chi-square value-3.419
	C.Warm	31	79.49%	8	20.51%	39	36.11%	
	D.Dosent matter	23	62.16%	14	37.84%	37	34.26%	
2	How long should you wash your hands ?							p-value-0.8065751
								Chi-square test-0.978
	A. At least 20 seconds	45	68.18%	21	31.82%	66	61.11%	
	B. 2 minutes	13	68.42%	6	31.58%	19	17.59%	
	C. until all soap is removed	15	71.43%	6	28.57%	21	19.44%	
	D.Don't know	2	100.00 %	0	0.00%	2	1.85%	
3.	True or False:All hand soap is antibacterial							p-value-0.72156305
	A.True	23	71.88%	9	28.13%	32	29.63%	Chi-square test-0.127
	B.False	52	68.42%	24	31.58%	76	70.37%	

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4.	Which handwashing method kills the most germs?							p-value-0.74385157
	A. Antibacterial soap and water	33	75.00%	11	25.00%	44	40.74%	Chi-square test-1.956
	B.Liquid soap and water	13	59.09%	9	40.91%	22	20.37%	
	C.Bar soap and water	0	0.00%	0	0.00%	0	0.00%	
	D. Any form of soap and water	11	73.33%	4	26.67%	15	13.89%	
	E.Hand sanitizer	18	66.6%	9	33.33%	27	25.00%	
5.	Is drying hands as important as washing them							p-value-0.00387816
								Chi-square test-8.34
	A.Yes	74	72.55%	28	27.45%	102	94.44%	
	B.No	1	16.67%	5	83.33%	6	5.56%	
6.	Good handwashing is two step process, True or False							p-value-0.49669075
	A.True	52	67.53%	25	32.47%	77	71.30%	Chi-square test-0.462
	B.False	23	74.19%	8	25.81%	31	28.70%	

Attitude:

Analysing the responses to the questions regarding the respondent's attitude toward hand hygiene determined that the respondent had a positive response regarding handwashing practices during the COVID-19 pandemic.

88.88% of respondents responded positively to handwashing using soap and water. The remaining 11.12% of

respondents who showed a negative attitude had issues with washing hands with bar soap, the reason being it can lead to infection if all use the same soap.

There was a significant difference between respondents' gender and their agreement on how hand hygiene was essential for preventing infection.

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Table 4: Represents the statistical analysis of the Attitude-related questions.

	Attitude related questions	Female	Frequency (%)	Male	Frequency (%)	Total	Total frequency (%)	P-value
1	Has covid increased the number of times you wash hands							p-value-0.30, Chi-square value-1.033
	Yes	55	72.37%	21	27.63%	76	70.37%	
	No	20	62.50%	12	37.50%	32	29.63%	
2	Hand hygiene is essential part of preventing infections							Chi-square value-8.137 p-value-0.04
	Strongly Disagree	0	0.00%	3	100.00%	3	2.78%	
	Disagree	2	66.67%	1	33.33%	3	2.78%	
	Agree	31	77.50%	9	22.50%	40	37.04%	
	Strongly Disagree	42	67.74%	20	32.36%	62	57.41%	
3	What is your attitude towards handwashing with soap and water							p-value-0.2, Chi-square value-1.227
	Positive	65	67.71%	31	32.29%	96	88.89%	
	Negative	10	83.33%	2	16.67%	12	11.11%	
4	If answer to question (3) is positive explain why?							p-value-0.6, Chi-square value-1.629
	1.Remove dust	4	66.67%	2	33.33%	6	5.56%	
	2.Prevent diseases	5	50.00%	5	50.00%	10	9.26%	
	3.All mentioned	56	70.00%	24	30.00%	80	74.07%	
	4.Other	0	0.00%	0	0.00%	0	0.00%	
5	If answer to question (3) was negative, explain why?							p-value-0.9, Chi-square value-0.84
	1.Soap causes allergy	4	80.00%	1	20.00%	5	4.63%	
	2.Water is only enough	1	100.00%	0	100.00%	1	0.93%	

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			%		%		
	3.Soap is not available	0	0.00%	0	0.00%	0	0.00%
	4.All mentioned	2	100.00 %	0	0.00%	2	1.85%
	5.Other	3	75.00%	1	25.00%	4	3.70%

Practices:

The questions regarding hand hygiene practices focused on analysing whether respondents used their hand hygiene knowledge in daily routines. The practice section made it clear that there was a significant difference between the respondent's gender and their agreement on the correct order of hand washing steps.

83.33% of the respondents (90) responded to the questions correctly. Among the 90 respondents, 75.56% were girls, and 24.44% were boys. The section also proved that COVID-19 had increased

the number of times respondents washed their hands. 86.11% of respondents followed and maintained proper hand position while performing hand hygiene routines. 88.89% preferred liquid soap over bar soaps and sanitizers. Also, there was a significant difference between respondents' gender and their agreement on what one should do if their hands touch the sink while washing. Among them, only 47.22% of respondents followed the appropriate handwashing method.

Table 5: Represents the statistical analysis of the Practice-related questions.

	Practice related questions	Femal e	Freque ncy(%)	Male	Frequen cy(%)	Tota l	Total frequency (%)	p-value
1	Place the following hand washing steps in proper order-a)Applysoap,b)Vigerously scrub handa and arms for at least 10-15 secs, c)Dry hands and arms with a single-use paper towel or warm-air hand dryer, d)Rinse your hands and arms thoroughly under running water,e)Wet your hands with running water							
	b e c d a	1	25.00 %	3	75.00%	4	3.07%	p-value-0.01225647
	e a b d c	68	75.56 %	22	24.44%	90	83.33%	Chi-square value-10.904
	a d c e b	6	46.15 %	7	53.85%	13	12.04%	
	e c d a b	0	0.00%	1	100.00	1	0.93%	

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					%			
2	Hand hygiene frequencies before covid 19							
	A. less 4 times	31	75.61 %	10	24.39%	41	37.96%	p-value-0.21193377
	B. 4-8 times a day	35	71.43 %	14	28.57%	49	45.37%	Chi-square value-4.504
	C.8-12 times a day	7	46.67 %	8	53.33%	15	13.89%	
	D.Greater than 12 times	2	66.67 %	1	33.33%	3	2.78%	
3	Hand hygiene frequencies after covid 19							
	A. less 4 times	3	75.00 %	1	25.00%	4	3.70%	p-value-0.9
	B. 4-8 times a day	28	68.29 %	13	31.71%	41	37.96%	Chi-square value-0.08
	C.8-12 times a day	30	69.77 %	13	30.23%	43	39.81	
	D.Greater than 12 times	14	70.00 %	6	30.00%	20	18.52%	
4	Your hands and forearms should be lower than your elbows while performing hand hygiene routine?							
	1.True	64	68.82 %	29	31.18%	93	86.11%	p-value-0.72473602
	2.false	11	73.33 %	4	26.67%	15	13.89%	Chi-square value-0.124
5	What should you do if your hands touch the sink while you are washing your hands?							
	Continue to washing hands	10	52.63 %	9	47.37%	19	17.59%	p-value-0.01013898
	Apply more friction during the procedure	2	28.57 %	5	71.43%	7	6.48%	Chi-square value-11.315

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	Repeat the procedure	37	72.55 %	14	27.45%	51	47.22%	
	Add more soap to your hands	26	83.87 %	5	16.13%	51	28.70%	
6	What is the preferred practice?							
	Bar soap	1	33.33 %	2	66.67%	3	2.78%	p-value-0.23119356
	Liquid soap	69	71.88 %	27	28.13%	96	88.89%	Chi-square value-2.929
	Sanitizer	5	55.56 %	4	44.44%	9	8.33%	

Pearson Correlation:

According to the Pearson correlation test, the coefficient of correlation between ± 0.50 and ± 1 represented strong, ± 0.30 and ± 0.49 represented medium and below $+0.29$ represented a weak correlation.

The Pearson Correlation test clarifies the relationship between respondents' hand hygiene knowledge and practices. The test gave a value of -0.8842 , which indicated a strong negative correlation between respondents' hand hygiene knowledge and practices.

4. DISCUSSION

The research study helped to understand the hand hygiene KAP followed by respondents between 12 to 17 years of age. Hand hygiene importance had increased during the COVID-19 pandemic(17). The focus of this study was to understand whether the respondents had hand hygiene knowledge, analyse their attitude towards hand hygiene before and after COVID-19, and analyse the practices that the

respondents followed.(18)

The data was analysed statistically using the Chi-square test and Pearson Correlation test.

Hand hygiene knowledge of the respondents:

In the first section, after analysing the responses to the six questions, it was observed that respondents had a good amount of knowledge regarding hand hygiene. About 34.26% of respondents were aware of the basic water requirement to wash hands; however, 36.11% and 15.74% of respondents went with warm water and hot water as answers, respectively, considering it better to wash hands. The reason could be due to the misconception that warm and hot water killed germs better than cold water. (19)

According to the 'Centres for Disease Control and Prevention (CDC)', washing hands for at least twenty seconds was essential for removal of all the germs. Only 61.1% of respondents were aware of it. Also, among all the respondents who

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responded correctly, 68.18% were girls, and 31.82% were boys.

Also, CDC and FDA recommended handwashing with soap and water regardless of whether a bar or liquid soap was used, as it makes no difference(20). Many infectious diseases, such as flu and COVID-19, are caused by viruses (the Influenza virus and Coronavirus, respectively), which the antibacterial ingredients do not target. Alcohol-based hand sanitizer was recommended if water was unavailable; however, it does not kill germs better than soap and water.(21,22)

The above statements made it clear that respondents should use soap and water to wash their hands. However, the survey clarifies that 40.7% of respondents considered antibiotic soap (that kills bacteria) and water better for killing germs.

The CDC recommended five steps of handwashing which included applying plain soap after wetting hands with clean, cool, running water, followed by rubbing hands together(23). Then after scrubbing hands for 15-30 seconds, rinse hands well, and finally dry hands using a clean towel or disposable paper towel for about 20-30 seconds (Cdc.gov, 2022).(24)

However, the survey proved that respondents were unaware of it as, according to 71.3% of the respondents, good handwashing was a two-step process, which was false. Only 28.70% were aware of the five steps.

94.4% of respondents agreed that drying hands was as important as washing, among which 74.19% were girls and 25.81% were boys who followed and understood the correct approach.

Hand hygiene attitude of the respondents:

The attitude section of the survey provided data to understand respondents' perspectives regarding proper hand hygiene and their response towards it during the COVID-19 pandemic; it also helped to analyse if, after the COVID-19 pandemic, were there any changes in respondent's attitude towards hand hygiene(25).70.37% of the respondents (76) agreed that COVID-19 had increased the number of times they washed their hands. Among those 76 respondents, 72.37% were girls, and 27.63% were boys. COVID-19 has positively affected respondents' hand hygiene. 88.88% of respondents proved that their attitude was positive towards handwashing with soap and water. The remaining 11.12% of respondents showed a negative attitude towards it. Their reasons were as follows: Soap could cause allergy (4.63% of respondents), water was only enough (0.93%of respondents), while the remaining had a problem using bar soap to wash hands (5.56% of the respondent) as it could lead to infections if people used the same soap.(26)

Hand hygiene practices of the respondents:

Respondents' daily hand hygiene practices were analysed using the questionnaire's practice section. 83.33% of the respondents (90) were able to place the handwashing steps in order. Among those 90 respondents, 75.56% were girls, and 24.44% were boys. Also, the number of times respondents washed their hands increased during the COVID-19 pandemic from 4 - 8 times per day to 8 - 12 times per day(27). 86.11% of respondents were

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aware of the positions of hands and forearms, which should be lower than the elbows during washing, to ensure that water flowed from the least to the most contaminated area and rinse microorganisms into the sink. 47.22% of respondents were aware of the practice of repeating the handwashing process if their hands touched the sink. 88.9% of respondents preferred liquid soap over sanitizer and bar soaps(28). The reason that can be understood and determined by the analysis of the entire survey was that germs and infections could spread rapidly through bar soaps if everyone shared the same soap.

At the end of the survey, correct answers regarding the important concepts of handwashing and reasons to understand and follow the proper hand hygiene practices were provided to the respondents.

Correlation between respondent's knowledge and practices of hand hygiene:

The Pearson correlation test showed a negative correlation between hand hygiene knowledge and practice(-0.8842). Thus, it proved that respondents aged 12-17 years did not use hand hygiene knowledge in their daily practices.

5. CONCLUSION

Hand hygiene knowledge and practices were essential to protect respondents from coronavirus infection(29). The following survey aimed to understand respondents' knowledge, attitude towards hand hygiene, perceptions, and day-to-day practices. Of the 12 points allotted to the questions, 6 were the average points scored by the

respondents, which tells us that there were still some gaps between the hand hygiene practices. Along with it, other questions in the survey made it clear that there was an adequate amount of hand hygiene knowledge among the respondent(27). However, there was a need to clear misconceptions regarding the use of soap, temperature of water, and the steps involved in a proper handwashing process. Pearson Correlation test was performed, which gave a negative value (-0.8842). It also proved that even though respondents knew about hand hygiene, they were not practicing it correctly.(30) On the positive side, COVID-19 has made respondents more aware of their hand hygiene practice. The analysis also made it clear that girls are more aware of hand hygiene knowledge, attitude, and practices than boys. However, respondents' hand hygiene practices must be monitored to ensure improvement in their daily practices and to clear misconceptions regarding the handwashing method, procedures, and steps.(31)

6. LIMITATION

The study's limitation was that the sample collection was carried out randomly from the state of Maharashtra, and the sample size was small as it could not include responses from all the places.

7. CONFLICT OF INTEREST

The authors have no conflicts of interest regarding this investigation.

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REFERENCES

1. Barrett C, Cheung KL. Knowledge, socio-cognitive perceptions and the practice of hand hygiene and social distancing during the COVID-19 pandemic: a cross-sectional study of UK university students. *BMC Public Health*. 2021 Dec 1;21(1).
2. Dwipayanti NMU, Lubis DS, Harjana NPA. Public Perception and Hand Hygiene Behavior During COVID-19 Pandemic in Indonesia. *Front Public Health*. 2021 May 13;9.
3. ref 30.
4. Siddiqui AA, Alshammary F, Amin J, Rathore HA, Hassan I, Ilyas M, et al. Knowledge and practice regarding prevention of COVID-19 among the Saudi Arabian population. *Work*. 2020;66(4):767–75.
5. Watson J, Cumming O, MacDougall A, Czerniewska A, Dreibelbis R. Effectiveness of behaviour change techniques used in hand hygiene interventions targeting older children – A systematic review. Vol. 281, *Social Science and Medicine*. Elsevier Ltd; 2021.
6. Pang J, Chua SWJL, Hsu L. Current knowledge, attitude and behaviour of hand and food hygiene in a developed residential community of Singapore: A cross-sectional survey Trauma care and orthopedic surgery. *BMC Public Health*. 2015 Jun 21;15(1).
7. Gawai P, Taware S, Chatterjee A, Thakur H. A cross sectional descriptive study of hand washing knowledge and practices among primary school children in Mumbai, Maharashtra, India. *Int J Community Med Public Health*. 2016;2958–66.
8. Burton M, Cobb E, Donachie P, Judah G, Curtis V, Schmidt WP. The effect of handwashing with water or soap on bacterial contamination of hands. *Int J Environ Res Public Health*. 2011;8(1):97–104.
9. Warren-Gash C, Fragaszy E, Hayward AC. Hand hygiene to reduce community transmission of influenza and acute respiratory tract infection: A systematic review. Vol. 7, *Influenza and other Respiratory Viruses*. 2013. p. 738–49.
10. Aiello AE, Coulborn RM, Perez V, Larson EL. Effect of hand hygiene on infectious disease risk in the community setting: A meta-analysis. *Am J Public Health*. 2008 Aug 1;98(8):1372–81.
11. Rabie T, Curtis V. Handwashing and risk of respiratory infections: A quantitative systematic review. Vol. 11, *Tropical Medicine and International Health*. 2006. p. 258–67.
12. Mbakaya BC, Lee PH, Lee RLT. Hand hygiene intervention strategies to reduce diarrhoea and respiratory infections among schoolchildren in developing

Journal of Coastal Life Medicine

- countries: A systematic review. Vol. 14, International Journal of Environmental Research and Public Health. MDPI; 2017.
13. comp. A guide for developing a hygiene promotion program to increase handwashing with soap The Handwashing Handbook A guide for developing a hygiene promotion program to increase handwashing with soap 2 The Handwashing Handbook.
14. Shilunga APK, Amukugo HJ, Mitonga KH. Knowledge, attitudes and practices of primary schools learners on sanitation and hygiene practices. Int J Community Med Public Health. 2018 Jul 23;5(8):3197.
15. Amuakwa-Mensah F, Klege RA, Adom PK, Köhlin G. COVID-19 and handwashing: Implications for water use in Sub-Saharan Africa. Water Resour Econ. 2021 Oct 1;36.
16. Liu L, Oza S, Hogan D, Perin J, Rudan I, Lawn JE, et al. Committing to Child Survival: A Promise Renewed [Internet]. 2014. Available from: www.jhsph.edu/http://files.unicef.org/publications/files/APR_2014_web_15Sept14.pdf
17. Rabbi SE, Dey NC. Exploring the gap between hand washing knowledge and practices in Bangladesh: a cross-sectional comparative study. BMC Public Health. 2013;13:89.
18. Alula SB, Dejene EM, Terefe ML, Abinet AS, Bazie M. Knowledge, attitude and practice on hand washing and associated factors among public primary schools children in Hosanna town, Southern Ethiopia. J Public Health Epidemiol. 2018 Jun 30;10(6):205–14.
19. Daverey A, Dutta K. COVID-19: Eco-friendly hand hygiene for human and environmental safety. J Environ Chem Eng. 2021;9(2).
20. Dajaan DS, Addo HO, Ojo L, Amegah KE, Loveland F, Bechala BD, et al. Hand washing knowledge and practices among public primary schools in the Kintampo Municipality of Ghana. Int J Community Med Public Health. 2018 May 22;5(6):2205.
21. Gammon J, Hunt J. COVID-19 and hand hygiene: The vital importance of hand drying. British Journal of Nursing. 2020;29(17).
22. Ng YM, Or PLP. Coronavirus disease (COVID-19) prevention: Virtual classroom education for hand hygiene. Vol. 45, Nurse Education in Practice. 2020.
23. journal of infection and public health.
24. Biran A, Schmidt WP, Wright R, Jones T, Seshadri M, Isaac P, et al. The effect of a soap promotion and hygiene education campaign on handwashing behaviour in rural India: A cluster randomised trial. Tropical Medicine and International Health. 2009 Oct;14(10):1303–14.
25. Watson J, Cumming O, MacDougall A, Czerniewska A, Dreibelbis R. Effectiveness of behaviour change techniques used

Journal of Coastal Life Medicine

- in hand hygiene interventions targeting older children – A systematic review. Vol. 281, Social Science and Medicine. Elsevier Ltd; 2021.
26. AM H, A S, S A, A K, A B. Knowledge, Attitude and Practices among Pupils towards Hand Washing in Basic Schools-Ombadda Locality-Khartoum State. *J Epidemiol Public Health Rev.* 2021;6(2).
27. Shilunga APK, Amukugo HJ, Mitonga KH. Knowledge, attitudes and practices of primary schools learners on sanitation and hygiene practices. *Int J Community Med Public Health.* 2018 Jul 23;5(8):3197.
28. Biran A, Schmidt WP, Wright R, Jones T, Seshadri M, Isaac P, et al. The effect of a soap promotion and hygiene education campaign on handwashing behaviour in rural India: A cluster randomised trial. *Tropical Medicine and International Health.* 2009 Oct;14(10):1303–14.
29. Huang F, Armando M, Dufau S, Florea O, Brouqui P, Boudjema S. COVID-19 outbreak and healthcare worker behavioural change toward hand hygiene practices. *Journal of Hospital Infection.* 2021;111.
30. Lopez-Quintero C, Freeman P, Neumark Y. Hand washing among school children in Bogotá, Colombia. *Am J Public Health.* 2009 Jan 1;99(1):94–101.
31. Bresee S, Caruso BA, Sales J, Lupele J, Freeman MC. “A child is also a teacher”: Exploring the potential for children as change agents in the context of a school-based WASH intervention in rural Eastern Zambia. *Health Educ Res.* 2016;31(4).