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Assessing The Impact Of Toxic Toys On Indoor Environments And Children Health In Interior Decoration

Dr. Ramesh Raj S[1], Dr. S. Angel Raphella[2], C. Aruna Sundari[3], P. Sivakami[4]

[1]Associate Professor and Head, Department of Hotel Management and Catering Science, Madurai Kamaraj University College, # 2, Alagarkoil Road, Madurai – 625002

[2]Associate Professor, Department of Management Studies, Loyola Institute of Technology and Science, Thovalai, Kanyakumari District, Tamil Nadu

[3]Assistant Professor, Department of Nutrition and Dietetics, Sadakathullah Appa College, Rahmath Nagar, Tirunelveli.

[4]Lecturer, Department of Home Science, Seethalakshmi Ramaswami College, Tiruchirappalli 620 002

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ABSTRACT

The integration of decorative toys into interior spaces has become a popular trend, especially in settings designed for children. However, many of these toys contain toxic substances such as lead, phthalates, and volatile organic compounds (VOCs), which can pose significant health risks and degrade indoor air quality. This research explores the impact of toxic toys in interior decoration, focusing on their chemical composition, the potential health hazards they introduce, and their long-term effects on indoor environments. By analyzing case studies, scientific reports, and regulatory guidelines, the study aims to highlight the dangers associated with toxic decorative elements and propose safer alternatives for sustainable and health-conscious interior design. The findings will contribute to raising awareness among consumers and designers, advocating for stricter regulations and promoting the use of non-toxic materials in decorative aesthetics

It is well knowledge that heavy metals like lead and cadmium delay brain development and increase the likelihood of high blood pressure. Because children's bodies absorb heavy metals more quickly than adults', they are the most vulnerable demographic. Such exposure might endanger their brain development. The toys include phthalates, which aid in the flexibility and dependability of plastic toys. the primary data is collected and the impact of toxic toys is examined by various tools using SPSS 27.0 and AMOS software. The media has to create awareness about the toxicity of toys and further plastic items to the public belonging to both urban and rural sectors.

Keywords: *Harmful, Illness, Phthalates, Toxic toys*

1. INTRODUCTION

At current rates, the Toy Association of India (TAI) believes that India's toy business is worth around INR 20 billion. Toys made in our country may be roughly categorized into the following groups: Mechanical and activity toys, plush/stuffed toys, board games/puzzles, educational games and toys, wooden toys, metal/tin toys, electronic toys/games, collectibles, and stationary items turned into playthings are examples of plastic toys. In plastic items, including children's toys, a variety of chemical additives are utilised to achieve or maximise particular product attributes such as material hardness or elasticity [1].

A total of 72 toys, the majority of which were PVC or had PVC components, were tested for phthalates in 17 countries. Phthalates were found in a significant amount (usually 10-40% by weight) in virtually all of the soft PVC toys tested [2].

Many modern toys are composed of flexible plastics like Poly Vinyl Chloride (PVC). PVC is made flexible by the inclusion of a phthalate plasticizer during the manufacturing process. Phthalates enter the environment through the air, food, and/or people, including newborns in their mothers' womb. Phthalates are being discovered in both interior air and dirt [3]. In general, newborns and young children are regarded more susceptible to chemical contact for a variety of reasons, including their rapid metabolic rate, high surface area to body weight ratio, and rapid organ and tissue growth [4].

Flexible vinyl is both long-lasting and inexpensive. In India, the unorganized sector dominates the toy manufacturing industry, with over 1,000 units in the small-sector and a larger number in the cottage sector. Businesses with minimal

customer value, significant turnover, and no direct touch between the vendor and the eventual buyer may not profit as much from CRM [5]. Toys made in the unorganized sector use cheap recycled plastic, which can be a source of poisoning. Lead paint is a major source of lead poisoning in children and a key source of lead exposure [6].

2. OBJECTIVES OF THE STUDY

1. To study the awareness about Toxic Toys among Customers
2. To know the opinion of Physicians towards Toxic Toys
3. To assess how toxic decorative elements affect indoor air pollution and overall environmental quality
4. To generate a model for maintaining Good Health of the Customers

3. METHODOLOGY

Toys marketed in India have been found to have alarmingly high amounts of lead and cadmium [7]. The research focuses on Tamil Nadu's top 10 biggest cities. The study's ten largest cities are Chennai, Madurai, Coimbatore, Tiruchirapalli, Salem, Tirunelveli, Tirupur, Erode, Vellore, and Tuticorin. For the study, 750 clients and 250 physicians from the aforementioned locations were chosen as samples and polled using a questionnaire. The research is based on factual data. Secondary data is obtained from a variety of trustworthy sources, such as books, newspapers, and journals, as well as through access to numerous websites. The random sampling approach is used to acquire primary data.

Tools and Techniques

Statistical tools like Descriptive Analysis, Mean Score Analysis, t-Test, ANOVA, Freidman Test and Factor Analysis using SPSS 23.0 are employed for the study. AMOS is used for reliability and validity of the items in the instrument and for generating the Structural Equation Model.

4. RESULTS

A. Awareness of Toxic Toys Crisis:

Awareness of toxins in toys has not yet reached most of the customers. There is a lack of a unified worldwide strategy to internationally regulating chemicals in children's goods and toys [8].

Since P value is less than 0.05, the null hypothesis is rejected at 5 per cent level of significance. Hence there is significant difference between urban and rural locality of customers with respect to awareness on ‘Making of toys with low quality components’. A green ball purchased from Toys ‘R’ Us contains the most phthalates, accounting for more than 47 percent of the ball's weight. Several squeeze toys, including a Fred Meyer rubber ducky and a Target brand penguin, had more than 30% phthalate. A ‘Baby I'm Yours’ doll from Target contains more than 30% total phthalates. A Wal-Mart dinosaur figurine contains more than 28 percent total phthalates [9].

Since P value is less than 0.01, the null hypothesis is rejected at 1 per cent level of significance. Hence there is significant difference between urban and rural locality of customers with respect to ‘Banning of import of toys’.

Since P value is greater than 0.05, there is no significant difference between urban and rural locality customers with regard to Toys are found to be Toxic, Many toy manufacturers do not hold license and Branded toys are also dangerous (Table 1).

Null Hypothesis I: There is no significant difference between Customers from Urban and Rural Locality with respect to dimensions of Awareness of Toxic Toys Crisis

Table 1: Student t test for significant difference between Customers from Urban and Rural Locality with respect to dimensions of Awareness of Toxic Toys Crisis

Sl.No.	Dimensions of Awareness of Toxic Toys Crisis	Locality				t value	P value
		Urban		Rural			
		Mean	SD	Mean	SD		
1	Toys are found to be Toxic	2.76	1.01	2.67	0.98	1.133	0.257
2	Many toy manufacturers do not hold license	3.99	0.98	4.10	0.83	1.525	0.128
3	Branded toys are also dangerous	2.63	1.30	2.70	1.15	0.733	0.464

4	Toys are made up of low-quality components	3.20	1.12	3.39	1.08	2.217	0.027*
5	Import of toys must be banned	3.71	1.21	3.97	1.18	2.782	0.006**

Source: Statistically analyzed data

Note: * Denotes significance at 5 % level

** Denotes significance at 1 % level

B. Reasons for preferring a particular toy:

Children prefer toys that are most attractive to them. They show more choice to the colours of the toys too. Since P value is less than 0.01, the null hypothesis is rejected at 1 per cent level of significance. Hence there is significant difference between Colours, Attractiveness, and Low cost, Children's Pressure, Modern Technology and Advertisement with respect to Dimensions of Reasons for preferring a particular toy (Table 2).

Null Hypothesis II: *There is no significant difference between Age categories of children with respect to dimensions of Reasons for preferring a particular toy*

Table 2: ANOVA for significant difference between Age categories of children with respect to dimensions of Reasons for preferring a particular toy

Sl.No.	Reasons for preferring a particular Toy	Age Category of Children				F value	P value
		Below 2 years	2-7 years	7-12 years	Above 12 years		
1	Colour	4.17 (1.05)	4.38 (0.85)	3.99 (0.96)	4.40 (1.00)	8.464	0.000**
2	Wide Range of Products	4.42 (0.63)	4.32 (0.56)	4.27 (0.65)	4.32 (0.65)	1.531	0.205
3	Attractive	4.28 (0.70)	4.46 (0.66)	4.38 (0.63)	4.57 (0.67)	4.497	0.004**
4	Desire	4.63 (0.62)	4.25 (1.01)	4.04 (1.09)	3.99 (0.98)	10.970	0.000**
5	Temptation	4.62 (0.48)	4.76 (0.42)	4.58 (0.49)	5.00 (0.00)	30.931	0.000**
6	Modern Technology	4.43 (0.49)	4.44 (0.49)	4.31 (0.72)	4.06 (0.68)	13.668	0.000**
7	Advertisement	3.00 (0.92)	2.62 (0.80)	2.40 (0.84)	2.39 (0.82)	14.653	0.000**
8	Display	4.58 (0.49)	4.59 (0.49)	4.62 (0.48)	4.48 (0.50)	2.491	0.059

Source: Statistically analyzed data

Note: ** Denotes significance at 1% level

C. Symptoms of illness seen in children:

Some harmful and prohibited compounds are still discovered in plastic toys on controlled markets, for example, as a result of recycling tainted polymers, manufacturer ignorance, or a lack of restrictions in the manufacturing nation [10]. Since P value is less than 0.01, the null hypothesis is rejected at 1 per cent level of significance. Hence it is concluded that there is significant difference between mean ranks towards Symptoms of illness seen in Children.

Based on mean rank, Headache (4.69) and Eyestrain (4.69) are the best factors behind Symptoms of illness seen in Children, followed by Irritability (4.68), Attention deficit (4.22), Anemia (4.10), Stomachache (3.98), and Low IQ (1.63) (Table 3).

Null Hypothesis III: *There is no significant difference between Mean Ranks towards Symptoms of illness seen in children*

Table 3: Friedman test for significant difference between Mean Ranks towards Symptoms of illness seen in children

Sl.No.	Symptoms of illness seen in Children	Mean Rank	Chi-Square value	P value
1	Anemia	4.10	1386.3	0.000**
2	Low IQ	1.63		
3	Stomachache	3.98		
4	Headache	4.69		
5	Irritability	4.68		
6	Eyestrain	4.69		
7	Attention deficit	4.22		

Source: Statistically analyzed data

Note: ** Denotes significance at 1% level

D. Awareness on effect of toxic decorative elements:

The awareness of the impact of toxic decorative elements on indoor air pollution and environmental quality varies across different factors (Table 4). A significant majority of respondents (71.9%) recognize that many decorative toys contain harmful substances such as lead, phthalates, formaldehyde, and volatile organic compounds (VOCs), which can off-gas into indoor environments. Furthermore, 77.5% acknowledge that poorly manufactured decorative items release harmful fumes over time, exacerbating air pollution. Ventilation plays a crucial role, with 86.7% agreeing that poor airflow contributes to the accumulation of toxic compounds, heightening health risks. Additionally, 63.7% believe that exposure to heat or sunlight accelerates the emission of hazardous chemicals from synthetic decorations. Over time, degradation of decorative toys becomes a concern, as 56% note the release of microplastics and airborne pollutants into living spaces. Regulatory oversight is another critical issue, with 72.4% of respondents indicating that weak safety regulations allow hazardous materials to enter homes unnoticed. The absorption and slow release of toxic substances by indoor surfaces such as carpets, walls, and furniture is acknowledged by 77.9% of respondents. Lastly, 73.7% recognize that toxic decorative materials contribute to waste generation and environmental degradation when disposed of improperly.

Table 4: Frequency Distribution of Awareness on effect of toxic decorative elements

Sl.No	Particulars	Positive Response		Negative Response		Total
		Count	%	Count	%	
1	Many decorative toys contain harmful substances like lead, phthalates, formaldehyde, and volatile organic compounds (VOCs) that can off-gas into the indoor environment.	539	71.9	211	28.1	750

2	Poorly manufactured decorative items can release harmful fumes over time, contributing to indoor air pollution.	581	77.5	169	22.5	750
3	Poor ventilation can exacerbate the accumulation of toxic compounds, making indoor spaces more hazardous.	650	86.7	100	13.3	750
4	Exposure to heat or sunlight can accelerate the emission of harmful chemicals from synthetic decorative materials.	478	63.7	272	36.3	750
5	Over time, decorative toys may degrade, releasing microplastics and airborne pollutants into the indoor environment.	420	56.0	330	44.0	750
6	Weak safety regulations allow hazardous materials to enter homes unnoticed, increasing health risks for occupants.	543	72.4	207	27.6	750
7	Carpets, walls, and furniture can absorb toxic substances and slowly release them back into the air, prolonging exposure.	584	77.9	166	22.1	750
8	Toxic materials contribute to waste generation and environmental degradation when discarded improperly.	553	73.7	197	26.3	750

Source: Statistically analyzed data

E. Opinion of Physicians on Toxic Toys Crisis:

Five factors are extracted from the matrix, based on the criterion that only factors with Eigen values of one or more should be extracted. Factor one is a combination of two variables, Factor two is a combination of two variables, Factor three is a combination of three variables, Factor four is a combination of two variables and Factor five has only one variable. The cumulative per cent of variance of the five factors account for **79.292** per cent of the total variance. This is a good fit because the researcher is able to economize on the number of variables (from ten, it is reduced to five underlying factors) while only 21 per cent is lost from the information content (79 per cent is retained by the five factors extracted out of the ten original variables). Each factor loading is a measure of the important variables from the table. The table represents that no variables is co-related with all the five factors. Hence the factors are independent (Table 5). If children are properly directed, parents and other adults may profit as well. Knowledge transfer from children to parents (and other adults) suggests that awareness may be conveyed sequentially from the classroom to the community [11].

Table 5: Factor loading and Percent of variance using Rotated Component Matrix for Factors behind Opinion of Physicians on Toxic Toys Crisis			
			Rotation Sums of Squared Loadings

Factor	Statement	Factor Loading	Eigen value	% of Variance	Cumulative %
I	Usage of toxic toys leads to anemia, low IQ, stomachache, headache, eye strain etc.	0.823	1.838	18.382	18.382
	Healthy and low cholesterol food must be consumed by everyone	0.749			
II	Attractive, colorful, eye straining toys must be avoided	0.915	1.833	18.333	36.716
	Children's hands must be washed immediately after playing with toys	0.649			
III	Intake of Lead, Cadmium, Phalthene in Toxic Toys, Paints leads to damage of Brain and Reproductive system	0.802	1.488	14.883	51.598
	Banning of toxic toys must be done	0.620			
	Regular health checkups must be undertaken	-0.544			
IV	Houses must be repainted where paint is flaking off	0.860	1.386	13.861	65.459
	Pregnant and lactating women suffer from lead poisoning	-0.612			
V	Regular cleaning of floors, window sills and other surfaces must be done regularly	0 .936	1.383	13.833	**79.292**

Source: Statistically analyzed data

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotation converged in 5 iterations.

F. Measurement Model of Maintaining Good Health (MGH) Five Constructs

The five-factor structure confirmatory factor analysis (CFA) measurement model namely Awareness to Customers about Toxic Toys, Maintain Good Health, Avoiding usage of Toxic Toys, Awareness from Sources and Symptoms of Illness by using AMOS software to check reliability and validity between twenty three items (Figure 1). The five -factor structure measurement model with values of CFA loadings item wise for five constructs of the MGD instrument is exhibited in the figure. All the twenty-three item factor loadings exceeded the acceptance range of 0.50 (Hair et.al. 2010). The finalized five factor structure measurement model become the baseline model related to cross-validation in research.

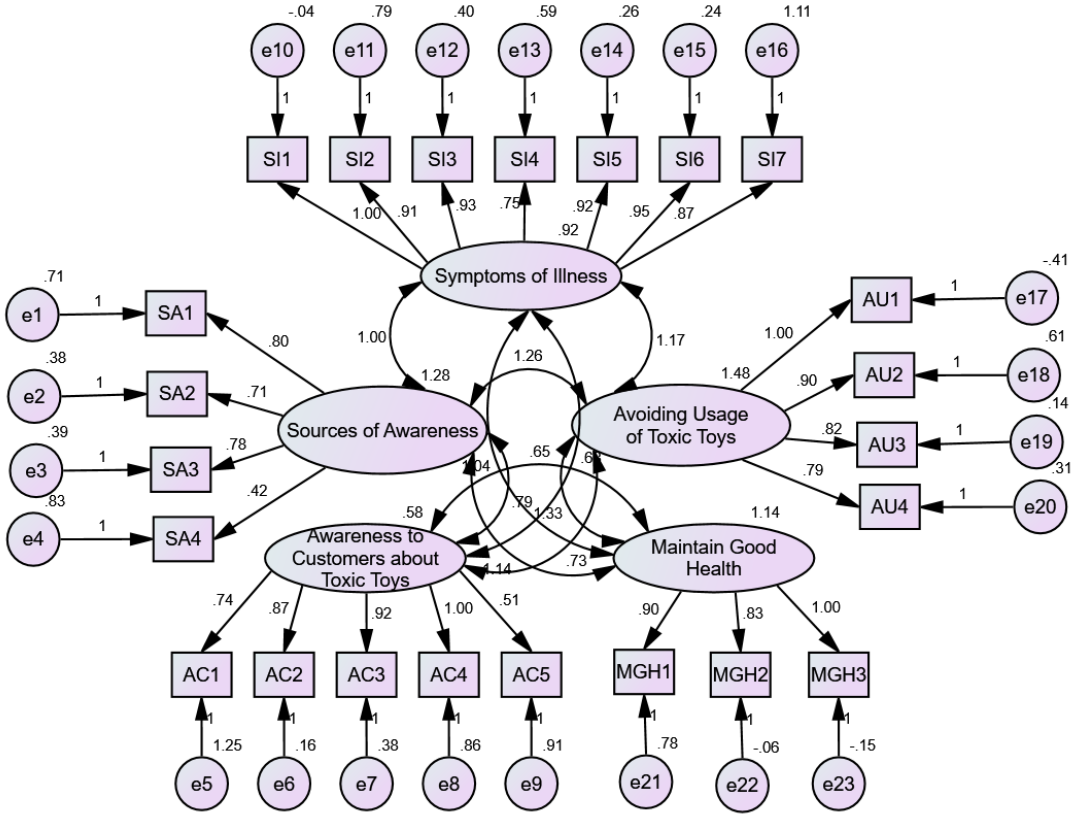

Fig 1 CFA Model for MGH Instrument

The values of reliability and validity assessment of Maintain Good Health questionnaire item wise are observed. The reliability values of Sources of Awareness (α = 0.931), Awareness to Customers about Toxic Toys (α = 0.951), Symptoms of Illness (α = 0.923), Avoiding Usage of Toxic Toys (α = 0.910) and Maintain Good Health (α = 0.899) are retrieved from the analysis (Table 6).

The reliability items result of Cronbach's Alpha (if Item deleted) and Confirmatory Factor Analysis loadings is shown in the table. By applying ALPHA method in SPSS, proved that there is an internal consistency between the items of 23 items in questionnaire related to the Maintain Good Health among children. Phthalates, which account up 10-40% of the overall weight of a toy, have been scrutinized due to their possible health consequences, particularly on reproductive development [12].

The Instrument is analyzed through a purification process based on the coefficient alpha as a measure of reliability of measurement instruments.

Table 6: Summary table of Reliability and Validity results of MGH Instrument

Sl. No.	Item(s) of Maintain Good Health (MGH)	Details of	Factor Item	CFA loading	Cronbach α (Item wise)	Cumulative Cronbach α (Dimension wise)	Composite Reliability (CR)
1	Television / Radio	Sources of Awareness	**SA1**	0.800	0.985	**0.931**	**0.780**
2	Newspapers / Magazines / Journals		**SA2**	0.710	0.936		
3	Friends / Relatives		**SA3**	0.780	0.939		

4	Physicians		**SA4**	0.420	0.865		
5	Toys are found to be Toxic	Awareness to Customers about Toxic Toys	**AC1**	0.740	0.997	**0.951**	**0.912**
6	Many toy manufacturers do not hold license		**AC2**	0.870	0.923		
7	Branded toys are also dangerous		**AC3**	0.920	0.992		
8	Toys are made up of low-quality components		**AC4**	1.000	0.918		
9	Import of toys must be banned		**AC5**	0.513	0.927		
10	Anemia	Symptoms of Illness	**SI1**	1.000	0.931	**0.923**	**0.970**
11	Low IQ		**SI2**	0.910	0.974		
12	Stomachache		**SI3**	0.930	0.909		
13	Headache		**SI4**	0.750	0.926		
14	Irritability		**SI5**	0.920	0.912		
15	Eyestrain		**SI6**	0.950	0.889		
16	Attention deficit		**SI7**	0.870	0.923		
17	Awareness needs to be created	Usage of Avoiding Toxic Toys	**AU1**	1.000	0.899	**0.910**	**0.932**
18	Banning of toxic toys		**AU2**	0.900	0.923		
19	Regular inspection of toys at point of purchase		**AU3**	0.820	0.898		
20	Quality checkups at manufacturing units		**AU4**	0.790	0.922		
21	Regular health check ups	Good Maintain Health	**MGH1**	0.900	0.879	**0.899**	**0.937**
22	Cleaning children after playing		**MGH2**	0.830	0.898		
23	Usage of traditional toys		**MGH3**	1.000	0.921		
	Acceptance limit			**0.4**	**0.7**	**0.7**	**0.961**

Source: Statistically analyzed data

G. Variable Summary of Structural Equation Model for Maintaining Good Health

Structural Equation Model for Maintaining Good Health is developed using AMOS. The fitness of the model is examined and the model is found to be perfectly fit (Figure 2).

I) Observed, endogenous variables

- Awareness to Customers about Toxic Toys
- Maintain Good Health
- Avoiding usage of Toxic Toys

II) Observed, exogenous variables

- Awareness from Sources
- Symptoms of Illness

III) Unobserved, exogenous variables

- e1

- e2
- e3

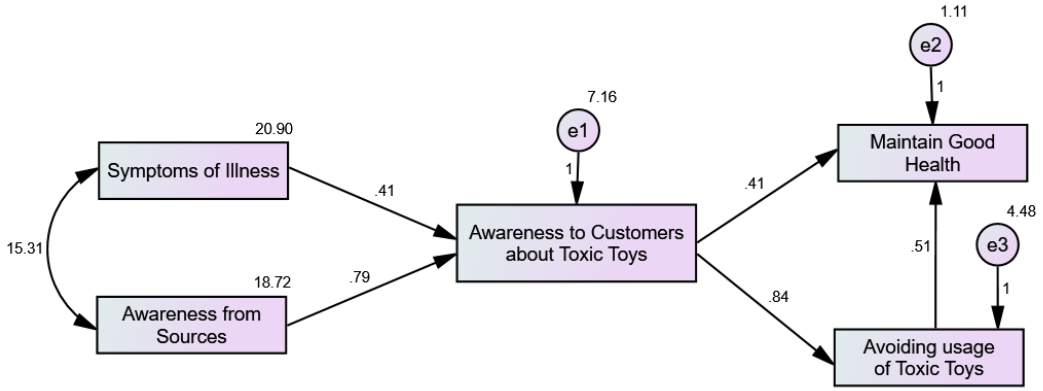

Fig. 2 Structural Equation Model for Maintaining Good Health

The model consists of three Observed, endogenous variables, two Observed, exogenous variables and three Unobserved, exogenous variables (Table 7).

The coefficient of Awareness from Sources and Awareness to Customers about Toxic Toys is **0.414.** The estimated positive sign implies that such effect is positive that Awareness to Customers about Toxic Toys will increase by every unit increase in Awareness from Sources towards Maintaining Good Health and this coefficient value is significant at 1% level.

The coefficient of Symptoms of Illness and Awareness to Customers about Toxic Toys is **0.788.** The estimated positive sign implies that such effect is positive that Awareness to Customers about Toxic Toys will increase by every unit increase in Symptoms of Illness towards Maintaining Good Health and this coefficient value is significant at 1% level.

The coefficient of Awareness to Customers about Toxic Toys and Avoiding usage of Toxic Toys is **0.842.** The estimated positive sign implies that such effect is positive that Avoiding usage of Toxic Toys will increase by every unit increase in Awareness to Customers towards Maintaining Good Health and this coefficient value is significant at 1% level.

The coefficient of Avoiding usage of Toxic Toys and Maintaining Good Health is **0.414**. The estimated positive sign implies that such effect is positive that Awareness to Customers about Toxic Toys will increase by every unit increase in Avoiding usage of Toxic Toys towards Maintaining Good Health and this coefficient value is significant at 1% level

The coefficient of Awareness to Customers about Toxic Toys and Maintaining Good Health is **0.509.** The estimated positive sign implies that such effect is positive that Maintaining Good Health will increase by every unit increase in Awareness to Customers towards Maintaining Good Health and this coefficient value is significant at 1% level.

The calculated P value is 0.060 which is greater than 0.05 which indicates perfectly fit. Here, GFI (Goodness of Fit Index) value and AGFI (Adjusted Goodness of Fit Index) value are greater than 0.9 which represents it is a good fit. The calculated CFI (Comparative Fit Index) value is 0.886 which means that it is a perfect fit, and also it is found that RMR (Root Mean Square Residual) value is (0.098) and RMSEA (Root Mean Score Error of Approximation) value is (0.074) which is less than 0.10 and indicates it is perfectly fit.

Table 7: Variables in the Structural Equation Model Analysis

Sl. No	Variables			Unstandardised co-efficient	S.E	Standardised co-efficient	t value	P value
1	Awareness to Customers about Toxic Toys	<--	Awareness from Sources	0.414	0.050	0.333	8.270	< 0.001**
2	Awareness to Customers about Toxic Toys	<--	Symptoms of Illness	0.788	0.053	0.599	14.887	< 0.001**
3	Avoiding usage of Toxic Toys	<--	Awareness to Customers about Toxic Toys	0.842	0.020	0.915	41.741	< 0.001**
4	Maintain Good Health	<--	Avoiding usage of Toxic Toys	0.414	0.025	0.469	16.638	< 0.001**
5	Maintain Good Health	<--	Awareness to Customers about Toxic Toys	0.509	0.027	0.531	18.841	< 0.001**

Source: Statistically analyzed data

5. DISCUSSION

In its standard criteria on Safety issues relating to mechanical and physical qualities, the BIS has set standards for toy safety labelling. The government has already begun the process of developing toy standards. A group has been constituted with the cooperation of the BIS to provide recommendations for defining toy standards. There have been several excellent encounters between scientists and media. Nonetheless, despite the idealistic objectives of scientists and professional journalists, their encounters may be chaotic and contentious. Such strife is usually the outcome of a collision between two cultures, science and the journalism [13]. Simply said, science is the realm of labs, publications, peer review, and acceptance based on scientific ideals and norms. The aim of reporting is to quickly enlighten the public and to chronicle history on the fly.

People are loyal to their nation, family, and beliefs, but not to their toothpaste, soap, or even beer. The marketer's goal should be to raise the tendency of the consumer to repurchase the company's brand [14]. It is also reported that the government intends to sell only toys bearing the 'Toy Safety' label in the country. All the Manufacturers do not provide details on the label regarding age and the indications of specific hazard(s) like ‘Warning! Not suitable for kids below three years’, ‘Contains small parts’ may appear on the label or in the instructions for the use of all the toys. The manufacturers may take into account that the packaging for toys projected for usage by kids from 3 to 6 years old and containing small portions, balloons, small balls or marbles must contain a cautionary statement regarding choking hazards. Retailers may increase customer loyalty by 1) creating a strong brand for the shop or store brands. 2) creating distinct and accurate positioning tactics and 3) Using loyalty programmes to build an emotional connection with customers [15].

6. CONCLUSION

Customers must always be a label reader. It is necessary to look for and heed age recommendations, such as ‘Not recommended for children under three’ and other safety labels including: ‘Flame retardant/Flame resistant’ on fabric products and ‘Washable/hygienic materials’ on stuffed toys and dolls. The government has enacted new toy safety laws and regulations across the country. Consumers' self-concept and living patterns are influenced by their age [16]. People are growing more intelligent. They don't enjoy being duped or having their intelligence questioned. People value beneficial knowledge. When firms cease distributing toys, parents may have a short sense of relief.

REFERENCES

[1] Andrady, A.L. and Rajapakse, N. 2019. "Additives and chemicals in plastics BT - hazardous chemicals associated with plastics in the marine environment". In: Takada, H., Karapanagioti, H.K. (Eds.), Springer International Publishing, Cham, pp. 1–17.

[2] Stringer, R., Labunska, I., Santillo, D., Johnston, P., Siddorn J. and Stephenson, A., 2000. "Concentrations of Phthalate Esters and Identification of Other Additives in PVC Children's Toys". Environmental Science & Pollution Res, Vol.7, pp. 1-10

[3] Rudel, R.A., Brody, J.G., Spengler, J.D., Vallarino, J., Geno, P.W., Sun, G. and Yau, A., 2001. "Methods to detect selected potential mammary carcinogens and endocrine disruptors in commercial and residential air and dust samples". Journal of Air and Waste Management Association, Vol. 51, pp. 499-513.

[4] Ionas, A.C., Ulevicus, J., Gomez, A.B., Brandsma, S.H., Leonards, P.E.G., Van de Bor, M. and Covaci, A., 2016. "Children's exposure to polybrominated diphenyl ethers (PBDEs) through mouthing toys". Environ. Int., Vol. 87, pp.101–107.

[5] George Day, S., 2003. "Creating a Superior Customer – Relating Capability", Sloan Management Review, Vol.44(3), pp.77-82.

[6] Jacobs, D.E., Clickner, R.P. and Zhou, J.Y., 2002. "The prevalence of lead-based paint hazards in U. S. housing". Environ Health Perspect, Vol.110, pp. A599- A606.

[7] Kumar, A. and Pastore, P., 2007. "Lead and cadmium in soft plastic toys". Current Science, Vol. 93, pp. 818-822.

[8] Negev, M., Berman, T., Reicher, S., Balan, S., Soehl, A., Goulden, S., Ardi, R., Shammai, Y., Hadar, L., Blum, A. and Diamond, M.L., 2018. "Regulation of chemicals in children's products: How U.S. and EU regulation impacts small markets", Sci. Total Environ., pp. 462- 471.

[9] Schreder, E., 2007. "Not so squeaky clean. Washington Toxics Coalition for the Toxic –Free Legacy Coalition". Seattle.

[10] Borling, P., Engelund, B. and Sørensen, H., 2006. "Survey, migration and health evaluation of chemical substances in toys and childcare products produced from foam plastic". Danish EPA report Survey.

[11] Christopher Vaughan, Gack Julie, Solorazano Humberto and Ray Robert, 2001. "The Effect of Environmental Education on School children, Their Parents, and Community Members: A Study of Intergenerational and Intercommunity Learning". Journal of Environmental Education, Vol. 34(3), p. 12.

[12] Duty, S.M., Silva, M.J., Barr, D.B., Brock, J.W., Ryan, L., Chen, Z., Herrick, R.F., Christiani, D.C. and Hauser, R., 2003. "Phthalate Exposure and Human Semen Parameters". Epidemiology, Vol. 14, pp. 269-277.

[13] William Allen, 2001. "A news media perspective on environmental communication". Bioscience, Vol. 51(4), p. 289.

[14] Wunderman Lester, 2000. "The most elusive word in Marketing". Contemporary Marketing.

[15] Jo Marney, 2001. "Bringing consumers Back for more". Marketing Magazine, 2001, p. 33.

[16] Henry, P., 2000. "Modes of Thought that vary systematically with both Social Class and Age". Psychology and Marketing, pp. 421 - 440.