

## Doctors' attitudes to and knowledge and usage of growth charts

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**Background:** Growth charts have been used worldwide for about 40 years but their use has always been fraught with problems.

**Methods:** A cross-sectional descriptive study was carried out on the reported usage of growth charts and whether there are factors that affect usage by the general practitioners working with children in public hospitals.

Data were collected through the use of a self-administered questionnaire. The questionnaire covered four concepts: demographic factors; doctors' self-reported growth chart usage; doctors' attitude towards growth monitoring and use of growth charts; and doctors' knowledge in terms of plotting, interpretation and management of growth patterns.

**Results:** A total of 90 out of 100 doctors completed the questionnaires. More than half (57%) of the doctors had high workloads. Fifty-six (62.2%) doctors thought they were too busy to use growth charts. Only 37 (41%) doctors achieved an acceptable total knowledge score. Although just over two-thirds of (67.8%) doctors reported a positive attitude towards growth monitoring, their reported usage does not reflect it. Fifty-four (60%) doctors plotted weights correctly. Doctors recognised the most probable cause for the given growth patterns. However, most doctors struggled to choose the most appropriate management option. Skill in plotting was associated with more regular usage. Better knowledge and a positive attitude were associated with higher usage whereas a perception of high workload and several years' experience were associated with lower levels of usage.

**Conclusions:** While doctors reported a positive attitude towards the use of growth charts, they lacked the knowledge to utilise them optimally and reported that the chart was often not used.

**Keywords:** attitude of health personnel, growth charts, growth monitoring, knowledge, medical staff, Road to Health booklet

### Introduction

Growth charts are used worldwide and were introduced in South Africa in 1971 to assist growth monitoring and the prevention of malnutrition in children under five.<sup>1,2</sup> In spite of its being in existence for over 40 years, the use of the growth charts has always been fraught with problems.<sup>3</sup> Different factors contribute to its ineffective use. Some factors relate to a lack of knowledge; previous studies have shown, for example, that health workers often do not have the ability to plot weight correctly, do not understand the charts, and fail to identify children with abnormal growth patterns.<sup>2,4</sup> Lack of knowledge is compounded further by health workers often feeling too overwhelmed by their workload to complete the charts, not asking to view the charts, and not filling them in completely.<sup>1,2,5,6</sup>

The researchers investigated which of the most common factors influencing the use of growth charts were relevant among doctors working in public sector hospitals in the Capricorn district of Limpopo province, South Africa.

The objectives of the study were to: describe doctors' reported usage of the growth chart and whether other factors such as experience, knowledge and attitude of the health worker affected usage. As Family Medicine is responsible for delivering primary care in the district health system we focused our inquiry on general practitioners working in the district.

### Method

A hospital-based, cross-sectional descriptive study was carried out of the general practitioners working with children in the public hospitals of the Capricorn district. Specialists and general practitioners who were not working with children at the time of the study were excluded. All general practitioners from the four

district hospitals and the single tertiary hospital in the Capricorn district were invited to participate in this study. The study was approved by the Faculty of Health Sciences Research Ethics Committee, University of Pretoria.

All the doctors who qualified to take part were requested to complete a questionnaire. Clinical managers were contacted via telephone and cell phone text messages before questionnaires were delivered to the various hospitals and were collected in person once they had been completed.

Data was collected through the use of a self-administered questionnaire that was created specifically for this study. The questionnaire was anonymous and participants were assured that their responses would be treated with the utmost confidentiality. The questionnaire was developed on the basis of the findings of a literature review that indicated that lack of knowledge, a heavy workload and a negative attitude of the health workers led to non-usage of the growth chart. The questionnaire covered four concepts that might impact on growth chart use. First, demographic factors such as age, gender, post level, years of experience and practice conditions were covered. Respondents were asked to state the average number of patients seen per day as well as their perception of how heavy their workload was. Second, doctors had to self-report on their growth chart usage; third, doctors' attitude towards growth monitoring and use of the growth chart was asked about. The last of the four concepts dealt with knowledge: plotting of a child's weight on a growth chart, interpretation of growth chart graphs and management of children with different growth patterns. The questionnaire consisted of both closed- and open-ended questions. A pilot study was carried out to identify possible problems and to ensure that the questions were not misleading.

In the coding of the questions, statements supporting the importance of growth chart use were regarded as positive and those negating the importance of growth chart use were regarded as negative. Each correct answer, answers indicating practice conditions conducive to evaluating the growth chart and answers conveying a positive attitude towards the use of the growth chart were scored as "1" whereas all negative or incorrect answers were scored as "0". After each answer had been scored, a total score was calculated for the concepts of attitude, knowledge and behaviour. Statistical significance was determined by the Fisher exact test.

As the use of growth charts is so fundamental to practice at this level of care a score of 75% or above was judged adequate for each concept. For the purpose of this study a practice with a workload of 40 patients or more per day was regarded as a very busy practice, a practice with 26 to 39 patients as busy and a practice with a workload of 25 patients or fewer per day was considered as ideal.

## Results

According to the human resources department records 100 doctors qualified to participate in the study. A total of 90 doctors returned completed questionnaires. A 90% representation of the study population was thus achieved. Table 1 shows the age, gender, post levels and years of experience of participants.

Seventy-five per cent of the respondents consulted more than the set ideal of 25 patients per day and more than half (57%) of

the doctors' workload reflected very busy practices of more than 40 patients per day. However, while nearly all agreed that the ideal number of patients to consult per day in order to update and use the growth chart was 25 patients or fewer, only 56 (62,2%) doctors were of the opinion that they were too busy to do so. Interestingly, no association was found between number of patients seen per day and doctors' perception of their workload. Senior doctors reported seeing more patients per day than junior doctors did.

### Doctors' knowledge, attitude and usage scores

Only 37 (41%) doctors managed to achieve the defined acceptable total knowledge score of 75%. Although 61 (67,8%) doctors reported a positive attitude towards growth chart usage, their reported usage on the other hand did not reflect this attitude, as only 37 (41%) doctors achieved the defined acceptable usage score (see Figure 1).

When the aspects of knowledge that presented problems are examined, it is very concerning that only 54 (60%) doctors plotted the given weights of a child correctly on the growth chart. Although not statistically significant, it seems that junior doctors may be more skilled in plotting growth on the growth chart, as 40 (66%) of 61 junior doctors could do so correctly in comparison with only 14 (48%) of 29 senior doctors who could.

As illustrated in Table 2, doctors could recognise the most probable cause for the given growth patterns from the list of

**Table 1:** Demographics of participants and their practices

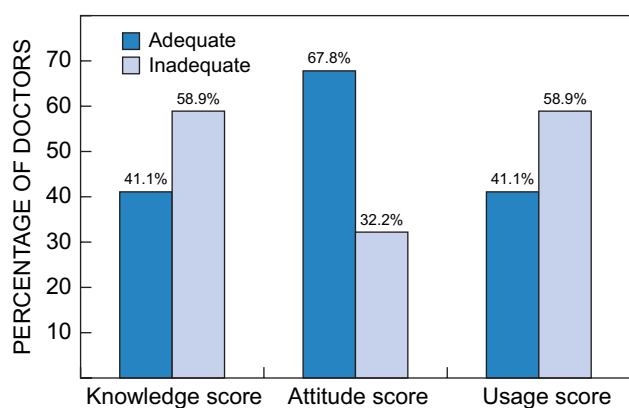
Age in years	Number of participants (N = 90)	Percentage %
20–29	40	45
30–39	24	27
40–49	20	22
50–59	5	5
60–69	1	1
<i>Gender</i>		
Male	61	68
Female	29	32
<i>Post level</i>		
Junior		
Intern	13	14
Community service	8	9
Senior medical officer (SMO)	40	45
Senior		
Principle medical officer (PMO)	14	15
Chief medical officer (CMO)	15	17
<i>Years of experience</i>		
1–9	67	75
10–19	12	13
20–29	8	9
30+	3	3
<i>Patients seen per day</i>		
≤ 25	22	24,4
> 25	68	75,6
<i>Ideal number of patients per day according to participants' opinion</i>		
≤ 25	84	93,3
> 25	6	6,7

**Table 2:** Interpretation and management according to 'Road to Health' chart graph

Graphs	Correct interpretation	%	Correct management	%
A. Normal growth	77	86	66	73.3
B. Normal preterm	58	64	39	43.3
C. Acute illness, not fully recovered	67	74	46	51
D. Chronic illness/ growth faltering	73	81	49	54.4

**Table 3:** Accuracy of management by reported growth chart usage levels

Graphs	Regular use Correct management	%	Infrequent use Correct management	%	Fisher exact p value
A. Normal growth	45	68	21	32	0.014
B. Normal preterm	30	77	9	23	0.005
C. Acute illness, not fully recovered	34	74	12	26	0.009
D. Chronic illness	33	67	16	33	0.136



**Figure 1:** Knowledge, attitude and usage scores

options given. However, most doctors had problems in choosing the most appropriate management option from the list for the identified conditions.

Those who reported more frequent usage were more able to choose the correct management option. (See Table 3) There was no statistically significant association between knowledge and attitude, post level or years of experience.

**Factors influencing usage scores**

Higher levels of knowledge (Fisher exact, p=0.005), a positive attitude towards growth charts (p=0.00003, Fisher exact), fewer years of experience (Fisher exact, p=0.015) and the perception that the workload was acceptable (Fisher exact, p=0.000033,) were the major factors associated with higher usage scores. Skill in plotting was associated with more regular usage of the growth chart. Thirty-nine (72%) of the 54 doctors who reported that they used the growth chart on a regular basis could plot the graph correctly, while only 15 (42%) of the 36 doctors who did not use the growth chart could accurately plot a child's weight on the chart. (X<sup>2</sup>, p=0.007) No association was found between level of usage and post level or reported real workload.

**Discussion**

This study investigated specifically general practitioners' knowledge of growth charts by evaluating their skill in plotting, their interpretation of growth patterns and their choice of management. Previous studies examined nurses' or mixed

professional groups of health care workers' skills in using growth charts to monitor children. In these studies it was found that extensive training was needed to ensure an acceptable level of skill in plotting and interpretation of growth charts as well as appropriate management of identified problems.<sup>7</sup> Doctors represent the highest level of professional training available in clinics and district hospitals. One would assume that their ability and skill set would be better than those with less training. It is encouraging that 74% or more of our study population identified growth patterns representing normal growth, acute disease not fully recovered and chronic illness. In South Africa with its high burden of tuberculosis and HIV, recognising these growth patterns is a very important ability for identifying children needing special attention. In the light of HIV, identifying children in need of attention becomes even more of a challenge. Growth references based on non-HIV infected children do not accurately identify HIV-infected children with inappropriate growth response to anti-retroviral treatment.<sup>8</sup> However, our findings are in line with previous studies that illustrated health workers' inability to plot and manage growth-pattern abnormalities.<sup>2-4,9</sup>

Surprisingly, experience as expressed in years after completion of study (and not related to post level) affected usage *inversely* with the less experienced doctors utilising growth chart more regularly than their more experienced colleagues. Although the study design did not allow for exploring the *reason/ cause* of the finding, senior doctors reported seeing more patients per day. The high patient load could have influenced their behaviour of not applying their improved knowledge through the use of the growth chart.

As could be expected, better knowledge and a positive attitude lead to better utilisation of a growth chart. This concurs with studies investigating relationships between knowledge, attitude and behaviour of health care workers.<sup>10,11</sup> A relationship between reported regular use and improved skill in managing patients correctly were found in our study, but whether regular use leads to improved skill, or *vice versa*, was not investigated.

Workload influenced usage behaviour but it was the *perception* of workload and not number of patients seen that was the important factor influencing behaviour. While there was no relationship found between reported workload (number of patients seen) and the perception of workload, doctors who considered themselves as very busy tended to use the growth chart significantly less often.

The limitations of this study were that the outcome measures were created to guide further in service training and no analysis was done of the psychometric properties of these measures. The study was conducted in one district and only with general practitioners working in the public sector. Therefore the generalizability of the findings is limited. In spite of this limitation, this research addresses doctors' knowledge of, attitudes to and behaviour regarding one of the cornerstone activities of primary care.

### Conclusions

The objectives of the study were to: describe doctors' reported usage of the growth charts and to describe whether factors such as experience, knowledge and attitude of the doctors affected usage. In this study 41% of doctors achieved an acceptable usage score. Better knowledge and a positive attitude were associated with higher reported usage whereas a perception of high workload and years of experience were associated with reported lower levels of usage. It was found that while doctors reported a positive attitude towards the use of growth charts, they lacked knowledge to utilise them optimally and reported that the chart was not often used.

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