

## Abstract

The aim of this study was to assess the effectiveness of a health promotion intervention program (TIPTOP package) in preventing early childhood caries (ECC), to improve nutritional status and dietary habits among toddlers. The study design was an intervention prospective study and conducted in Tumpat and Pasir Mas districts in Kelantan. The intervention group was 2-3 year old toddlers in Tumpat and received the TIPTOP package, while the control group was in Pasir Mas and received the normal toddlers' oral health program under the MOH. Baseline information on a proxy population of 527 preschool children (5-6 years old) showed that almost every child in both districts was affected by caries (97.9%) and three-quarters have more than 7 teeth affected by caries. The majority of preschool children had malnutrition; 36.1% who were underweight (WAZ), 40.1% were stunted (HAZ) and one-third (31.1%) were underweight (BMI-for-age). Majority of nutrients intake were not adequate as compared to RNI (2005). Added sugar consumption was three times higher (205.1%) than the recommendation. Dietary habits of sugary foods and drinks showed that "milo" consumption was the highest scored (84.6) followed by "cokelat" (sweets) (75.3) and ice-cream (67.5). More than one-half of parents scored in the "moderate" category of knowledge, attitude and practices. At the intervention phase, 519 of toddlers aged 2-3 years old from Tumpat and Pasir Mas were screened for their caries status and only 15.8% (n=82) were caries free. There was only one drop out and the final sample consists of 40 toddlers from Tumpat and 41 from Pasir Mas who participated until the end of study period. After 18 months, majority of toddlers in intervention group had low or no caries (77.5%), the percentage of caries-free was 37.5%, the odds ratio of having ECC was lower (OR=0.805). About three-quarters (72.5%) had normal of WAZ, more than three-quarters (80%) had normal of HAZ and majority (87.5%) had normal of BMI-for-age. Added sugar intake was reduced, most of sugary foods and drinks consumption improved in intervention than control group. There were improvements in energy, protein, calcium, iron, zinc and vitamin C intake and was a large improvement of fruits and cariostatic foods consumption in intervention group than control group. The majority of mothers' knowledge scores was high (82.5%), 65% scored high attitude and almost all (95%) had high practices scores. In the control group, only 58.5% had low or no caries, one-third (39%) were normal of WAZ and (34.1%) normal of HAZ and more than one-third (39%) normal of BMI-for-age. Only protein, iron, zinc, vitamin C and vitamin A intake were improved. Added sugar intake increased about one-third. Only one-third (39%) with high knowledge, nearly one-half (43.9%) with high attitude and more than one-half (58.5%) with high practices score at the end of the study period. We conclude that the combination of nutrition and oral health promotion intervention in the TIPTOP program meant to prevent ECC, could have a positive influence in producing good general health outcomes. We recommend that the current Ministry of Health toddlers' health program should therefore adopt the effective elements of the TIPTOP health promotion package.

## Abstrat

Tujuan kajian ini adalah untuk menilai keberkesanan program promosi kesihatan (pakej TIPTOP) dalam mencegah kerosakan gigi (ECC) pada peringkat awal kanak-kanak, untuk memperbaiki status pemakanan dan tabiat pemakanan di kalangan kanak-kanak. Reka bentuk kajian adalah kajian intervensi prospektif yang dijalankan di Tumpat dan Pasir Mas, Kelantan. Kumpulan intervensi adalah kanak-kanak berumur 2-3 tahun di Tumpat dan menerima pakej TIPTOP, manakala kumpulan kawalan adalah kanak-kanak 2-3 tahun di Pasir Mas dan menerima program penjagaan kesihatan mulut di bawah seliaan KKM. Maklumat asas bagi proksi populasi ke atas 527 kanak-kanak prasekolah (5-6 tahun) menunjukkan bahawa hampir semua kanak-kanak di kedua-dua daerah mengalami masalah kerosakan gigi (97.9%) dan tiga suku daripada mereka mempunyai karies lebih daripada 7 gigi. Majoriti kanak-kanak prasekolah mengalami masalah malnutrisi; 36.1% adalah kekurangan berat badan (WAZ), 40.1% adalah terbantut (HAZ) dan satu pertiga (31.1%) mengalami masalah kekurangan berat badan (BMI-for-age). Majoriti pengambilan nutrien adalah tidak mencukupi berbanding dengan RNI (2005). Pengambilan gula tambahan adalah tiga kali ganda lebih tinggi (205,1%) daripada yang syorkan. Tabiat pengambilan makanan dan minuman bergula menunjukkan "milo" merupakan pengambilan tertinggi (84.6) diikuti oleh "coklat" (gula-gula) (75.3) dan ais-krim (67.5). Lebih daripada separuh ibu bapa berada dalam kategori "sederhana" bagi pengetahuan, sikap dan amalan. Pada peringkat intervensi, sebanyak 519 kanak-kanak yang berumur 2-3 tahun dari Tumpat dan Pasir Mas telah disaring untuk melihat status karies dan hanya 15.8% (n = 82) adalah tiada karies. Hanya seorang kanak-kanak yang tercicir dan sampel akhir adalah sebanyak 40 kanak-kanak dari Tumpat dan 41 dari Pasir Mas yang mengikuti program intervensi sehingga akhir kajian. Selepas 18 bulan, majoriti kanak-kanak dalam kumpulan intervensi mempunyai peratus karies yang rendah (77.5%), peratusan bebas karies adalah sebanyak 37.5%, nisbah kemungkinan mempunyai ECC adalah lebih rendah (OR = 0.805). Kira-kira tiga suku (72.5%) mempunyai berat badan yang normal bagi WAZ, lebih daripada tiga suku (80%) mempunyai tinggi yang normal bagi HAZ dan majoriti (87.5%) adalah normal bagi BMI-for-age. Pengambilan gula tambahan telah berkurangan dan pengambilan makanan dan minuman bergula juga bertambah baik bagi. Terdapat peningkatan dalam pengambilan tenaga, protein, zat besi, zink dan vitamin C serta peningkatan dalam pengambilan buah-buahan dan makanan cariostatic bagi kumpulan intervensi berbanding dengan kumpulan kawalan. Majoriti ibu mempunyai skor yang tinggi bagi pengetahuan iaitu (82.5%), sikap iaitu 65% dan hampir semua (95%) mempunyai skor yang tinggi bagi amalan. Bagi kumpulan kawalan, hanya 58.5% sahaja yang tiada kerosakan gigi atau kerosakan pada tahap rendah, hanya satu pertiga (39%) mempunyai berat badan yang normal bagi WAZ dan 34.1% mempunyai tinggi yang normal bagi HAZ dan lebih daripada satu pertiga (39%) adalah normal bagi BMI-for-age. Hanya pengambilan protein, zat besi, zink, vitamin C dan vitamin A bertambah baik. Pengambilan gula tambahan telah meningkat sebanyak satu pertiga. Hanya satu pertiga (39%) sahaja ibu berada dalam kategori tinggi pengetahuan, hampir satu setengah (43.9%) berada dalam kategori tinggi bagi sikap dan lebih daripada satu setengah (58.5%) berada dalam kategori tinggi bagi amalan di akhir kajian. Sebagai kesimpulan, kombinasi diantara pemakanan dan promosi intervensi kesihatan mulut melalui program TIPTOP berkesan untuk mencegah ECC, serta mempunyai pengaruh yang positif dalam menghasilkan tahap kesihatan yang baik. Kami mengesyorkan bahawa Kementerian Kesihatan bagi program kesihatan kanak-kanak seharusnya mengadaptasi unsur-unsur yang berkesan yang terdapat dalam pakej promosi kesihatan atau TIPTOP.

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## Publications

The following papers have been written and presented from this thesis:

Peer Reviewed Journal:

1. H.Ruhaya., Jaafar N., Marhazlinda J., Ismail A.R., Ismail N. M., Badariah T. C., Zaiton M. S. and Mat A. Nutritional and sociodemographic predictors of Early Childhood Caries among Preschool Children in disadvantaged rural communities. Sent to Asia Pacific Journal of Public Health.
2. H.Ruhaya , N.Jaafar , J.Marhazlinda , A.R. Ismail , N.M Ismail ,T.C Badariah ,M.S. Zaiton and A.Mat. The relationship between nutritional status and early childhood caries among preschool children in Malaysia. Sent to Archives of Orofacial Science, University Science Malaysia.

Presentations at seminars/conferences

1. Ruhaya H., Jaafar N., Marhazlinda J., Ismail A.R., Ismail N. M., Badariah T. C, Zaiton M. S. and Mat A. Establishing a Standardized Protocol for recording Digital Images of Early Childhood Caries (ECC). Poster presentation in the IADR Conference – January 2009. UITM, Shah Alam, Selangor, Malaysia. April 1-4,
2. Ruhaya H., Jaafar N., Marhazlinda J., Ismail A.R., Ismail N. M., Badariah T. C, Zaiton M. S. and Mat A. Nutritional Status and Early Childhood Caries (ECC) Among Preschool Children In Tumpat district, Kelantan. Poster presentation in the Nutrition Society Malaysia Conference (NSM)- March 20-22, 2010. Crown Plaza Hotel, Kuala Lumpur, Malaysia. March 20-22.
3. Ruhaya H., Jaafar N., Marhazlinda J., Ismail A.R., Ismail N. M., Badariah T. C, Zaiton M. S. and Mat A. The relationship between nutritional status and early childhood caries (ECC) among preschool children in Pasir Mas district, Kelantan. Poster presentation in the National Conference Health & Medical Sciences (NCHMS )- July 2010. Grand River View Hotel, Kota Bharu, Kelantan Malaysia. 11-12 July.

## **Abbreviations**

ECC	Early Childhood Caries
WAZ	Weight-for-age z-score
HAZ	Height-for-age z-score
BMI-for-age	Body Mass Index z score