Warning Information Provided with Child Care Products: An Application to Safety

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Abstract*—Warnings can be properly viewed as communications whose purposes include information and influencing the behaviour of people. Warnings are not simply signs or labels. Products should communicate safety information effectively and a warning should be comprised of a signal word to convey the gravity of the risk, an indication of the hazard, the possible consequences in terms of injuries and instructions as to how to avoid injuries. Elders, media, neighbours, and other related persons need guide about the safe use of children products to prevent child care product related accidents. So, it is essential to give due recognition to safety labels on anything you give your child to use or play with. In the present study efforts have been made to make warning symbol effective for use on baby products with the help of testing awareness level of parents, drawing up a list of requirements in terms of legibility, and understand ability, investigation of effectiveness of explicit warning and finally to suggest guidelines to make product information effective. An experimental study was purposively carried out at Pantnagar on a sample size of 70 i.e. 35 parents and 35 general public using estimation test and comprehension test. The test was conducted to evaluate the level of comprehensibility of warning symbol for five referents of (suffocation, unattended, age, weight, height) with four variants of each referent. The results of estimation and comprehension test reveal that symbols with high level of comprehension for the referents of suffocation (91%), followed by unattended, weight, age, and height 89% each meet the highly acceptable to be used as warning symbols by the parents. Similarly by the general public the referents for suffocation (85%), unattended (85%), weight (91%), age (80%) and height (85%) were found highly comprehensive.*

Keywords— Child Care Products, Comprehensibility, Safety Labels, Warning Symbols.

I. INTRODUCTION

Children play with toys and learn about world. Child care products are an integral part of children's developmental processes. A child of below three year of age may handle the things in a different manner from a child of 3-6 years of age group. Child care products may also inflict accidental injuries to children Like Sharp edges of toys; flammable, electrical, mechanical characteristics may cause accidents. Therefore, there is need to look out for toy labels and toy safety marks on the products that we buy for our children, to identify the quality of products.

Effective warnings should result in safe behaviour, leading to reduction in number of accidents. Unfortunately the response rate to the warnings is usually low. **Dorris and Pusewell (1998), Otsubo (1999**) showed that many either do not notice warning, fail to read them, or do not comply with them. The question is how to raise the impact of warnings. **Edworthy and Adams (1996)** argued that a warning sign should be thought of as an artefact that represents the risk associated with the hazardous situation. In order to do so a warning usually serves as an alerting function and as an information function. The alerting aspects of warning serve as an indication of hazards and the severity of hazards. Signal words, colors, symbols and sounds are an example of alerting elements in a warning. When used effectively these elements require little conscious information processing; and are almost spontaneously understood. The information aspects of a warning give indication on how to handle a hazardous product or how to act in a hazardous situation.

That is why the study was planned with the following objectives:

- To study the legibility and understandability of product information
- Preference ranking of warning symbols on the basis of comprehension

II. METHODOLOGY

Experimental as well as descriptive research design was planned to carry out the study. Under experimental research design estimation and comprehension test were used for present study for collection of data, related to warning symbols were developed to assess the comprehensibility of warning symbols for child care products. Preference ranking sheet was also developed to select the two most preferred symbols by parents and

general public. Total of 70 people out of which 50%, each from the age of 25-35 & 35-45 years old having children from 1-3 years of age were selected purposively from pantnagar block of U.S.Nagar district of Uttarakhand state.

Considering the importance of symbols in communicating safety information effectively, it was felt necessary to test already developed symbols as well as new symbol of their variants were developed and evaluated as a set of warning symbols. The selection of warnings symbols was based on an analysis by **Trommelen (1994)** of 15 European (draft) standards for the safety of child care products to identify the main hazards of these products.

Following Warning symbols were tested & developed:

- Keep plastic away from your child to avoid suffocation.
- Do not use this product once your child is older than x year of age; taller than x cm; weight more than x kg.
- Never leave your child unattended in/with this product. Your child may be hurt.

The following abbreviation will be used for these referents:

- Suffocation
- Age/weight/height
- Unattended

The procedures adhere to the main requirements of the procedure prescribed in the standards ISO/DIS 9186 rev. 1995 – 01-03. Procedure for the development and testing of public information symbols (ISO, 1995). The aim of the test procedure is to select symbols with a verified level of comprehensibility in an efficient and objective way. The test procedure consists of three stages:

- Selecting symbol variants for testing.
- Testing of selected symbol variants in estimation test.
- Testing the best symbol variants in comprehension test.

Stage I- Selecting Symbol Variants for Testing

The aim of the first stage was to collect as many symbol designs as possible for each of the referents. Vocational students were given the idea to design symbols for the different warnings. The resulting sets of drawings were used to develop symbol variants.

Stage II- Testing Symbol Variants in Estimation Test

The aim of second phase of the test procedure was to select the most promising symbols from the total set of symbol designs collected in the first phase. In an estimation test, the sample population was asked to estimate the percentage of the population that they think will understand the meaning of the different symbol variants for each of the referents. The median of the estimates of the sample population for a symbol was its estimated comprehension score. According to the ISO standard it can be assumed that symbols with an estimation score above 80 per cent will pass the comprehension test and can be accepted without further testing.

Stage III- Testing Symbol Variants in Comprehension Test

In the last phase of the procedure the variants selected with the estimation tests were further tested to verify their level of comprehensibility. In the comprehensibility test, the sample population was first explicitly told about the context of use of the symbols, and then they were shown one symbol variant per referent and asked to write down what they think each symbol means. The percentage of correct interpretations of a symbol determines its comprehension score. For the study, the acceptance criterion was set at 80 per cent correct interpretations with less than 4 per cent opposite interpretations. However, there was no agreed criterion for the acceptance of warning symbols. For public information symbols in general, the ISO standard prescribes an acceptance criterion for 66 per cent.

1 Estimation Test

In estimation test was conducted to select the most promising symbols from the total set of symbol designs to check the meaning of the different symbol variants for each of the referents. Preference ranking sheet was developed to select the two most adapting or preferable symbols from each referents which were chosen by the parents and general public.

In an estimation test the respondents were shown all the symbol variants for a referent. The symbols for a referent were depicted simply on the laptop. The respondents were asked to understand the meanings of the different symbol variants. The respondents were then asked to do preference ranking of the different variants symbols in each group.

2 Comprehension Test

The comprehension test was further conducted to verify their level of comprehensibility. In this, sample population was explicitly told about context of use of symbols, then they were shown one symbol variant per referent and told that what each symbol means.

III. RESULTS AND DISCUSSION

Four variants were developed for each of the five referents i.e. suffocation, unattended, age, weight and height.

By summarizing the results it can be concluded that symbol for further testing are available for all the referents. Symbol with estimation score for all the

referents are further tested on the bases of scores attained as per standards described by ISO.

Symbol with estimation score about 85 percent were accepted without further testing. Symbols with estimation score below 45 percent were rejected straight away. The level of comprehension of symbols with an intermediate estimation between 45-85 percent was tested in comprehension test to determine if they meet the acceptation criterion.

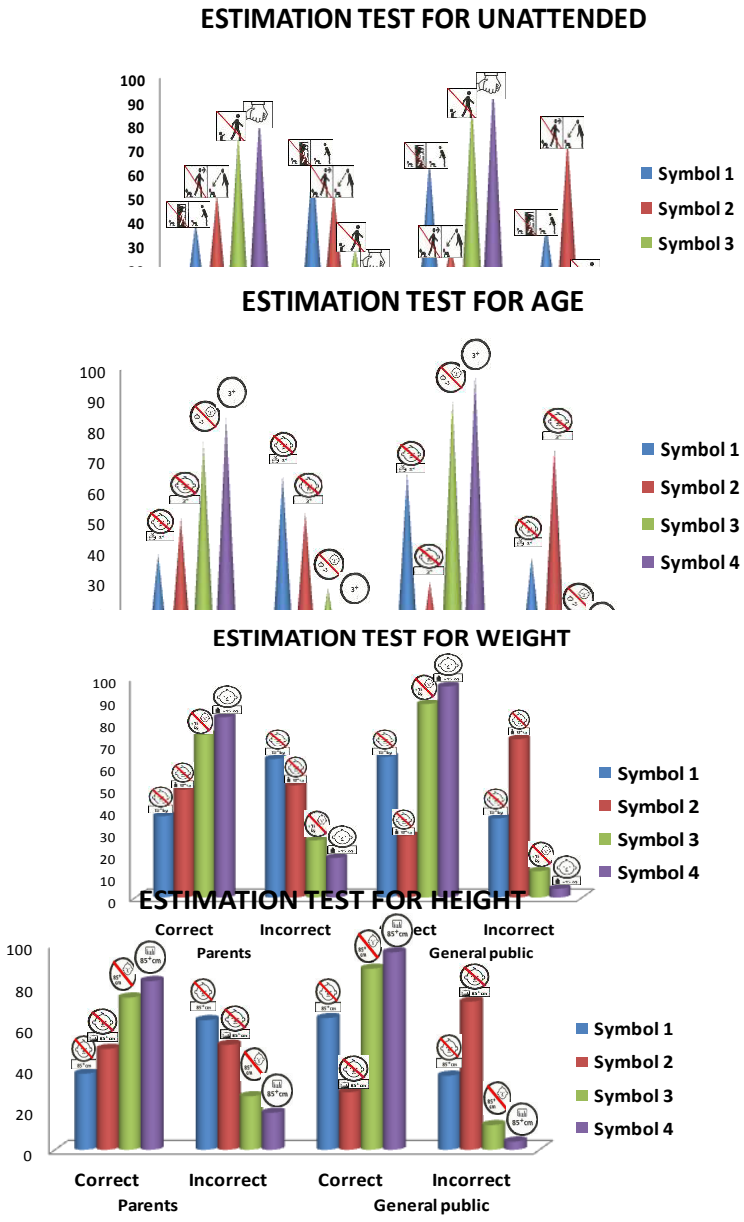
The ISO standards are prescribed for public information symbols, not for warning symbols which need more stringent requirements. Therefore it was decided that symbols with an estimation score about 85 percent will further be tested through comprehension test. Perceived hazardousness and perceived cost of compliance are the most influencing factors determining the consumer motivation to pay attention to a warning and to respond it in an appropriate manner **(Dingus et al., 1991 and Wogatler et al., 1991)**. Researches show that if information is presented as graphic symbols, compliance will increase **(Jaynes and Boles, 1990)**.

In the last phase of the procedure the variants selected from estimation test were further tested to verify their level of comprehensibility. In the comprehensibility test, the sample population was first explicitly told about the context of use of symbol, and then they were shown one symbol variants per referents and asked to determine what they think each symbol means. The percentage of correct interpretation of a symbol determines its comprehension score. For this study the acceptance criteria was set as 80 percent correct interpretation with less than 4 percent opposite interpretations. However there is agreed criterion for the acceptance of the worrying symbols. For public information symbols in general ISO prescribed acceptance criteria of 66 percent. The results of comprehensibility test i.e. the interpretations given by the sample population indicated that why symbols are misunderstood. This information can further be utilized to adapt variants to improve their comprehensibility.

A similar study has been done by **Zwaga et al. (2008)** in which they develop and evaluated a set of warning symbols. **Edworthy and Adams (1996)** stressed the point that iconic information in the form of a warning symbols can at least have an alerting function even if the consumer does not understand the meaning of the symbols.

Data for the symbols suffocation, unattended and age were collected from a sample of 70 viz 35 from parents and 35 from general public respectively. The results for "suffocation" indicated a comprehension score for the first symbol as 91 percent and 85 percent respectively for parents and general public. Neither triggers more then a negligible percentage of checked responses. The symbol was sufficiently well understood to accept then as properly representing the warning they stand chosen for the study and criterion meet the ISO acceptance criteria for public information symbols. Results for "unattended" indicate a similar comprehension score of 89 for parents and general public which also means it meets the acceptance criteria. Results for "age'' indicate that symbol variant first and fourth can be accepted as the comprehension score is 89 present and 80 present respectively whereas for weight only first variant meets the acceptance criteria with a comprehension score of 80persent.

IV. FIGURES AND TABLES



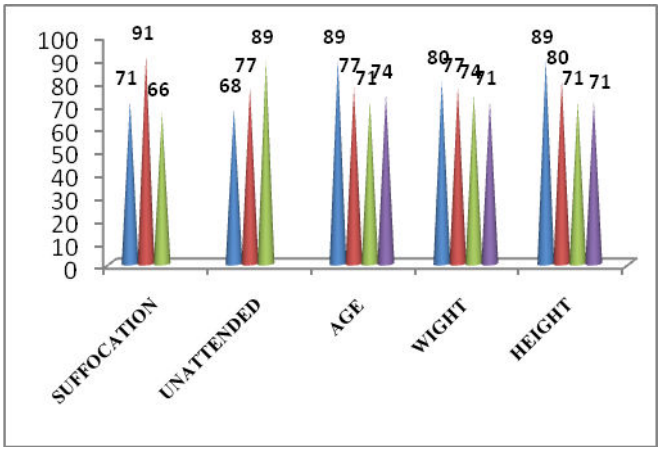


Fig.5 Comprehension Test to Check the Understandability of the symbols for parents and general public

V. CONCLUSION

The investigation has resulted in symbols with sufficient high level of comprehension for the referents suffocation (91%), unattended (89%), weight (80%), age (89%) and height (89%) as per parents. As per general public referent for suffocation (85%), unattended 85%, weight (91%), age (80%) and height (85%) were having comprehension score. A general conclusion would be that, before a test procedure to select or develop suitable symbols for a warning is started, the feasibility of a particular warning as a message intended for the general public or a specific user group should be verified. This is because feasibility of a warning message is determined by the ability of the intended user to specify two aspect of a warning: the possible danger involved and the measures one should take to avoid possible danger. If one and or the other is insufficiently known, this information should be represented in the proposed symbols.

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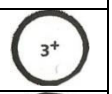
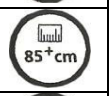
Referents	Symbol 1	Symbol 2	Symbol 3	Symbol 4
Suffocation				
Unattended				
Age				
Weight				
Height				

REFERENCES

[1] **A.l. dorris, and j.l. purswell,** human factors In the design of effective product warnings. Proceedings of human factors society 22th Annual meeting. Human factors society, pp.343-6, 1998**.**

[2] Harm j. Zwaga, and paul mijksenaar, the development and standardization of warning symbols; the role of design and human factors human factors and ergonomics society annual meeting proceedings, proceedings 4 - multiple-session symposia , pp. 782-785(4), 2008.

[3] Lin*da s* jaynes, and david b. Boles, the effect of symbols on warning compliance. Human factors and ergonomics society annual meeting proceedings, safety, pp. 984-987, 1995.

[4] M.a. Trommelen, perceived hazardousness of child-care products and the effectiveness of safety information. International journal of injury control and safety promotion,1,81-91. Health & safety; health promotion; occupational/industrial health & safety; public health - medical sociology; rehabilitation medicine. International journal for consumer and product safety, ***pp. 1387-3059, 2000.***

[5] **R.s. edworthy and a. Adams,** warning design: A research perspective. London: taylor & Franci. 1996**. Shirley m. Otsubo,** a behavioral study of Warning labels for consumer products.

[6] Perceived danger and use of pictographs. human factors and ergonomics society Annual meeting proceedings, forensics Professional, pp. 536-540, 1999.