Knowledge, Awareness, Perception and Attitude Regarding Exposure to Chemicals in Personal Care and Consumer Products among Undergraduate Dental Students

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ABSTRACT

Background: Personal care and consumer products are widely used in daily life and often contain chemical constituents such as parabens, phthalates, triclosan, and formaldehyde releasers, which may pose potential health risks upon prolonged exposure. Dental students, as future healthcare professionals, should possess adequate knowledge and awareness regarding chemical exposure to guide personal practices and patient education.

Objective: To assess the knowledge, awareness, perception, and attitude regarding exposure to chemicals in personal care and consumer products among undergraduate dental students.

Methods: A cross-sectional questionnaire-based study was conducted among 200 undergraduate dental students. A structured, pretested questionnaire comprising 13 items evaluated four domains: knowledge, awareness, perception, and attitude toward chemical exposure in personal care and consumer products. Demographic variables such as age, gender, and year of study were recorded. Data were analysed using descriptive statistics and chi-square tests to compare responses based on gender and year of study.

Results: The mean age of participants was 21.35 ± 1.20 years. Females constituted 63%, while males accounted for 37% of the sample. Overall, students demonstrated moderate awareness but limited in-depth knowledge regarding chemical exposure. Statistically significant associations were observed between gender and responses for selected questions (Q1, Q7, Q10, Q11) and between year of study and awareness-related questions (Q2, Q3). Senior students and interns showed relatively better perception and attitude compared to junior students.

Conclusion: Although undergraduate dental students exhibited reasonable awareness and a positive attitude toward reducing chemical exposure, gaps in scientific knowledge persist. Incorporation of environmental health and chemical safety topics into the dental curriculum is recommended to enhance informed decision-making and preventive practices.

Keywords: Attitude, Consumer Products, Chemical Exposure, Dental Students, Knowledge, Awareness, Personal Care Products.

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Introduction

In recent decades, the use of personal care and consumer products has increased exponentially, leading to unavoidable daily exposure to a wide range of synthetic chemicals. These products include cosmetics, soaps, shampoos, deodorants, plastics, household cleaners, and food packaging

materials. Many of these contain potentially harmful substances such as endocrine-disrupting chemicals, preservatives, and synthetic fragrances, which have been linked to adverse systemic and reproductive health effects.

Healthcare professionals play a crucial role in educating the public about preventive health strategies. Dental students, in particular, are exposed to consumer and professional chemical products during training and clinical practice. Therefore, assessing their knowledge, awareness, perception, and attitude (KAPA) regarding chemical exposure is essential for promoting safer practices and patient counselling.

Despite increasing public concern, limited data exist on the understanding of chemical exposure among dental students. This study aims to evaluate the KAPA levels of undergraduate dental students regarding exposure to chemicals in personal care and consumer products.

Methodology

Aim

To assess the knowledge, awareness, perception, and attitude regarding exposure to chemicals in personal care and consumer products among undergraduate dental students.

Objectives

1. To evaluate the level of knowledge and awareness among dental students regarding chemical exposure.
2. To assess perception toward health risks associated with chemicals in consumer products.
3. To analyse attitudes toward minimizing exposure and adopting safer alternatives.

Study Design and Setting

A cross-sectional study was conducted among undergraduate dental students.

Study Population

A total of 200 BDS students from all academic years (I BDS to Interns) participated in the study.

Inclusion Criteria

- Undergraduate dental students willing to participate.
- Students present during data collection.

Exclusion Criteria

- Unwilling participants
- Incomplete questionnaires

Study Instrument

A structured, self-administered questionnaire with 13 multiple-choice questions covering knowledge, awareness, perception, and attitude domains was used.

Statistical Analysis

Data were analysed using descriptive statistics. Chi-square tests were applied to assess associations between responses and demographic variables. A p-value ≤ 0.05 was considered statistically significant.

Result

Demographic Characteristics

The age of participants ranged from 18 to 23 years, with a mean age of 21.35 ± 1.203 years. Females (63%) outnumbered males (37%). Distribution across academic years showed representation from all levels, with the highest proportion from IV BDS students.

Gender-wise Comparison

Statistically significant differences between males and females were observed for:

- Q1 (p = 0.05)
- Q7 (p = 0.035)
- Q10 (p = 0.036)
- Q11 (p = 0.05)

Females demonstrated better awareness and more cautious attitudes toward chemical exposure compared to males.

Year-wise Comparison

Significant associations were observed for:

- Q2 (p = 0.036)
- Q3 (p = 0.003)

AGE					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Age	200	18	23	21.35	1.203

Gender	Frequency	Percent	Valid Percent
Male	74	37.0	35.1
Female	126	63.0	64.9
Total	200	100.0	100.0

Year of Study	Frequency	Percent	Valid Percent
I BDS	31	15.5	14.7
II BDS	48	24.0	28.0
III BDS	25	12.5	11.8
IV BDS	53	26.5	25.1
INTERNS	43	21.5	20.4
Total	200	100.0	100.0

Distribution and comparison of responses based on gender

Item	Response	Males		Females		Chi-Square value	P value
		n	%	n	%		
Q1	1	12	32.4	25	67.6	0.536	0.05*
	2	32	33.6	63	66.3		
	3	15	40.5	22	59.5		
	4	15	48.3	16	51.6		
Q2	1	11	35.4	20	74.5	0.469	0.493
	2	23	31.9	49	68.1		
	3	28	31.4	50	68.5		
	4	2	22.2	7	88.8		
Q3	1	10	23.3	33	76.7	6.490	0.090
	2	11	26.8	30	73.2		
	3	19	39.6	29	60.4		
	4	34	43	45	57		
Q4	1	17	43.6	22	55.4	6.262	0.100
	2	13	22.8	44	77.2		
	3	11	32.4	23	67.6		
	4	33	40.7	48	64.9		
Q5	1	7	35	13	65	1.759	0.624
	2	7	35	13	65		
	3	8	25	24	75		
	4	52	37.4	87	62.6		

Q6	1	24	42.9	32	57.1	6.351	0.096
	2	7	33.3	14	66.7		
	3	8	57.1	6	42.9		
	4	35	29.2	85	70.8		
Q7	1	16	37.2	27	62.8	8.634	**0.035***
	2	23	48.9	24	51.1		
	3	12	21.4	44	78.6		
	4	23	35.4	42	64.6		
Q8	1	10	41.7	14	58.3	1.065	0.785
	2	7	38.7	11	61.1		
	3	5	41.7	7	58.3		
	4	52	33.1	105	66.9		
Q9	1	6	60	4	40	4.871	0.182
	2	8	50	8	50		
	3	8	33.3	16	66.7		
	4	52	32.3	109	67.7		
Q10	1	11	61.6	7	38.9	8.534	**0.036***
	2	4	21.1	15	78.9		
	3	8	47.1	9	52.9		
	4	51	32.5	106	67.5		
Q11	1	10	58.8	7	41.2	7.518	**0.05***
	2	8	47.1	9	52.9		
	3	9	42.9	12	57.1		
	4	47	30.1	109	69.9		
Q12	1	8	47.1	9	52.9	1.176	0.759
	2	7	33.3	14	66.7		
	3	5	33.3	10	66.7		
	4	54	34.2	104	65.8		
Q13	1	29	34.1	56	65.9	0.947	0.814
	2	15	41.7	21	58.3		
	3	8	30.8	18	69.2		
	4	22	35.1	42	65.2		

Distribution and comparison of responses based on year of the study:

Item	Response	I BDS		II BDS		III BDS		IV BDS		INTERN		Chi-Value	P-Value
		n	%	n	%	n	%	n	%	n	%		
Q1	1	4	10.8	13	35.1	5	13.5	8	21.6	7	18.9	8.434	0.06
	2	14	18.1	14	18.1	4	5.1	24	31.1	21	27.2		
	3	4	10.8	12	32.4	5	13.5	11	29.7	5	13.5		
	4	9	18.3	9	18.3	11	22.4	10	20.4	10	20.4		

Q2	1	3	16.6	15	83.3	11	7.9	35	25.2	25	18	10.528	**0.036***
	2	8	11.1	14	19.4	5	19.4	10	25	7	25		
	3	17	48.5	18	51.4	4	16	5	9.4	6	13.9		
	4	3	60	2	40	4	16	3	5.6	5	11.6		
Q3	1	3	7	20	46.5	2	4.7	7	16.3	11	25.6	29.919	**0.003***
	2	3	7.3	15	36.6	4	9.8	10	24.4	9	22		
	3	5	10.4	13	27.1	8	16.7	16	33.3	6	12.5		
	4	20	25.3	11	13.9	11	13.9	20	25.3	17	21.5		
Q4	1	5	12.8	12	30.8	3	7.7	8	20.5	11	28.2	17.598	0.128
	2	6	10.5	22	38.6	5	8.8	15	26.3	9	15.8		
	3	6	17.6	12	35.3	2	5.9	10	29.4	4	11.8		
	4	14	17.3	13	16	15	18.5	20	24.7	19	23.5		
Q5	1	3	15	3	15	12	5	5	25	8	40	10.737	0.552
	2	3	15	6	30	5	10	3	15	6	30		
	3	3	9.4	10	31.2	1	15.6	7	21.9	7	21.9		
	4	22	15.8	40	28.8	17	12.2	38	27.3	22	15.8		
Q6	1	7	12.5	16	28.6	5	8.9	19	35.8	9	20.9	5.907	0921
	2	2	9.5	6	28.6	4	19	4	7.5	5	11.6		
	3	3	21.4	3	21.4	2	14.3	3	21.4	3	21.4		
	4	19	15.8	34	28.3	14	11.7	27	22.5	26	21.7		
Q7	1	9	20.9	9	20.9	2	4.7	14	32.6	9	20.9	9.196	0.686
	2	7	14.9	14	29.8	4	8.5	13	27.7	9	19.1		
	3	8	14.3	18	32.1	9	16.1	10	17.9	11	19.6		
	4	7	10.8	18	27.7	10	15.4	16	24.6	14	21.5		
Q8	1	3	12.5	9	37.5	3	12.5	4	16.7	5	20.8	14.232	0286
	2	0	0	6	33.3	4	22.2	4	22.2	4	22.2		
	3	3	25	1	8.3	2	16.7	1	8.3	5	41.7		
	4	25	15.9	43	27.4	16	10.2	44	28	29	18.5		
.Q9	1	2	20	3	30	0	0	3	30	2	20	9.492	0.660
	2	1	6.2	4	25	2	12.5	6	37.5	3	18.8		
	3	4	16.7	8	33.3	4	16.7	1	4.2	7	29.2		
	4	24	14.9	44	27.3	19	11.8	43	26.7	31	19.3		

Q10	1	3	16.7	8	44.4	2	11.1	2	11.1	3	16.7	10.656	0.559
	2	1	5.3	4	21.1	3	15.8	7	36.8	4	21.1		
	3	4	23.5	5	29.4	2	11.8	1	5.9	5	29.4		
	4	23	14.6	42	26.8	18	11.1	43	27.4	31	19.7		
Q11	1	3	17.6	6	35.3	1	5.9	3	17.6	4	23.5	8.343	0.758
	2	1	5.9	5	29.4	3	17.6	3	17.6	5	29.4		
	3	4	19	6	28.6	3	14.3	2	9.5	6	28.6		
	4	23	14.7	42	26.9	18	11.5	45	28.8	28	17.9		
Q12	1	2	11.8	6	35.3	1	5.9	4	23.5	4	23.5	11.371	0.497
	2	0	0	8	38.1	4	19	5	23.8	4	19		
	3	2	13.3	2	13.3	4	26.7	3	20	4	26.7		
	4	27	17.1	43	27.2	16	10.1	41	25.9	31	19.6		
Q13	1	16	18.8	25	29.4	11	12.9	17	20	16	18.8	6.234	0.904
	2	5	13.9	11	30.6	2	5.6	11	30.6	7	26.9		
	3	2	7.7	7	26.9	3	11.5	7	26.9	7	20.3		
	4	8	12.5	16	25	9	14.1	18	28.1	13	20.4		

Discussion

The present study highlights that while undergraduate dental students are moderately aware of chemical exposure in personal care and consumer products, comprehensive knowledge remains limited. These findings are consistent with previous studies assessing environmental and chemical health literacy among healthcare students.

Female students exhibited greater concern and awareness, possibly due to higher personal use of cosmetic products and increased health consciousness. Additionally, higher academic years demonstrated better understanding, emphasizing the role of education and clinical exposure.

Given the growing evidence linking chemical exposure to systemic health effects, it is imperative that dental curricula incorporate environmental health, toxicology, and consumer safety education. This will empower future dentists to make informed personal choices and educate patients effectively.

Conclusion

Undergraduate dental students demonstrated moderate awareness and a positive attitude toward reducing exposure to harmful chemicals in personal care and consumer products; however, significant knowledge gaps were identified. Educational interventions, curriculum enhancement, and awareness programs are recommended to strengthen chemical safety literacy among future dental professionals.

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