



Oral Health Advices and Illustrations Card for Use in Mother-and-Child Health Clinics: Face and Content Validity

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Authors' contributions

This work was carried out in collaboration between all authors. Authors EP, RSV and JEF conceptualized and designed the study. Authors EP and RSV developed the preliminary meetings and focus group session. Author EP carried out the field test material assessment. Author JEF analysed the data. Authors EP, RSV and JEF drafted the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Background: The prevalence of Early Childhood Caries (ECC) in Peruvian children is very high especially in sub-urban areas. The dental profession is unable to solve this problem alone. Nurses have close contact with mothers and young children through the mother-and-child health clinics. Educating nurses in providing oral health advises to parents and inspecting teeth of the children regularly might reduce the prevalence of ECC. Supportive educational materials need to be developed and validated to facilitate their counselling actions.

Objective: To develop and validate an oral health advisory card and related illustrations for face and content.

Methodology: The infant oral health guidelines from the Peruvian Association of Dentistry for Infants (ASPOB) were adapted into statements and related illustrations, and assessed during a

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focus group meeting. Using the RAND modified e-Delphi consensus method, 60 panel members, covering (non-) dental professionals from 6 Latin-American countries, assessed 14 statements and illustrations for face and content, using a Likert scale (1-9). Consensus was obtained at the 90% mark point. The statements and illustrations were then field tested with 30 parents from a public school to guarantee the understanding of words and graphics used.

Results: Two assessment rounds were needed. The response rates were 66.7% and 50%, for round 1 and 2, respectively. At the end of round 1, full agreement on 6 statements and illustrations was obtained. At the end of round 2, the mode value of agreement was 95.2% and concerned 8 statements and illustrations. The maximum value of 100% agreement was reached for 5 statements and illustrations. Consensus was reached for all 14 statements and illustrations. Parents approved the oral health advisory card and related illustrations.

Conclusion: The newly developed oral health advisory card and related illustrations were validated for face and content and were accepted by parents.

Keywords: Oral health; delphi technique; dental caries; early childhood caries; content validity.

1. INTRODUCTION

Dental caries can be prevented. Unfortunately, many infants and young children suffer from Early Childhood Caries (ECC). The prevalence of ECC among 0-11, 12-23, 24-35 and 36-47 months-old infants from deprived areas of Lima (capital of Peru) in 2011 was 10.5%, 27.3%, 60% and 65.5%, respectively [1]. Additional data from the study of Villena et al. [2] indicated that almost all tooth cavities were left untreated. This finding is in line with the results from the Global Burden of Disease 2010 study. Untreated caries of primary teeth ranked 10th on the list of the prevalence of 291 diseases and injuries investigated. This poor rating might be attributed for a large part to the manner in which the dental profession is managing ECC globally. Insufficient provision of information on good oral health habits and guidance to parents and carers to adhere to these advises [3], insufficient attention to monitoring dentitions regularly [4] and the application of preventive measures, the social belief that primary teeth will exfoliate and doesn't need to be restored [5], absence of training of oral health professionals to treat paediatric patients [6] and the different remuneration systems might be reasons why so many young children live with open cavities [7].

If the dental profession is unable to ensure a caries free dentition for the majority of the young in a society, then it should reassess its management strategies and consider the outcomes of appropriate research on curbing ECC seriously. A strategy that yielded success offered advice, applied preventive measures in the clinic and provided guidance to the parents, starting from soon after birth [8]. The prevalence of dental caries in children whose parents /

carers had followed this strategy over a period of 50 months was 9 percent compared to the prevalence of 81 percent for children that had not followed that strategy. Other experiences, establishing nutritional programs and home visits to promote healthy habits, have shown to be effective over a long-term period [9]. Furthermore, the dental profession should abstain from using the traditional 'drill and fill' treatments that make children anxious for receiving dental care but, instead, should resort to atraumatic approaches like the Atraumatic Restorative Treatment (ART) approach, which has been shown higher acceptance by young children [10].

A different approach to manage ECC in infants and toddlers might be related to the public healthcare system. Most of such systems, worldwide, contain a clinic in which nurses monitor the physical and health development of new-borns at least to the age of 3. These nurses educate parents / carers, among others, about nutritious food and good general hygiene practices. Extending the content of these advices to include also oral health education might enable parents in reducing the onset of demineralisation in enamel and the development in tooth cavities of their infant. Effective participation of these nurses in providing appropriate oral health advices to the parents / carers attending the Mother-and-Child clinics on a regular basis, and in recognizing changes in enamel, requires evidence-based and standard oral healthcare related messages, and the willingness of nurses to do so. The latter was investigated among a representative group of nurses employed in the public health services in Lima-Peru. Nurses overwhelmingly expressed their willingness to participate as they saw a

need for reducing the presence of caries lesions in infants but requested for proper training first and for permission from their superior [11].

Effective oral health prevention demands more than interdisciplinary professional and self-care. Important is the patients' ability to understand and act upon health information they receive [12]. Therefore, any oral prevention strategy should include aspects of communication that are intended to inform patients about how to take care of their own health and the kind of professional services that are available to them [13]. This integral approach, through the assistance of nurses and presented in a standardized way with dentists, might contribute to a reduction in the prevalence of ECC in Peru.

In order to develop standardized oral health messages for use by nurses in Mother-and-Child clinics, a set of statements and accompanied illustrations were required. These need to be validated for face and content, and construct first before they can be applied in health care centres. The aim of the present study was to develop and validate such statements and illustrations for face and content.

2. MATERIALS AND METHODS

2.1 Development of the Oral Health Card

In 2007, the Peruvian Association of Dentistry for Infants (ASPOB), a non-profit organization that promotes the early intervention and prevention of oral diseases in infants, organized an international meeting and published guidelines and strategies for promoting oral health for infants in Latin America. This meeting had a follow-up in 2010, when a different group of 30 professionals from nine countries of the region reviewed and updated the content of the first publication on the basis of newly published evidence [14]. This updated document was taken as a source of information for developing oral health related statements that were meant to assist parents / carers in keeping the teeth of their infants healthy. Eight members of ASPOB, who had neither participated in the writing of the 2007 nor in that of the 2010 document, collaborated to model the recommendations into 15 statements related to different oral health topics covered. They were health promotion, oral hygiene, use of fluorides and healthy diet. The statements were accompanied by a set of tailor-made illustrations that represented graphically

the intention of each statement with the aim of improving the understanding of its content.

2.2 Assessment Procedure

2.2.1 Focus group

The first step in the process of validating the statements and the illustrations was to discuss the proper wording and meaning of the statements, and clarity of the illustration in a focus group meeting. The group comprised of 25 members who originated from different professions such as paediatric dentistry, paediatrics, neuro-linguistic therapy and nursing care. They assessed each statement and related illustration, suggested modifications until they reached consensus. As a result of this exercise, two statements were merged into one, owing to the similarities of their content. At the end of the meeting, the group agreed on a draft card with 14 statements and related illustrations.

2.2.2 Panel rounds

The second stage of the validation process used the RAND modified e-Delphi method [15]. E-Delphi is an interactive consensus methodology that combines scientific evidence with the opinions and experience of experts through a number of interactive rounds of assessments of the presented information. Participants are able to rate their agreement with a set of statements and make comments to improve the quality of each statement [16]. This stage required the development of a website that was the host for the individual panel rounds for assessing each statement plus illustration using a Likert scale from 1 to 9 (1=completely inadequate; 9=completely adequate). The website presented the statements, the illustrations, the Likert scale options and a text box, positioned under each statement, in which participants could place remarks (Fig. 1).

2.2.3 Panel group

A list of panel members was constructed (n=60) of people with different backgrounds who had shown interest in the topic under study through publications, attending conferences and engaging in paediatric dentistry associations. These included paediatric dentists, post-graduation students in paediatric dentistry, general dentists, and non-dental professionals such as paediatricians, psychologists, and primary school teachers. The participants

originated from Argentina, Brazil, Chile, Costa Rica, Mexico and Peru. Each was invited via e-mail to access the website and was provided with a personal username and password to assess each statement and illustration. The website contained a section in which the intention of the card was explained. It also included a PDF file with a user guide to guarantee that members had all the information required to manage the website tool properly. After thirty days, non-responded panel members received reminder e-mail kindly requesting them to complete the assessment within 15 days. A second reminder was sent to those not having responded. The website was closed 30 days after having sent the second reminder.

2.2.4 Evaluation

Comments presented by the panel members were analysed by two authors (EP and RV). Suggestions that were thought to improve the clarity of wording of the statements, its content and its illustrations were used to modify them. The panel members who had responded in the first round were re-invited to assess the modified statements and illustrations (Fig. 2). Panel members that had not responded within 10 days received a reminder. Those who had not responded within 15 days from the first reminder received a second reminder. The website was closed 10 days after having sent the last reminder.

2.2.5 Field test

The consensus card statements and related illustrations were subjected to a field test discussion. Thirty parents, who had children in primary school ages and who resided in low socio-economic suburban area of Lima, participated. The discussion took place in two stages. During the first stage, parents received the 14 illustrations without any text. They were requested to note on a paper sheet what advice the illustration might contain. Thereafter, the paper sheets were collected and the results were analysed, item-by-item to assess the concordance between the parents' perception and the advices approved through the panel rounds. During the second stage, each parent received a copy of the advisory card including the 14 illustrations and accompanying statements. They were requested to circle any word or phrase that they did not fully understand to make sure that the wording and sentences were presented adequately. From the 14 statements, only 3 illustrations (N°9, 10 and 11) were not completely understood and were improved subsequently. Two weeks later, these were then subjected for judgment of clarity and understanding to ten parents who had participated in the first field round. The parents agreed to the interpretation of the illustrations as approved by the panel members.



Fig. 1. Capture of the website format in which the statements, illustrations, Likert scale and comments box are presented

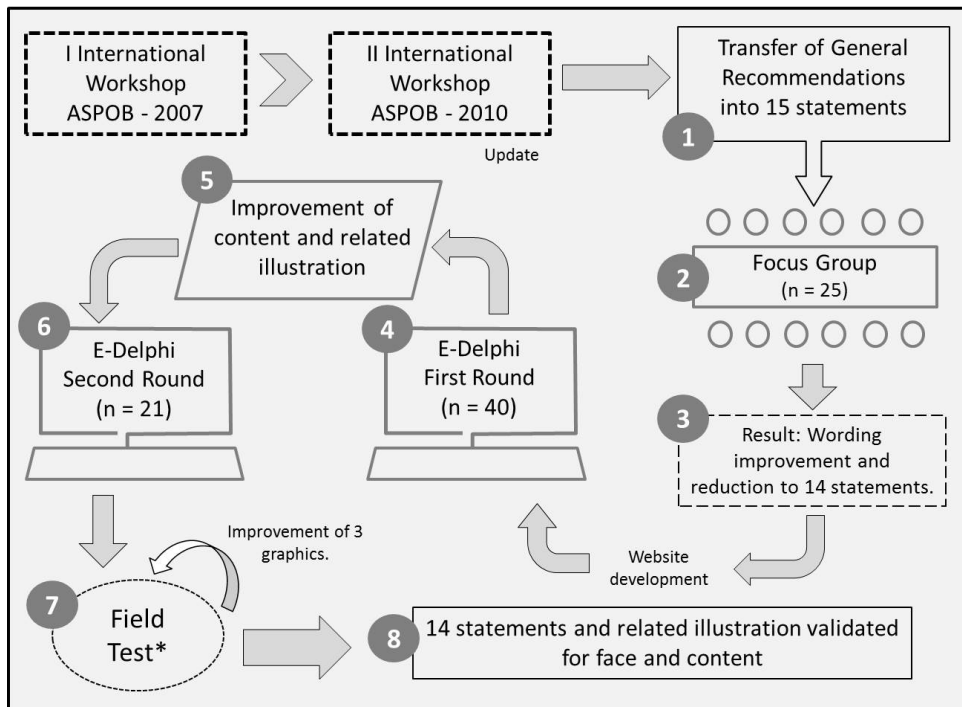


Fig. 2. Flow of the oral health advice card development (*First pilot test n=30 and the second pilot test n=10 subjects from the first group)

2.3 Statistical Analysis

Straightforward calculations were needed to obtain results. The nine assessment codes were clustered as 1–3, 4–6 and 7–9, indicating ‘disagreement’, ‘not in agreement / doubt’ and ‘agreement’ with the statement, respectively. A statement was considered valid if more than 90% of the panel members had rated it using a code within the cluster indicating ‘agreement’.

3. RESULTS

The flow of the development of the oral health advisory card is presented in Fig. 2. The profession and gender of the panel members are presented in Table 1. Out of the 60 panel members originally invited to participate, 40 responded. The respondents of the first round were originated from Argentina (n=1), Brazil (n=1), Chile (n=1), Costa Rica (n=1), México (n=2) and Peru (n=34). The response rate in the first and the second round were 66.7% and 50.0%, respectively.

Table 2 shows the percentage of agreement and mean scores for statements by panel rounds. In

the first round, consensus was reached on 6 statements. Statements ‘1,5’ and ‘13’ needed to be changed entirely. In statements ‘2,4,6,7’ and ‘10’ some words needed to be changed and the related illustrations needed to be adapted slightly. The mode value of agreement was 95.2% and concerned 8 statements and illustrations. The maximum value of 100% agreement was reached for 5 statements and illustrations. Consensus was reached in all ‘14’ statements and illustrations at the end of round 2.

Table 1. Gender and profession of the members of the panel-first round

Characteristic	n
Male	11
Female	29
Profession	
Paediatric dentistry	17
Paediatric dentistry student	9
General dentistry	8
Other(paediatrics, psychology, primary teacher)	6

n = number of panel members+

Table 2. Percentage of agreement and mean scores on statements and illustrations by members of the expert panel over the two rounds of assessment

Statement	Round 1		Round 2		Difference
	Mean score	Agreement, %	Mean score	Agreement, %	
1.- Oral health care of the pregnant women	7.63	80.0%	8.52	95.2%	+15.24%
2.- Exclusive breastfeeding up to 6 months of age	8.00	85.0%	8.48	95.2%	+10.24%
3.- Advise not to use the bottle with milk during night-time	8.13	92.5%	8.81	95.2%	+2.74%
4.- Proper time for semi-solid diet	8.00	82.5%	8.67	95.2%	+12.74%
5.- Transmission of bacteria from mother to child	7.55	85.0%	8.52	90.5%	+5.48%
6.- Oral hygiene responsible is the parent	8.15	87.5%	8.57	100.0%	+12.50%
7.- Importance of primary teeth	7.80	82.5%	8.67	95.2%	+12.74%
8.- Reduce consumption of sugary food and beverages	8.30	95.0%	8.81	100.0%	+5.00%
9.- Importance of proper tooth brushing	8.43	92.5%	8.95	100.0%	+7.50%
10.- Danger of excessive fluoride intake	8.08	87.5%	8.37	95.2%	+7.74%
11.- Starting time for use of fluoride toothpaste	7.95	92.5%	8.62	95.2%	+2.74%
12.- Helping the children to wash their teeth	8.40	92.5%	8.90	100.0%	+7.50%
13.- Importance of regular visits to the dentist	8.33	87.5%	8.81	95.2%	+7.74%
14.- Correct tooth brushing technique	8.23	95.0%	8.90	100.0%	+5.00%

4. DISCUSSION

The fact that the prevalence and severity of ECC among Peruvian children is high shows that the dental profession alone cannot control this disease. Assistance is needed from professionals who come in contact with the parents/carers of children at an early stage in their life. In Peru, as in many countries, free health counselling and primary care is available at health centres. This situation presents a unique opportunity to integrate oral health into general health counselling through the participation of the nurses. They can only become effective if they are equipped with appropriate knowledge and skills.

The present study validated an infant oral health advices and related illustrations card for face and content. As dental caries is a behavioural disease, the main aim of the card is to guide mothers/carers in implementing good oral health behavioural instructions by having these written down and illustrated. This was considered necessary as studies have shown that patients remember not more than 3 to 4 health advises provided verbally by health personnel during a consultation visit. Combining verbal and written information improved the knowledge and satisfaction of the patients instead of merely providing information alone verbally [17]. Furthermore, it has been suggested that tailor-made strategies and materials adapted to the needs and skills of a particular group of patients will foster a much more effective learning environment [12]. This is especially true when one deals with low literacy communities, who need very simple words and instructive illustration that simplify health concepts and instructions aimed at maintaining a healthy dentition. Different researchers had shown that illustrations improve patients' comprehension and compliance related to health recommendations [18-20], but they must be accompanied by captions or written information to guide the understanding of their content [21].

The RAND modified e-Delphi method was used to assess each statement and illustration during the panel rounds for face and content. This method has been used to reach consensus among policy-makers and homogenous groups to validate diagnostic tools [22-24]. It is an electronic version of the Delphi method, which facilitates data entry and enhances communication among panel members and the researcher in comparison with the traditional

Delphi method that uses written physical datasheets. This method worked very well in the present study. Although only 50% of the panel members assessed the statements and illustrations during the second round, because a high level of agreement was reached after round 1, the relatively low level of response may not have had much impact on the face and content validity of the final advisory card and related illustrations.

Post-dissemination compliance with clinical guidelines is higher when the recommendation are compatible with the existing norms and values, are easy to follow and are supported by evidence [25-27]. Effective educational interaction need to be sufficiently persuasive, informative and relevant to the learner [28], and should be provided in the moment where the user finds it interesting and applicable in the immediate future. Following the validation process, the oral health advisory card will be distributed during three key moments, the first during enrolment of the child, the second when the child attends the 6-month-control session and the last one during the 12-month-control session. In this manner, the mothers will receive the information of interest at the ideal moment without being overwhelmed with excessive information, thus increasing the possibility of post-dissemination compliance.

5. CONCLUSION

The new oral health advisory card, introduced in the present study, has shown high acceptance both from a panel of experts and from parents from a low-SES community in Lima-Peru. The validation acceptance scores for both statements and illustrations were very high.

CONSENT

All authors declare that written informed consent was obtained from all the nurses and mothers who participated in the present study.

ETHICAL APPROVAL

Ethical clearance was obtained from the Dental School of the San Martin de Porres University (Lima-Peru) institutional review board (Resolution N° 252-2013-D-FO-USMP). The study was registered at the Netherlands Trial Centre with number NTR 4510. Participants of the focus group received an informed consent form that they were requested to agree with

before the session could start. Panel members were requested to read a digital opening statement that informed them about the aim of the study before starting the validation process.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

- Villena-Sarmiento R, Pachas-Barrionuevo F, Sanchez-Huaman Y, Carrasco-Loyola M. Early childhood caries on children under 6 years of age from sub-urban areas of Lima. *Rev Estomatol Herediana*. 2011; 21:79-86.
- Marcenes W, Kassebaum NJ, Bernabé E, Flaxman A, Naghavi M, Lopez A, Murray CJ. Global burden of oral conditions in 1990-2010: A systematic analysis. *J Dent Res*. 2013;92:592-7.
- Yin HS, Johnson M, Mendelsohn AL, Abrams MA, Sanders LM, Dreyer BP. The health literacy of parents in the United States: A nationally representative study. *Pediatrics*. 2009;124(3):289-98.
- Giannobile WV, Braun TM, Caplis AK, Doucette-Stamm L, Duff GW, Kornman KS. Patient stratification for preventive care in dentistry. *J Dent Res*. 2013;92(8): 694–701.
- Martin JM, O'Halloran KA, Butcher JA, Hopcraft MS, Arnold-Smith TS, Calache H. Evaluation of a capacity building clinical educational model for oral health clinicians treating very young children. *Community Dent Health*. 2014;31(3):176-82.
- Karki AJ, Thomas DR, Chestnutt IG. Why has oral health promotion and prevention failed children requiring general anaesthesia for dental extractions? *Community Dent Health*. 2011;28(4):255-8.
- Tinanoff N, Reisine S. Update on early childhood caries since the Surgeon General's Report. *Acad Pediatr*. 2009;9(6): 396–403.
- Medeiros PB, Otero SA, Frencken JE, Bronkhorst EM, Leal SC. Effectiveness of an oral health program for mothers and their infants. *Int J Paediatr Dent*. 2015;25 (1):29-34. Doi:10.1111/ipd.1294.Epub 2014Jan7.
- Feldens CA, Giugliani ERJ, Duncan BB, Drachler ML, Vitolo MR. Long-term effectiveness of a nutritional program in reducing early childhood caries: A randomized trial. *Community Dent Oral Epidemiol*. 2010;38:324–32.
- Frencken JE, Leal SC, Navarro MF. Twenty-five-year atraumatic restorative treatment (ART) approach: A comprehensive overview. *Clin Oral Investig*. 2012;16:1337-46.
- Pesaressi E, Villena RS, van der Sanden WJM, Mulder J, Frencken JE. Barriers to adopting and implementing an oral health programme for managing early childhood caries through primary health care providers in Lima, Peru. *BMC Oral Health*. 2014;14-7.
- Jacobson KL. Clear and effective patient education: A guide for improving health communications in the Hospital Setting. Rollins School of Public Health, Emory University; 2005.
- Horowitz AM, Kleinman DV. Creating a health literacy-based practice. *J Calif Dent Assoc*. 2012;40:331-40.
- Peruvian Association of Dentistry for Infants (ASPOB). Agreements of the concertation round tables 2007 – 2011. Oral health proposals for infants in Latin-America and the Caribbean. I–II International Session III and VI Peruvian

- Meeting of Dentistry for infants. Lima: ASPOB; 2011.
15. Dalkey NC. The Delphi Method: An experimental study of group opinion. Santa Monica, CA: RAND Corporation; 1969.
 16. Hsu C, Sandford BA. The Delphi Technique: Making sense of consensus, practical assessment, research & evaluation. 2007;12(10):1-8.
 17. Johnson A, Sandford J, Tyndall J. Written and verbal information versus verbal information only for patients being discharged from acute hospital setting to home. *Cochrane Database Sys Rev.* 2008; (4):CD003716.
 18. Austin PE, Matlack R, Dunn KA, Kesler C, Brown CK. Discharge instructions: Do illustrations help our patients understand them? *Ann Emerg Med.* 1995;25:317-20,.
 19. Delp C, Jones J. Communicating information to patients: the use of cartoon illustrations to improve comprehension of instruction. *Acad Emerg Med.* 1996;3:264-70.
 20. Houts PS, Doak CC, Doak LG, Loscalzo MJ. The role of pictures in improving health communication: A review of research on attention, comprehension, recall, and adherence. *Patient Educ and Consel.* 2006;61:173-90.
 21. Pettersson R. Visual Literacy. In: Associations from pictures in imagery and visual literacy: Selected readings from the annual conference of the international visual literacy association. Oxford: Pergamon Press; 1994.
 22. Kuthy RA, Siegal MD, Wulf CA. Establishing maternal and child health data collection priorities for state and local oral health programmes. *J Public Health Dent.* 1997;57:197-205.
 23. Paterson FM, Paterson RC, Watts A, Blinkhorn AS. Initial stages in the development of valid criteria for the replacement of amalgam restorations. *J Dent.* 1995;23:137-43.
 24. De Souza AL, van der Sanden WJ, Leal SC, Frencken JE. The Caries Assessment Spectrum and Treatment (CAST) index: Face and content validation. *Int Dent J.* 2012;62:270-6.
 25. Burgers JS, Grol RP, Zaat JO, Spies TH, van der Bij AK, Morkink HG. Characteristics of effective guidelines for general practice. *Brit J of Gen Pract.* 2003; 53:15-9.
 26. Grilli R, Lomas J. Evaluating the message: The relationship between compliance rate and the subject of a practice guideline. *Medical Care.* 1994;32:202-13.
 27. Grol R, Dalhuijsen J, Thomas S, Veld C, Rutten G, Morkink H. Attributes of clinical guidelines that influence use of guidelines in general practice: Observational study. *Brit Med J.* 1998;317:858-61.
 28. Freemantle N, Harvey EL, Wolf F, Grimshaw JM, Grilli R, Bero LA. Printed educational materials: effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews.* 1997;2:CD000172.

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