UC San Diego
Independent Study Projects

Title
Growth chart basics in 3 minutes: A resource for improving parent's understanding of growth charts

Permalink
https://escholarship.org/uc/item/96k0j59w

Author
Kroesing Albino, Nicholas

Publication Date
2019

eScholarship.org Powered by the California Digital Library
University of California

Title

Growth chart basics in 3 minutes: A resource for improving parent's understanding of growth charts.

Abstract

As information technology continues to improve, patients are given access to increasing amounts of their health data. Health applications such as Epic MyChart provide an easily accessible archive of information for both patients and, in the case of pediatrics, parents. With increasing amounts of available information there is a concurrent need to provide education about interpretation. This study aimed to create a short, parent-focused, educational video to convey high-yield information regarding growth chart data. A pre- and post-survey were administered in conjunction with the educational video using QR codes at pediatric offices in La Jolla. We found, in general, parents felt well-equipped to be active participants in their child's health, but identified some areas for improvement regarding perceptions of health.

Background

Sharing growth chart data has long been a tenet of the pediatric well-child visit, but graphical interpretation can be challenging for both parents and professionals. Previous efforts to demystify the growth chart have largely been focused on developing countries, but the United States is not without need for education as well[1]. One study of 1000 parents in the U.S. demonstrated that up to 77% of parents incorrectly interpreted charts containing both height and weight measurements. Yet despite highly inaccurate interpretations, the majority of parents surveyed believed that sharing growth chart data was a necessary part of the well-child visit[2]. Even healthcare providers, who receive specific training about interpretation of growth chart data, not to mention prerequisite courses and examinations in mathematics, still report feeling uncomfortable detecting abnormal growth[3]. How can we expect parents to truly understand abstract data being presented in such short time frames, when we as health providers struggle with the same interpretation?

Steps have been made towards improving the presentation of growth chart data. In 2011, the UK designed and evaluated new formats for their WHO-based growth charts using a multidisciplinary expert team, including parent focus groups and health staff. Some of their conclusions included eliminating an emphasized 50th percentile line and optimizing grid size[4]. While parents were involved in this redesign process, the final product and educational instructions were primarily focused on healthcare providers. Other institutions have similarly worked to clarify growth chart presentations, however the majority of resources available for those looking to learn about growth chart interpretation remain geared towards professionals.

Arguably the most contentious growth parameter depicted in growth charts is Body Mass Index, and previous attempts to improve parent understanding of this

have been met with mixed results. Some studies have shown that parents have difficulty recalling information about reported BMI, while others have shown that even when they do recall correct BMI, the long-term BMI changes are minimal at best[56]. A 2011 study showed that despite schools reporting BMI measurements directly to parents, the knowledge of their child's BMI had no effect on subsequent measurements when compared to no notification[7]. Growth charts portray several growth parameters other than BMI, and professionals should take the opportunity to provide a good foundation for interpretation before delving in to the more sensitive parameter of BMI.

If pediatricians continue to share growth chart data during well-child visits, attempts should be made to try to improve this information exchange. In a systematic review by Coker *et al* the authors evaluated strategies and tools employed in well-child visits, and it was noted that there was good evidence for improving well-child care using non-face-to-face formats for anticipatory guidance. Specifically, the use of the internet was demonstrated to improve parent knowledge, discussion, and action[8]. With YouTube services nearly ubiquitous in our modern society, this is the perfect platform to provide more educational resources for parents.

Methods

The video was designed using Adobe Photoshop, Adobe Illustrator, and Adobe After Effects with input from the student's ISP committee on content and length. It was limited to three minutes in length and focused on conveying three major points of information: 1. The basics of how to read the x- and y-axis. 2. The definition and usefulness of a percentile. 3. The importance of focusing on the overall trend. It was then uploaded to a publicly available YouTube channel. Recruitment occurred at clinic either before or after well-child checks, primarily in children under the age of 6. Participants were given a sheet with 3 QR codes that were hyperlinked to the corresponding surveys and videos and instructed to follow the QR codes in order. The pre-survey included five main questions, four of which were intended to measure basic understanding of growth chart interpretation, and one question to gauge parent's comfort in participating in their child's health using a Likert scale. Participants were instructed to complete the post-video survey after watching the video, and the questions were repeated from the pre-test survey. The video can be found at https://www.youtube.com/watch?v=hQ-wVqbWDL0

Growth Chart Pre-Survey

This survey is meant to help us determine better ways to present growth chart information. There is no compensation, nor penalty, for taking this survey. All responses will be anonymous, and we thank you for your time and effort!

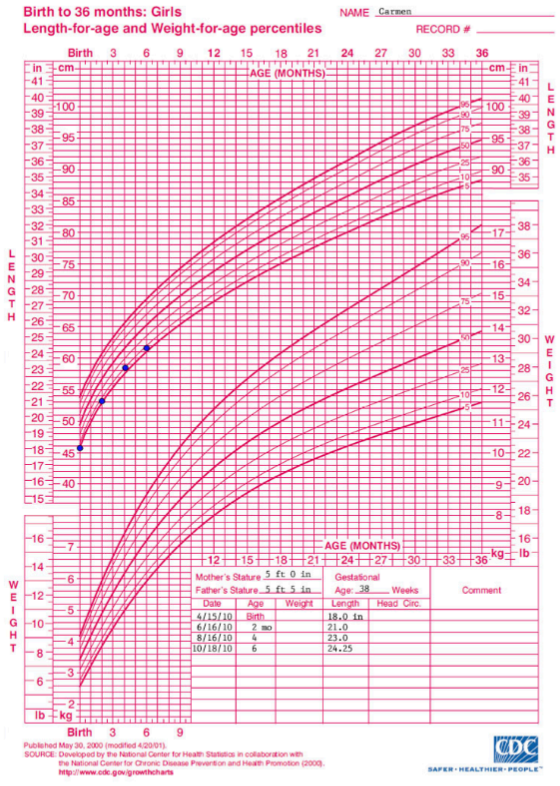
* Required

1. **Your first initial and last 3 digits of cell phone (example: Jane Doe 619-555-1234 would be "J234") ***

2. **Your highest level of education**
   Mark only one oval.
   - ◯ Below High School
   - ◯ High School
   - ◯ College or above

Quiz Questions

3. **1. About how tall is this child at their 6-month visit? ***



Mark only one oval.

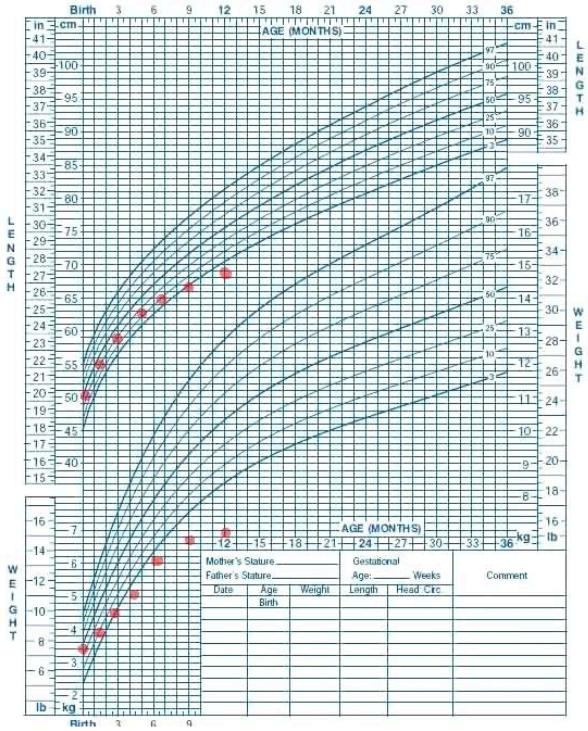
- ◯ 16 inches
- ◯ 20 inches
- ◯ 24 inches
- ◯ 28 inches
- ◯ 32 inches
- ◯ I don't know

4. **2. Which percentile is healthiest for my child?** *

Mark only one oval.

- ◯ 75th percentile
- ◯ 25th percentile
- ◯ I don't know
- ◯ 50th percentile
- ◯ It depends on other factors
- ◯ 99th percentile

5. **3. This child's growth trend can best be described as** *



Mark only one oval.

- ◯ Decreasing
- ◯ Staying the same
- ◯ Increasing
- ◯ I don't know

6. **4. Based on the previous growth chart, would you consider this child healthy?** *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ I don't know

7. **5. Do you feel that you can be an active participant in your child's health?**

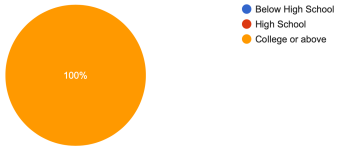
Mark only one oval per row.

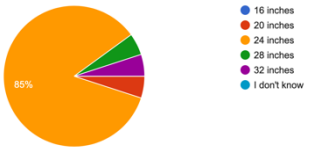
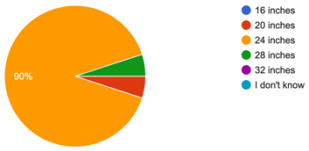
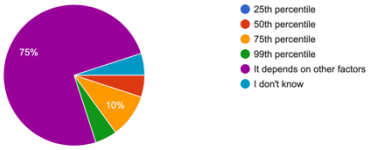
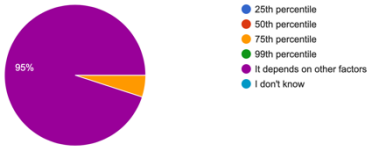
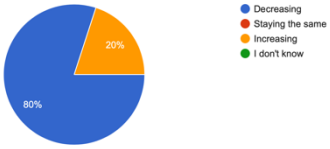
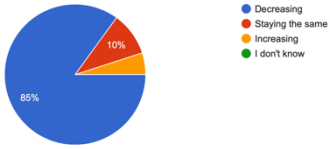
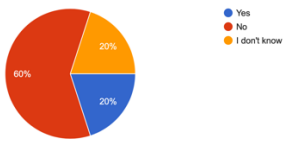
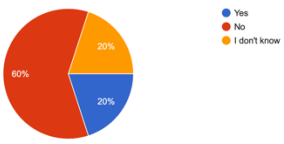
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Answer	◯	◯	◯	◯	◯

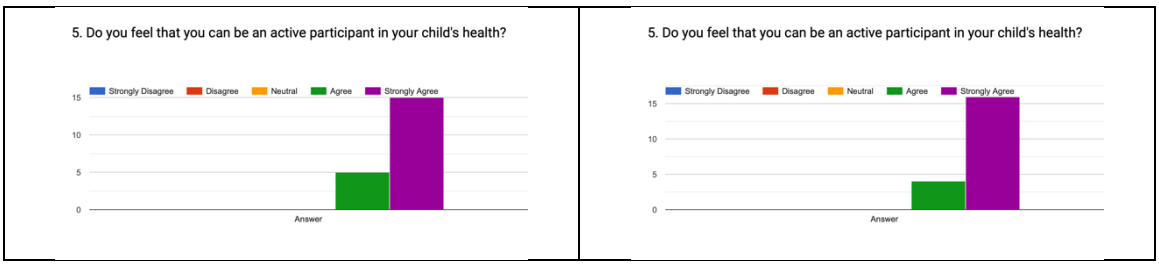
Results

Demographics:

Your highest level of education
20 responses



Pre-Video Responses	Post-Video Responses
1. About how tall is this child at their 6-month visit? 20 responses  	1. About how tall is this child at their 6-month visit? 20 responses 
2. Which percentile is healthiest for my child? 20 responses  	2. Which percentile is healthiest for my child? 20 responses 
3. This child's growth trend can best be described as 20 responses  	3. This child's growth trend can best be described as 20 responses 
4. Based on the previous growth chart, would you consider this child healthy? 20 responses  	4. Based on the previous growth chart, would you consider this child healthy? 20 responses 



Discussion

Although there are relatively few respondents and the design of the experiment does not allow for tests for significance, there are several interesting trends to be noted. First, despite all respondents being college graduates, with many holding advanced degrees, including those in the health sciences, there was still some error in the basics of reading growth charts. Most participants were able to correctly identify the height of the child on the first growth chart, using either the y-axis or the recorded heights in the bottom-right of the chart. Second, there was disagreement in response to the pre-survey question asking about the healthiest percentile. The video appears to have been of some help to these respondents as this was answered correctly on 95% of the post-video surveys. Third, the questions that asked parents to identify and interpret the trend were generally, but not entirely, answered correctly, and saw no change from pre-video to post-video. All participants answered that they agreed or strongly agreed that they could be active participants in their children's health.

There are several strong limitations to interpreting this data. The basis of this study relies on a basic technologic literacy, and during implementation there were several issues raised with those who had Android phones running on older operating systems as these do not have built-in QR code readers. There were several participants who completed part of the pre-survey, but did not complete the post-survey, these were omitted from the final analysis. The majority of respondents were from highly educated backgrounds, but, interestingly, even those with higher degrees (M.D., Ph.D., etc.) did not have perfect scores on the pre-, or even post-video survey. Lastly, there was no "control" group to compare this video intervention to.

References:

[1] Roberfroid, D. , Pelto, G. H. and Kolsteren, P. (2007), Plot and see! Maternal comprehension of growth charts worldwide. Tropical Medicine & International Health, 12: 1074-1086. doi:10.1111/j.1365-3156.2007.01890.x

[2] Ben-Joseph, E. P., et al. (2009). "Do parents understand growth charts? A national, Internet-based survey." Pediatrics 124(4): 1100-1109.

[3] Wright, C. M., et al. (2012). "Designing new UK-WHO growth charts: implications for health staff use and understanding of charts and growth monitoring." Matern Child Nutr 8(3): 371-379.

[4] Sachs, M., et al. (2012). "'Now I understand': consulting parents on chart design and parental information for the UK-WHO child growth charts." Child Care Health Dev 38(3): 435-440.

[5] Dawson, A. M., et al. (2014). "Do parents recall and understand children's weight status information after BMI screening? A randomised controlled trial." BMJ Open 4(7): e004481.

[6] Gerards, S. M., et al. (2014). "Parental perception of child's weight status and subsequent BMIz change: the KOALA birth cohort study." BMC Public Health 14: 291.
[7] Madsen, K. A. (2011). "School-based body mass index screening and parent notification: a statewide natural experiment." Arch Pediatr Adolesc Med 165(11): 987-992.
[8] Coker TR, Windon A, Moreno C, Schuster MA, Chung PJ. Well-Child Care Clinical Practice Redesign for Young Children: A Systematic Review of Strategies and Tools. *Pediatrics*. 2013;131(Suppl 1):S5-S25. doi:10.1542/peds.2012-1427c.