

# The relation between oral impacts on daily performances and perceived clinical oral conditions in primary school children in the Ugu District, Kwazulu Natal, South Africa

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## ABSTRACT

Few studies have related the common oral health related quality of life (OHRQoL) impacts in children to perceived causes.

**Objective:** To assess the prevalence, extent and intensity of oral impacts in relation to perceived clinical conditions in primary school children in South Africa.

**Methods:** Cross-sectional study of a random sample of children attending 26 schools. The Child Oral Impacts on Daily Performance (Child-OIDP) index, administered through individual face-to-face interviews, was used.

**Results:** Sixty four per cent of the sample of 2610 children aged 11-13 years participated. 36.2% reported having one or more oral impacts on daily performances, 61.1% having one affected and 63.1% reporting impacts were of "very little" or "little" intensity. Eating was most commonly affected (22.8%) mainly related to decay (40%), followed by cleaning the teeth (17.2%). Toothache impacted on speaking (32.5%), whereas toothache (35.7%) and tooth decay (28.6%) influenced studying. Position of teeth impacted on smiling (19.2%), social (8.5%) and speaking (7.5%). Bleeding gums" and "tooth colour" affected cleaning teeth and smiling respectively.

## ACRONYMS

OHRQoL: Oral Health Related Quality of Life

Child-OIDP: Child Oral Impacts on Daily Performance

**Conclusions:** The prevalence of oral impacts on the quality of life in this South African population of schoolchildren was relatively modest, as was the extent and intensity of the impacts, affecting mainly eating, cleaning of teeth and smiling.

## INTRODUCTION

Traditional clinical dental methods of measuring oral health information have shortcomings as they assess only the normative aspects of oral health.<sup>1</sup> Hence they have been complemented by oral health related quality of life (OHR-QoL) measures.<sup>2</sup> A number of these have been developed for assessing oral well-being and for describing oral impacts on the quality of life of people.<sup>3</sup> They measure the extent to which oral conditions disrupt daily life at school, or while undertaking parental or household duties.<sup>4</sup> In addition to describing these effects, OHRQoL data has the potential to be of value in the planning of oral health services if they are considered together with the traditional normative measures in the assessment of dental needs.<sup>2,5,6</sup>

Most OHRQoL studies have been carried out on adults or elderly populations, with relatively few on children. In general, studies on children report a high prevalence of oral impacts.<sup>5,6</sup> Among the OHRQoL measures intended specifically for children, the Child Oral Impacts on Daily Performance (Child-OIDP) index<sup>7</sup> was considered the instrument of choice as it is the only one designed to link perceptions of which specific oral problems are associated with the reported impacts on quality of life and to measure the extent and intensity of the impacts.<sup>8-10</sup> However, few attempts have been made to provide information on the extent and intensity of the impacts and their relation to perceived clinical conditions. Some studies on OHRQoL in children have been reported from Africa<sup>11-17</sup> but only one has come from South Africa.<sup>18</sup> That study found

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that 49.5% of the sample reported at least one oral impact in the past six months. Naidoo *et al.*<sup>19</sup> also used a single impact measure, namely, dental pain in South African children, and reported a high prevalence affecting daily life.

As few data on OHRQoL in children have been reported from Africa a study was planned with the objective of assessing the prevalence, extent and intensity of oral impacts and their relation to perceived clinical conditions in a sample of primary school children in South Africa.

## METHODS

The Ugu Health District in Kwazulu Natal (KZN) in South Africa was selected for this study because it had a socio-economic profile typical of many areas of South Africa; namely high levels of poverty, poor infrastructure, and high illiteracy and innumeracy levels (DOH, 2006).<sup>20</sup> For this cross-sectional study, a random selection was made of twenty six primary schools from amongst all those in the Ugu district (n=210). Ethical approval for the study was obtained from the Research Ethics Committee of the University of the Western Cape (ref. 2006/C023). The Department of Education for Ugu District Local Authority and the participating primary schools gave permission for the survey. Signed informed consent for each child was obtained from the parents or carers.

The study sample comprised 2610 school children aged between 11-13 years old. At each school, the principal and the class teachers were requested to provide information on the socio-economic category (low, medium, high) of the schoolchildren. (Children reporting on their family socio-economic status is unreliable.) Oral examinations were performed in classrooms by three calibrated examiners using the WHO criteria.<sup>21</sup> The children were seated and were examined using plane mouth mirrors and explorers under a portable headlight. No radiographs were used. Ten percent of the children were re-examined by each examiner. High intra- and inter-examiner Kappa scores ranging from 0.85-0.95 were obtained.

The Child-OIDP was used to collect data on oral impacts through structured, administered, individual face-to-face interviews by one interviewer (SN), based on an English language questionnaire. The Child-OIDP was selected for this study as the objective was to link the reported impacts with perceptions of which oral conditions were related, as well as measuring the extent and intensity of the impacts.<sup>5-6</sup> A prior study had been carried out to validate the Child-OIDP questionnaire, using the process recommended by Gherunpong *et al.*<sup>7</sup> The psychometric properties of the Child-OIDP in terms of face, content and concurrent validity as well as internal and test-retest reliability were excellent. The index was also practical to use with this age group. Test-retest reliability of data was assessed by ten percent random duplication. Weighted kappa score for the Child-OIDP was 0.91.

### Measuring oral impacts

The Child-OIDP was used to assess the oral impacts. Each child was individually interviewed to assess oral impacts on daily life in relation to eight daily activities or "performances", namely: eating, speaking, cleaning teeth, relaxing, smiling, laughing and showing teeth without embarrassment, maintaining emotional state, study, including going to school and doing homework, and, contact with other people. If a child re-

ported an impact, both the frequency and the severity of the effect on their daily life were scored, the frequency on a scale from 1, for "1 to 7 days" or "once or twice a month", to 3, for "15 days or more" or "3 or more times a week" and the impact on a scale of 1, for "little effect", to 3, for "severe effect". If no impact was reported, a zero score was recorded. The oral impact score for each performance was obtained by multiplying the respective severity and frequency scores. Hence oral impact scores could range from zero to nine per performance. The overall impacts score was expressed as a percentage of the total possible score of 72 (the sum of all eight performance scores multiplied by 100 and divided by 72).<sup>22</sup>

Using 'intensity' and 'extent' to describe the severity of impacts provides an alternative method of describing and comparing the levels of oral impacts on children. Intensity refers to the most severe impact on each of the eight performances. Impacts on performances were classified into six levels: none, very little, little, moderate, severe and very severe. The level gave an indication of the differences, for example, between a child experiencing minor impacts (score of 1) on six different performances and another child experiencing severe impacts (score of 6) on only one performance. In the former case, the child will be in the 'very little' and in the latter, in the 'severe' category. The extent refers to the number of performances with impacts (PWI) affecting a child's quality of life over the past three months. It ranges from 0 to 8 PWI.

Children were also asked what oral problems they considered to be related to each specific impact. The oral problems were identified from a set list of conditions. Consequently, the Child-OIDP index also provided a condition-specific measure (CS-Child-OIDP) which attributes oral impacts to different oral problems as perceived by the respondent.<sup>8</sup>

## DATA ANALYSIS

Differences in the prevalence and intensity of oral impacts between boys and girls were assessed through the chi-squared test, while the Mann-Whitney test was used to determine the gender differences in relation to the extent of oral impacts. Differences in oral impacts by age were estimated through the chi-squared test for trend (for prevalence of impacts) and by the Cuzick's test for trend (for intensity and extent of impacts). The SPSS and Stata programmes were used to conduct the statistical analyses.

## RESULTS

### The sample

Of the 2610 children aged 11-13 years from 26 primary schools, 64% (n=1665) participated in the study. There were slightly more girls (n=883, 54%) than boys (n=782, 47%). More than two thirds (64.4%) were 12 years old. Two thirds of the sample (60.8%) were caries free. The mean DMFT was 1.02 (SD ±1.7).

### Prevalence, intensity and extent of oral impacts

Just over a third of the sample (36.2%) reported one or more socio-dental impacts during the previous three months (Table 1). Eating was the most common performance affected (22.8%) followed by cleaning of the mouth (17.2%) (Table 1). Among those with impacts on quality of life, the mean number of daily performances affected was 1.62; and 61.1% reported impacts for one performance (Table 2). The impacts were mainly of low intensity; with 63.1% reporting that impacts were of "very little" or "little" intensity. However, impacts on studying

Table 1: Prevalence and intensity of oral impacts by performance and overall

	Eating	Speaking	Cleaning	Relax	Smiling	Emotion	Study	Social	Overall
Prevalence of impacts (n=1665 adolescents)									
	380 (22.8%)	36 (2.%)	287 (17.2%)	46 (2.8%)	120 (7.2%)	41 (2.5%)	22 (1.3%)	44 (2.6%)	602 (36.2%)
Intensity of impacts in 602 children with impacts*									
1	15.3	16.7	38.0	15.2	20.0	9.8	4.6	4.6	18.6
2	50.2	55.5	41.5	43.4	34.1	31.7	22.7	59.0	44.5
3	25.5	19.4	16.7	34.8	32.5	39.0	22.7	18.2	25.9
4	7.9	2.8	3.1	4.4	9.2	17.1	22.7	13.6	8.0
5	1.1	5.6	0.7	2.2	4.2	2.4	27.3	4.6	3.0

\* Intensity: 1 very little, 2 little, 3 moderate, 4 severe, 5 very severe.

Table 2: How many performances were affected by oral impacts in each child? (n=602).

Number of performances affected per child							
1	2	3	4	5	6	7	
368(61.1%)	159 (26.4)	40 (6.6%)	15 (2.5%)	12 (2.0%)	6 (1.0%)	2 (0.4%)	

Table 3: Prevalence, intensity and extent of oral impacts, by gender

Co-variables	Boys		Girls		P value
	n	%	n	%	
Prevalence of impacts <sup>1</sup>					
With impacts	272	34.8	330	37.4	0.272
Without impacts	510	65.2	553	62.6	
Intensity of impacts <sup>2</sup>					
Very little	46	16.9	66	20.0	0.504
Little	120	44.2	148	44.8	
Moderate	70	25.7	86	26.1	
Severe	27	9.9	21	6.4	
Very severe	9	3.3	9	2.7	
Extent of impacts <sup>2</sup>					
Mean + SD.	1.61 + 1.03		1.63 + 1.03		0.777
Range	1 - 7		1 - 6		

<sup>1</sup> Chi-squared test <sup>2</sup> Mann-Whitney test.

and emotional status were more intense (Table 1). There were no gender differences in the prevalence, intensity or extent of oral impacts (Table 3). Prevalence and extent, but not intensity of oral impacts, increased with increasing age (Table 4).

### Perceived causes of the impacts

The main perceived causes the children associated with the impacts were "toothache" and "tooth decay". The primary perceived cause of impacts on eating was tooth decay (40.0%). Toothache (32.5%) was the main cause of impact on speaking, whereas toothache (35.7%) and tooth decay (28.6%) impacted on studying. Position of teeth was among the main perceived causes of impacts on three performances: smiling (19.2%), social (8.5%) and speaking (7.5%). Eight per cent could not relax due to toothache and tooth decay. Nearly a third of those with impacts reported that the colour of their teeth prevented them from smiling (28.8%). Impacts in relation to cleaning teeth and smiling were primarily caused by "bleeding gums" and "tooth colour" respectively (Figure 1).

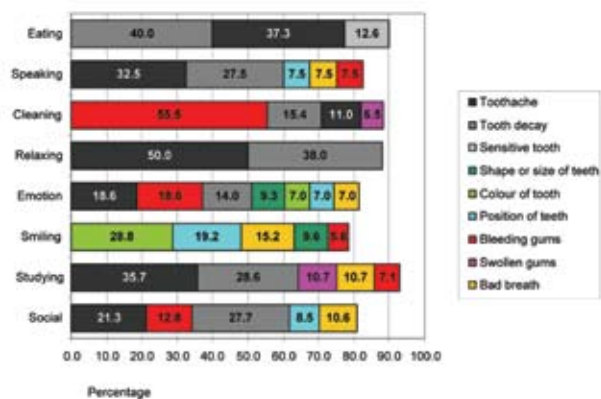
## DISCUSSION

The prevalence of oral impacts (36.2%) experienced by the schoolchildren during the previous three months was relatively modest and of low intensity compared with the rates reported by some other studies on this age group. The low prevalence in the South African children was most probably related to their low level of caries. The prevalence of impacts was similar to that reported in UK adolescents (40.4%)<sup>23</sup> but was much lower than the 90% prevalence reported by Gherunpong *et al.*<sup>7</sup>, and 85.2% by Krisdapong *et al.*<sup>24</sup> in Thailand, 82% by Bernabé *et al.*<sup>25</sup> in Peru, 80% in Brazil by Castro *et al.*<sup>26</sup> and 73% by Tubert-Jeannin *et al.*<sup>27</sup> in France, using the same OHRQoL index. African studies from Uganda<sup>17</sup> reported a prevalence of 62% and from Tanzania, 51.2% and 62.1% in children in urban and in rural areas.<sup>28</sup> Though all the aforementioned reports used the same OHRQoL index (Child-OIDP), the different designs of the studies and the diversity of the cultural settings limit direct comparisons.

Table 4: Prevalence, intensity and extent of oral impacts, by age

Co-variables	11 years		12 years		13 years		P value
	n	%	n	%	n	%	
Prevalence of impacts <sup>1</sup>							
With impacts	74	29.4	389	36.3	139	40.8	0.005
Without impacts	178	70.6	683	63.7	202	59.2	
Intensity of impacts <sup>2</sup>							
Very little	14	18.9	78	20.1	20	14.4	0.281
Little	32	43.2	168	43.2	68	49.0	
Moderate	25	33.8	104	26.7	27	19.4	
Severe	3	4.1	28	7.2	17	12.2	
Very severe	0	0.0	11	2.8	7	5.0	
Extent of impacts <sup>2</sup>							
Mean + SD.	1.39 + 0.59*		1.57 + 0.98*		1.88 + 1.28**		0.006
Range	1 - 3		1 - 7		1 - 7		

<sup>1</sup> Chi-squared test for trend. <sup>2</sup> Cuzick's test for trend.



**Figure 1:** Oral problems perceived as causes of oral impacts on daily performances.

The present study found that eating was the most important aspect of OHRQoL affected, consistent with reports from Uganda.<sup>17</sup> Difficulty with eating due to oral problems was the most common impact and led to more severe oral impacts on children's quality of life than on other performances. The majority of other studies using the OIDP in different age groups also reported that eating was the most prevalent performance affected.<sup>17,26,27</sup> Toothache, tooth decay and having a high DMFT contributed to eating difficulties in more than three quarters of those with impacts. The second most prevalent oral impact was difficulty in cleaning teeth. This has direct negative implications for these children, possibly leading to further deterioration of their oral health.

Difficulty with smiling was the third most prevalent oral impact reported by the children in Ugu District. Children are concerned about their oral appearance. Chen and Hunter<sup>29</sup> found that psychological impacts of oral health, such as avoiding laughing and being teased about teeth were prevalent in children. de Oliveira and Sheiham<sup>30</sup> found that adolescents with untreated malocclusions were significantly more likely to report oral impacts on their daily lives than those who had completed orthodontic treatment.

An interesting finding was that impacts relating to social dimensions, such as studying and socialising, were less prevalent but more intense than for other daily performances. The low prevalence of these impacts was also observed by Gherunpong *et al.*<sup>7</sup>, although they found the impacts to be the least severe. It has been suggested that the social performances of children are more closely related to their physical and psychological performances than is the case in adults.<sup>31</sup>

In the present study toothache and tooth decay were the most prevalent causes for nearly all the affected performances, except for smiling, where colour and position were the reasons, and for cleaning, where bleeding gums predominated as the problem. This provides good support regarding the relevance of using the condition-specific form of the Child-OIDP index. Furthermore, the CS-Child-OIDP provided evidence that respondents offered credible information about their perceptions of the causes of their impacts, thereby highlighting the importance of taking their perceptions into consideration when assessing treatment needs. Perceptions about health and illness<sup>32</sup> as well as about quality of life<sup>33-34</sup> change as children mature. The age of the group under investigation may have influenced the perception of oral impacts. A key finding from the present study

was that whilst the prevalence and extent of impacts were higher in older children, the intensity of those impacts was relatively low, so that greater levels of disability and handicap were not observed. This study has limitations. The participants of the present study represent a child population living in conditions of levels of poverty and poor infrastructure in South Africa, but are not necessarily representative of the general child population of the same age groups attending primary schools in South Africa. Further studies from other South African provinces would provide more information. The response rate at 64% was satisfactory, those children who did not respond being absent from school on the day of the study. It is of course possible that their absence was related to dental problems and if so, a higher prevalence of impacts could have been observed. Furthermore, analyses of the present findings could not provide a complete reflection of all the factors affecting self-perception of the oral impacts on the quality of life since they are based only on bivariate rather than multivariate analyses.

## CONCLUSIONS

The prevalence of oral impacts on the quality of life in this South African population of schoolchildren was relatively modest, as was the extent and intensity of the impacts. Oral impacts affected the children's quality of life mainly by influencing eating, cleaning of teeth and smiling. Toothache and tooth decay contributed significantly to most impacts, while impacts on cleaning teeth were largely attributed to bleeding gums and those on smiling to tooth colour. The prevalence and extent of impacts increased in older children, but the intensity did not vary significantly by age. Using additional ways of measuring OHRQoL, such as extent and intensity, provided a clearer and more complete picture of how the children experienced oral impacts.

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