

Parents' Experience with Routine Infant Growth Monitoring

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Introduction

Routine growth monitoring (RGM) is universally considered an integral part of pediatric primary care. While traditionally used to detect malnutrition, it is now primarily used to identify underlying causes of short stature and childhood obesity in developed countries.^{1,3} Despite widespread use and assumptions that RGM is a safe, effective, low-cost screening intervention,² there is little evidence to support these beliefs. Several reviews have concluded that "there is insufficient reliable information to be confident about whether routine growth monitoring is of benefit to child health"³⁻⁷ and others have raised concerns about the potential for associated harm.^{1, 2, 4-6, 8, 9}

Studies have consistently shown that many parents and providers have difficulty interpreting growth charts which can lead to confusion, anxiety or inappropriate provider and parent responses.⁹⁻¹¹ Considerable time is dedicated to RGM for both parents and providers and it may displace other beneficial interventions.

Most of the policy around RGM has been driven by providers, particularly specialist paediatric endocrinologists and dietitians, neither of whom generally perform RGM, with scarce attention paid to the important voices of parents. Although some studies on related issues (breastfeeding, obesity, comprehension of growth charts) have indirectly touched on the topic, a recent scoping review did not identify any previous qualitative studies that directly explored parents' experiences of infant RGM⁹ in high-income settings.

The objectives of this qualitative study were to better understand parents' experiences with infant RGM with respect to: 1) potential benefits and harms, 2) comprehension and 3) self-reported behaviour change.

Better understanding parents' experiences may influence how front-line care providers perform RGM and communicate growth information. This could provide more evidence to evaluate the risks and benefits of RGM and lead to a more positive experience for parents.

Methods

Study Design

We used a qualitative research study design, Interpretive Description (ID) which provides a framework for applied qualitative research reflecting the complexities encountered in health care practice. This study seeks to access complex, subjective phenomena such as experience, perception, opinion, values, meanings and beliefs, as related to parents' experiences with RGM, an intention that is well matched with the Interpretive Description applied research method.¹²⁻¹⁴

Inclusion/Exclusion Criteria

Inclusion: English speaking parents of at least one child 2-5 years of age at the time of the interview living in or near the target communities (Cranbrook, Kelowna or Vancouver).

Exclusion: Parents of children with serious medical problems who would require frequent weight monitoring for medical reasons, including parents of preterm babies (<37 weeks).

Population

Parents were purposefully sampled from three different types of communities in British Columbia with a broad range of demographic characteristics. The target sample size was 20-30 participants as suggested by Thorne.¹⁵ Participants were recruited through posted and electronic recruitment flyers on relevant online platforms and locations, an online platform for health research volunteers (<https://www.reachbc.ca/> and snowball sampling).

Data Collection

Demographic information was collected via an online survey. Team members conducted one-on-one semi-structured telephone or zoom interviews lasting 30-45 minutes. Interviews were audio-recorded and transcribed. The lead team members conducting the interviews included one family physician (IH) and two masters level nursing faculty members (SO and NS). Two team members (IH and SO) have done other research related to RGM and have experience and training in qualitative research methods. All three team members are female and have clinical experience with RGM in practice and two have personal experience with their own children. None of the researchers were known to any of the interviewees. In some cases, research trainee team members were present during the interviews (SS, KX).

We developed a semi-structured interview guide (Table 1, Appendix 1) based on Donabedian's classification of quality of medical care (structure, process and outcome),¹⁶ further differentiated using the domains defined by patients regarding perceptions of health care services described by Sofaer.¹⁷ To attempt to gain further insight from parents about the utility of growth monitoring as a stimulus for behaviour change related to their child's weight we developed the questions in this domain using the Theory of Planned Behaviour to help us understand why and how parents changed behavior.¹⁸

As the interviews progressed, we sought to iteratively understand and interpret parental perceptions using critical reflection and examination to make meaning of the data as it was collected. We made minor modifications to the interview guide in response to interviewers' observations,

Process	Patient-centred
	Communication
	Information
	Courtesy
	Emotional support
	Technical quality
Structure	Access
	Efficiency
Outcome	Expectations
	Results of process
	Addressing problem
	Improvement in function
Behaviour	Change in attitude
	Subjective norm
	Perceived behavioural control

field notes and discussions within the team, in order to explore new and important themes as they were identified. We also regularly discussed the need for further recruitment based on the frequency of new ideas being raised.

Participants received a \$25 electronic gift card after completion of the study.

Data Analysis and Interpretation

We used an interpretive description process for analysis based on the steps described by Archibald et al.¹⁹ First, we listened to audio-recordings and read transcripts in detail several times then began to group codes into preliminary categories. These were used to code the remainder of the interviews, adding new codes as required. We used qualitative research software (Nvivo) along with a combination of manual sorting and visualization. The team met at regularly to discuss findings and identify key messages in relation to the guiding theoretical frameworks and pragmatic relevance to the clinical setting. Analytic rigour was enhanced through collaborative reflexivity and triangulation among multiple researchers. We used the consolidated criteria for reporting qualitative research (COREQ) checklist to ensure adherence to high quality standards.²⁰ (Appendix 2)

Ethics

The study received ethical approval through a harmonized review from the University of British Columbia (UBC) Behavioural Research Ethics Board (Reference # H20-02871).

Findings

Of the 32 participants who were recruited, 3 were deemed ineligible and another 8 were lost to follow-up prior to completing an interview. Demographic information from the 21 participants who completed the interviews is summarized in Table 2.

Gender	
Female	21
Male	0
Age	
20-30	1
31-40	16
41+	1
Marital status	
Married	15
Common Law	1
Single	1
Divorced	1
Education level	
Secondary school	2
Post-secondary certification	3
Post-graduate certification	13
Annual household income	
\$50,000 - \$79,999	3
\$80,000 - \$99,999	3
\$100,000 and over	12
Number of children	
1	7
2	8
3	1
Location	
Urban	13
Rural	8
*Three participants did not respond to most demographic questions	

KEY THEMES

(See Table 3, Participants Quotes)

Growth Monitoring is an Emotionally Charged Topic

Many parents were soothed and reassured by regular monitoring if they interpreted their child's growth as normal while others reported anxiety, worry, fear and guilt. Some had been warned antenatally by other parents that growth monitoring could be very stressful. Worries were exacerbated by confusion due to inconsistency between providers in interpretation and measurement.

Some respondents described comparisons of size with other parents as an additional stress, particularly when babies were smaller than average. The cultural perception that "bigger is better" among babies was most prevalent but some also perceived stigma for infants who were larger.

Table 3. Participant quotes

Growth monitoring is an emotionally charged subject	
Worry / guilt / pressure	"A lot of pressure, a lot of guilt, a lot of worrying..." P1 "I'm blaming myself because I'm the parent... at the back of your mind you're like... I'm such a bad mom". P12 "I felt a little bit anxious about it with my first child because it was happening a lot...they always want to know the measurement".P26 "...getting really anxious and just feeling a little bit stressed out and frustrated, because...nothing is working..." P28 "...scary for parents to go through that and always have to think "my perfect little child might have something wrong".P3 "[RGM] can create a lot of emotional distress for a mother and it can set off that whole nursing relationship in a bad trajectory" P1
Anxiety about low weight	"I had always kind of been warned by friends ...they would really push, whether the weight was on the mid-range to low side, that there might be something wrong."P3 "I can see it creating some anxiety if your child is not growing as they "should be" P28 "she started off in 75th percentile ...and then once it dropped below 50 I started to get concerned...thinking why is she not in the average percentile? Am I not feeding her enough?... And then every mom starts to get stressed... once you drop below the 50th percentile" P23 "That felt catastrophic in many ways. I was like, "Oh, god, she's been on the third percentile forever, but now she's going to drop, she's going to shrivel up, she's not going to eat anything!"P2 "And I was just going further down the rabbit hole... thinking that I was not doing a good job and having anxiety like "she's so little, what if there's something wrong with her?" P2 "Some of them would leave in tears because they were talking so heavily about "your child is not this, your child is not that, they're not growing enough" P3
Obsession with monitoring	"I was really nervous so I had an app and I tracked absolutely everything."P13 "It just became an obsessive thing about how small she is."P2 "I had his measurements every month, so for me it made me feel better, like my data is complete." P21
Comparison with others	"Moms talk about it, right? They're like, "Oh, he's 95th percentile. He's huge for his age."P2 "I feel like it seems like a point of pride to have a child that's more than 50th percentile." P26 "There's some pretty brutal Mommy culture wars out there, and people compare each other and they compare their babies and their own bodies." P1
Reassurance	"Being a first-time mom, the benefits were that reassurance that I'm doing a good job of feeding him." P4 "Having monitoring does give me a peace of mind." P29 "It was comforting knowing that she was growing at the rate she should be." P28
Understanding of the role of growth monitoring	
Ensure overall good health	"To make sure everything's on track, that there's nothing I should be concerned about." P19 "To make sure that you're not starving them." P28 "Part of the general health monitoring of how children are developing." P26 "If everything is going well, then the baby's growth is steady and consistent, not rapid or too slow, but fairly regular range." P7
Importance of staying on the curve	"If they're following their own growth curves then everything is fine, but if they're dropping then I just need to pay more attention to make sure that they're getting enough calories." P23 "It doesn't matter how big or small they start out... but then they should be growing along their percentile." P9 "To make sure that your child was consuming enough so that they weren't dropping off of the curve." P21
Misunderstanding	"She just needed more milk, avocado, and butter... If we didn't have that appointment, you know, it could've gone further and maybe at some point she could've gone way off or lost weight." P3 "Without that [RGM] there's just a lot of risk." P3 "When our child came out and he was 49cm and average is 50cm, I was like "Oh my god what's wrong?"P21 "At three months I thought, "Oh my goodness I have to wait for another three months! What if something goes wrong between now and then?" P21 "The larger the number, the better, the healthier your child is." P26
Awareness of individual differences	"Just because your child is 95% doesn't mean they're doing great. Like it's not like they get an A." P13 "I have started to understand that every you know every child grows in a different rate, and that some kids are bigger than others." P23 "You kind of start to use it as a barometer for how you're doing, and it's not really a realistic barometer." P2
Differences in provider communication	"There's been a lack of interpretation of that information in general." P1 "Putting it on a growth chart for me like, "this is where it is on the growth curve and they're tracking their own curve"... that interprets that piece of information for me, and it's helpful." P1 "The public health nurse was like, "Oh, you know, maybe you should have a home visit. She looks quite pale." and "Oh, you know, and she is quite small" ... really kind of stoking those fires [but] the pediatrician was just like, "Yeah, the world needs skinny people, too, right?" If I had the messaging consistently from all providers... that would have been really helpful." P2 "Usually I have the vaccine appointments with the public health nurse and then we also have the well-being appointments for the kids. They'll do measuring at both of those appointments. Sometimes it can be that you have a two-month check-up for the baby and then you also have the two-month vaccine, it can be close together." P9 "They have a different scale, and it would be different from the doctor's office. So if you're not consistent with which scale you're using, it can throw off or the numbers." P12 "I just found that it was kind of inaccurate, like with the measuring tape. There was one time when she was like 10 cm off and I know she did not shrink 10cm, somebody measured something inaccurately." P29 "If my doctor was concerned I'd be concerned, but if public health was concerned I probably wouldn't be concerned." P3
Expectations	"I imagine most people don't really know about it until they have that first experience with the public health nurse." P3 "I guess I expected it to happen, to be thorough." P31 "I'm pretty neutral about it. Like if I'm there and it's available then I don't necessarily mind doing it." P26
Impact on behaviour	
Adding formula	"She suggested that we should switch from breast milk to formula because it gives more calories ...and she was fine from there on." P20 "I know with my son they were encouraging me to continue with giving formula in addition to breastmilk, because of weight gain." P26 "Right at the start...his weight dropped a little, he wasn't getting enough milk from me so we had a supplement and so [the nurse] was really reassuring there to say "you're doing a great job, we just need to supplement a little bit..." He came back again and he was fine after that." P4 "When you first have a baby and your milk doesn't come in immediately ...there can be some pressure to not be patient for breast milk to come in when a child is losing ... we need to be more patient in our culture and society... to allow breast milk to come in and not to push formula too early."P1
Changes to feeding	"Knowing that [she] is not really keeping up with her growth... I feel like I am trying to feed her more. So I guess it is changing my behaviour.P8 "I started thinking I need to fatten my child up, I need to make sure she eats more. I need to make sure we get some more healthy fats in her." P23 "She started to put the focus on higher fat and more calories after her appointment, to try and get some extra weight gain for her child." P26 "It does change my behavior... I'll be like "Okay, what are some healthy fats I can give them?" P31 "If I were to see my child go off the chart like the 95th or 100th percentile I'd think maybe they need to be eating less, right?" P23
No change	"We didn't really change our behavior, because I feel like with growth there's really nothing you can do." P31 "We fool ourselves into thinking that we can be more in control of our own children than we are of our own bodies." P1 "It did kind of worry me, but I did some Googling and followed my mom instinct." P29

Table 3 (continued). Participant quotes

Individualized needs	
Experience	"Because this is my third child, I've been less worried. I've just been through it and I kind of trust that my children would be OK and I kind of feel more confident as parents and maybe just more busy, less ability to fret over it." P1 "I took a lot more stock into it with my first child just because just not knowing or being very new to parenting and wondering whether you are doing the best for them." P26 "Being a first time parent, I think those kind of suggestions were definitely helpful to us." P20
Type / amount of communication	"Hearing my pediatrician say "she looks great, you're doing really great. She's meeting all her milestones" and then some "she looks healthy", that kind of "don't worry mom". That type of stuff was always helpful." P2 "Every child is different, every child grows differently and I think it really just depends on the child's needs." P10 "I think it would've been nice to really know why it matters... I like to know the reason behind it. I always find that really helpful..." P3 "I don't necessarily need a whole lot of information about it." P7
Child weight	"Because James was always growing fine I never had a situation where they had to deal with a difficult conversation ...there was never enough of a cause to be worried." P21 "Because my children were good solid weights so they have said "we could bring what's necessary to weigh and measure them - Would you like us to do that?" And I think I usually said like "no, it's fine." P1

Parents emphasized the importance of the health care providers' words and actions in either relieving or exacerbating anxiety. They noted that frequent monitoring sends a strong message that something is wrong.

A number of parents reported obsessive behaviours using excessively frequent weighing to calm their anxiety. Other self-reported "data nerds" simply obsessed around having "a complete data set" even if they weren't worried about their child's growth.

The presence of drop-in weighing clinics at local libraries or public health units was mentioned by several parents as a place they could go to monitor more frequently which was reported to either relieve or, in some cases, heighten anxiety.

Understanding and Interpretation of RGM

Most parents had a general sense that the purpose of growth monitoring was to ensure babies were growing well ("getting enough") and seemed to understand the general concept of "following the curve". Many parents placed undue emphasis on the significance of the numbers and took these concepts to extremes, worrying about minor fluctuations or deviations from the curve. Many parents misinterpreted normal growth along the lower end of the normal range as problematic.

Some parents recognized that growth is only one component of a child's overall health. Others admitted that they had not really thought about it at all; that it was something routine that was just always done. Many parents had little or no awareness of the process of RGM prior to delivering their first child and so had no expectations around it however once they became aware that it was a routine practice then it did become an expectation for many to have growth monitored and discussed at each visit.

When asked whether they would do it if they were not expected to, most said they would, out of curiosity at least, but approximately one third said they would not although most agreed it was simple, not terribly inconvenient and not controversial.

Some parents credited growth monitoring with identifying problems that they were then able to address and this reinforced their belief in the importance of RGM.

Parents often conflated the importance of growth monitoring with the general experience of attendance at health visits and the additional information that was provided during the visit.

Several parents emphasized the importance of the visual

aid of the growth chart to better understand the meaning of the measurements along with careful explanations from providers. Many parents reported using alternate sources, especially online sources, to understand the significance of the measurements and what to do about them.

Impact on Behaviour

Many parents reported that growth monitoring caused them to feed their child more or supplement with formula and to increase the frequency of monitoring. When asked theoretically if they would change their behaviour if growth was noted to be abnormal, many confidently said that they would alter their child's diet while others were skeptical about a parent's ability to influence how much or what a child eats.

Individual Variation

Throughout the interviews it was apparent that significant variation exists among individuals' emotional responses, levels of understanding, expectations and behavioural responses to RGM.

The most important factor influencing parents was experience. First-time parents reported significantly more anxiety about growth which was most pronounced in the first months of life. Several parents reflected later on that they had worried too much. Parents with older or multiple children recognized their limited ability to control a child's eating or growth and placed more emphasis on other ways of assessing health. They also had less time to focus on their second or third child and were more likely to report that RGM was inconvenient.

The other major contributor to variation in responses was child size. Parents of children above the 50th percentile were less worried, more confident and more reassured by RGM. Parents of smaller children, despite often acknowledging that some healthy children were just genetically smaller, tended to worry more, experience doubts about their adequacy as a parent and feel that they should feed their children more.

Other factors that seemed to have some influence were personality type or past medical or family history such as anxiety, personal weight struggles or previous children with growth or health problems.

Socioeconomic or educational factors were identified indirectly through parent reporting that they were able to stay at home and so had more time to learn about growth and attend visits. Parents with higher levels of education seemed less prone to misinterpreting RGM information.

Discussion

The potential for RGM to alleviate or induce anxiety, confirms the concern that has been raised by other authors and noted indirectly in other studies.^{1,4-6,9} It is also a well-described phenomenon in parenting communities and the lay-press^{21,22} and is very familiar to most practicing clinicians who perform RGM. It is an important finding given the elevated risk of mental health problems the postpartum period and can also contribute to additional visits, referrals and investigations.

The societal stigma related to weight, in this case, usually lower infant weights can also be harmful to parents, similar to the negative effects of weight bias and stigma related to obesity²³ known to cause shame, guilt, low self-esteem and avoidance of health care. Terms like “failure to thrive” or comments such as “good job” betray our bias towards larger babies and an assumption that larger babies are being well-cared and can reinforce parents’ feelings of guilt and fear.

This sample of well-educated parents seemed to have a better understanding than has been reported in other studies⁹ closely mirroring the common understanding amongst health professionals. Unfortunately, even among healthcare providers and experts, the specific objectives of RGM, appropriate interpretation and recommended interventions are not clearly defined and not supported by evidence³ which leads to inconsistency among providers. In multiple studies, healthcare practitioners have also been reported to have problems plotting and correctly interpreting growth charts.^{11,24} Most practitioners use age-based instead of the recommended length-based measures, leading to over-diagnosis of short or tall babies as under- or overweight.^{25,26} Many of the commonly used “rules of thumb” are not based on evidence. The common expectation for babies to return to birthweight by 2 weeks fails to recognize that 14 % of normal babies don’t do this,^{26,27} especially those delivered by C-Section (24%) or breastfed babies. Although providers are advised to watch for infants who cross major growth percentile lines,² in a large database study of 9369 infants, 64% cross 1 major growth line and 38% cross two lines, officially meeting the definition of “failure to thrive”.^{28,29} These basic “rules”, which are also embraced by parents, oversimplify a complex process and suggest that all babies grow consistently along the same smooth percentile line from birth onwards. In reality, these smooth lines are population averages while real babies grow in bursts and pauses. It is also common for babies to shift percentile lines during the first year of growth as they transition from their birthweight, determined by the intrauterine environment, to their ultimate weight percentile, determined by their genetic potential.³⁰ Relying too heavily on these outdated guidelines can exacerbate confusion and misunderstanding for providers and parents, resulting in overdiagnosis and inappropriate intervention.

Reacting to small fluctuations in growth measurements by recommending behaviour change with subsequent resolution of the “problem” can inappropriately reinforce the importance of RGM for parents as noted in this study.

Another worrisome finding from this study is the number of parents who reported changing their behaviour related to growth findings, typically by feeding more or using formula. Given our focus on RGM, it is natural for parents assume the numbers have meaning and will independently take initiative to “correct” a perceived problem. There is a

real risk of parents inappropriately changing their feeding practices and undermining healthy responsive feeding by pressuring children to eat more or restricting their intake increasing the risk of disordered feeding and later obesity.³¹ A study that examined frequency of growth monitoring in the first weeks of life found that babies who were randomized to be monitored more frequently (on day 2-3 instead of day 5 had a statistically significant increase in formula supplementation.³² Another study on breastfeeding mothers in the UK also found that over-reliance on monitoring instead of other aspects of feeding success could undermine mothers’ confidence.³³

Given the complexity of interpretation of growth, the frequent reports of parents accessing additional “drop-in” weighing clinics, often staffed by non-health professionals, and the proliferation of online resources related to growth is also concerning.

The wide variation in parent experiences, preferences and expectations based on parity, infant weight parenting style or past experiences suggests that trying to adopt and apply a standardized approach with all parents will fail to meet parents’ needs.

Through a reductionist medical model which attempts to simplify a process as complex as infant growth and development by focusing only on easy to measure data we undermine our confidence in our own clinical powers of observation and history taking and fail to use a holistic view of the child in their context and can also undermine parents’ instincts. Several parents in this study reflected that with experience, their natural intuition draws them back towards a more rational, child-centred approach where they worry less about the numbers and pay more attention to their child. As a profession, we are recognizing that more is not always better and can lead to patient harm, unnecessary healthcare utilization and cost. Excessively frequent, routine growth monitoring in infants may be another example of a traditional intervention that needs to be reassessed.

Limitations

The participants in this study were relatively homogenous socioeconomically with an over-representation of well-educated, financially secure parents and fathers were not represented at all.

Conclusions

The findings in this study contradict our assumption that RGM is a “low-cost intervention that is unlikely to result in harms, and likely to be valued by parents and clinicians”² and confirms that growth monitoring, although sometimes reassuring, can also lead to anxiety, over-diagnosis and inappropriate feeding changes.

Policy makers and providers should acknowledge the inherent complexity of growth monitoring, the current lack of evidence and the lack of international consensus on optimal timing, frequency or diagnostic cut-offs and use the findings of this study to mitigate some of the potential harms identified. They must recognize the significant emotional impact of growth monitoring and how providers’ language and actions contribute to this. New guidelines should promote RGM that is patient centred, tailored to each family, de-emphasizes the numbers and avoiding overly frequent monitoring. Cost-benefit analyses of the RGM as a screening test would also provide valuable information.

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