Nurse versus Ordering Provider Perceived Barriers to Anthropometry Measurements in Critically Ill Children

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Background

- Anthropometric data (weight, stature and head circumference) are vital to patient safety and essential to care delivery in the Pediatric Intensive Care Unit (PICU)
- Under appreciation of the importance of accurate measurements and their impact on patient care
  - minimize or avoid over / under-dosing medications, fluids, and nutrient intake
  - Prescribe appropriate treatment modalities

Background

- Multi-professional group of providers interested in nutrition issues for critically ill infants and children
- Constructed 21-item survey

Background

- Hypothesis:
  - Specific barriers exist to obtaining anthropometric measurements
  - Perceptions of these barriers differ between ordering providers (physicians, nurse practitioners and physician assistants) and bedside nurses

Purpose

- To describe perceived barriers in obtaining anthropometry measurements in critically ill children
  - Weight
  - Stature
  - Head circumference

- Difference in the perceived barriers among providers, the targeted audience
  - Nurses
  - Ordering Providers
    (Physicians, Nurse Practitioners, Physicians Assistants)

Methods

- "Survey Monkey" software; 21-item online survey
- Items were constructed to identify actual and perceived barriers to obtaining anthropometric measurements
- Data collection for 14 weeks, from early June 2012 – Mid September 2012 with 3 reminders

Methods

- Online survey to Professional list serves
  - Advanced Nursing Practice in Acute and Critical Care
  - American Society for Parenteral and Enteral Nutrition – Pediatrics
  - PICU Advanced Practice Nursing
  - PICU_Nursing_Science
  - Society of Critical Care Medicine – Pediatric Section
  - The Children's Hospital of Philadelphia - PICU

Methods

Sample of survey items:

- Are growth parameters (weight, stature, head circumference) collected on each patient on admission to the ICU?
- If an actual weight or length/height is not measured on admission, how do you obtain an estimate?
- What do you consider to be barriers to obtaining anthropometrics on critically ill patients?
- Do you routinely place orders for anthropometric measurements on PICU patients?
- How is the anthropometric data shared with the care team?

Results

- Total responses = 376
- Responses with complete data for analysis = 318
- Responses of nurses and ordering providers = 258
- Most respondents were located in United States
  - 92% of ordering providers*
  - 87% of nurses

Chi-square and Fisher's Exact

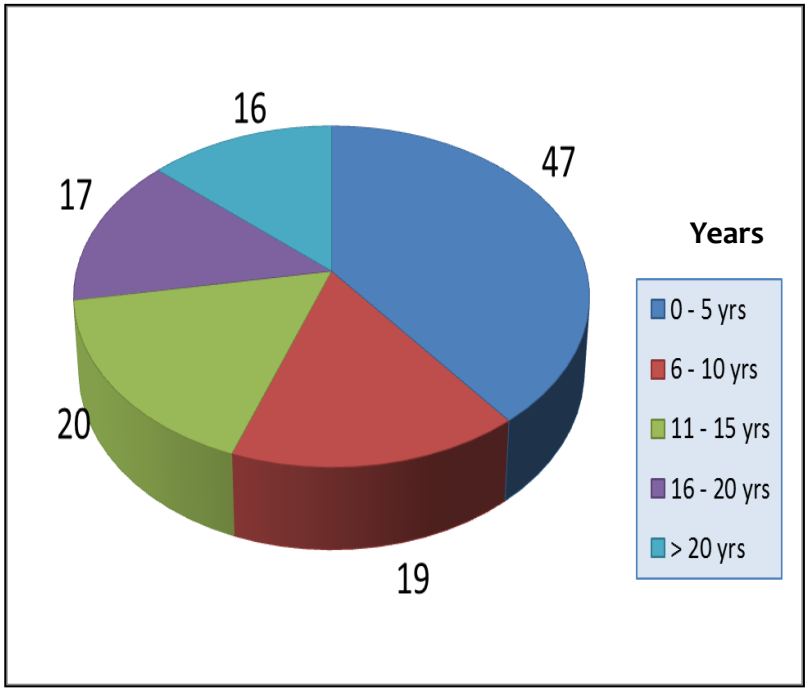
STATA Data Analysis and Statisitical Software

* Did not breakdown the ordering providers

Results
Experience in Years

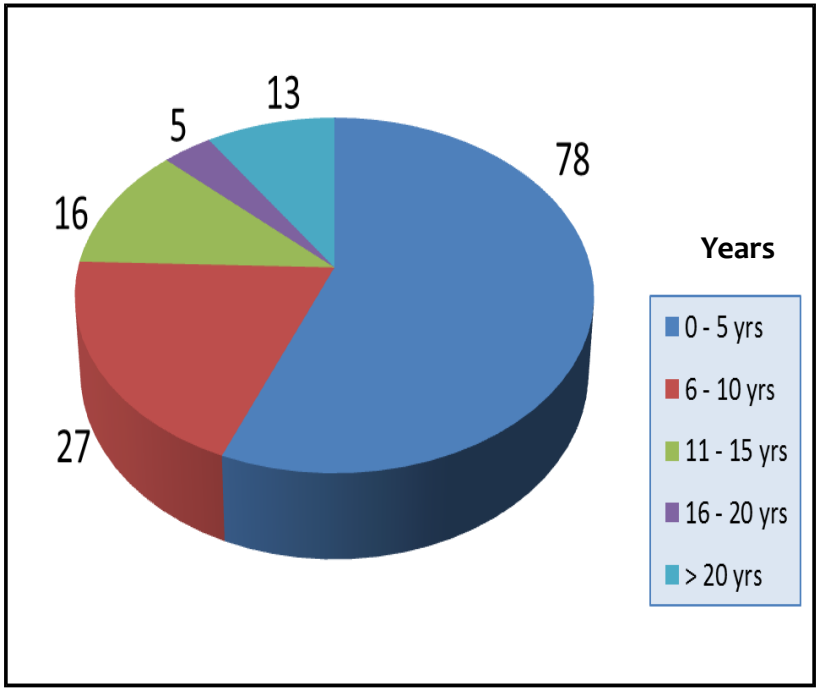
Ordering Providers

N = 119



Nurses

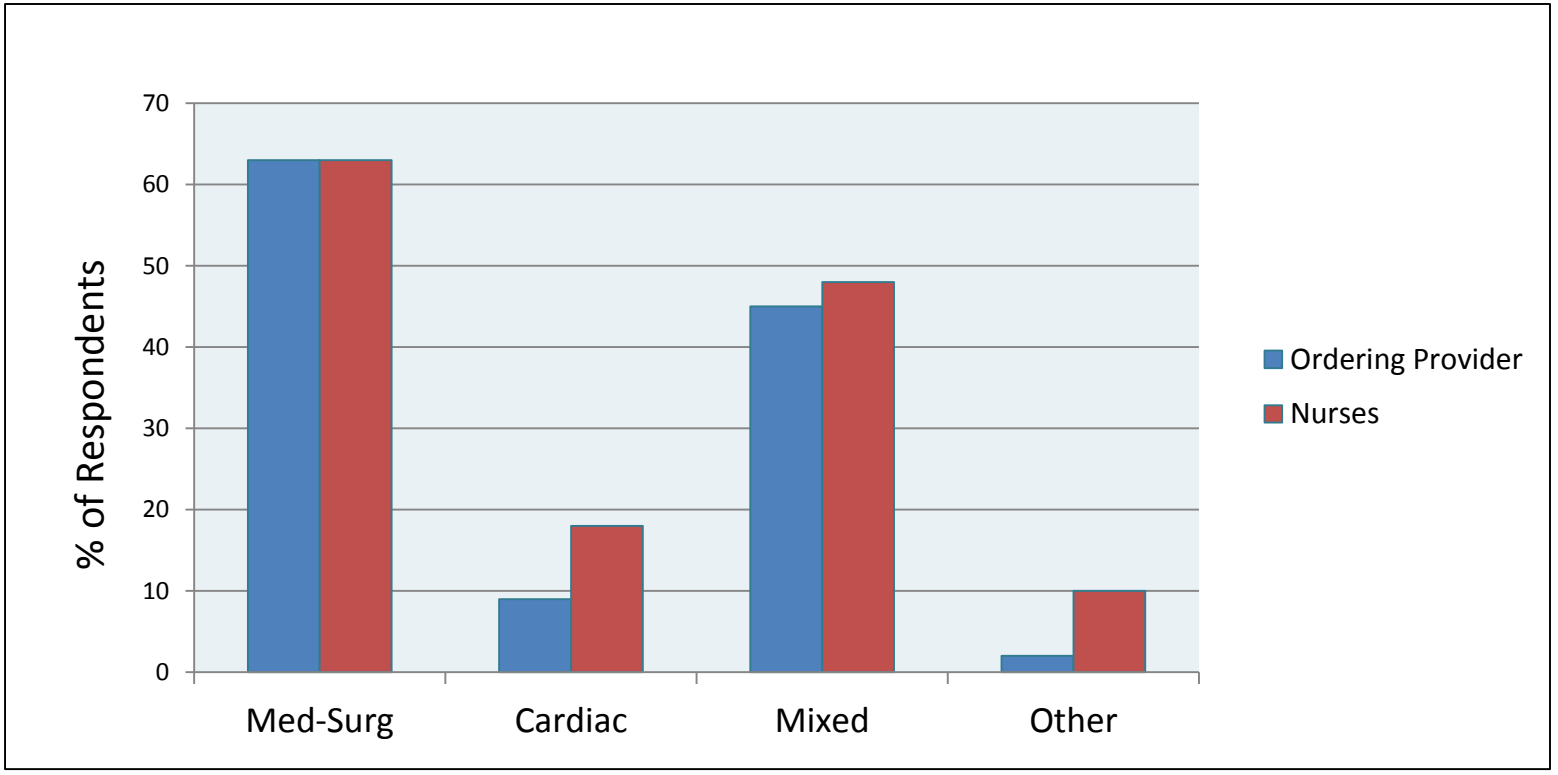
N = 139



p value 0.005

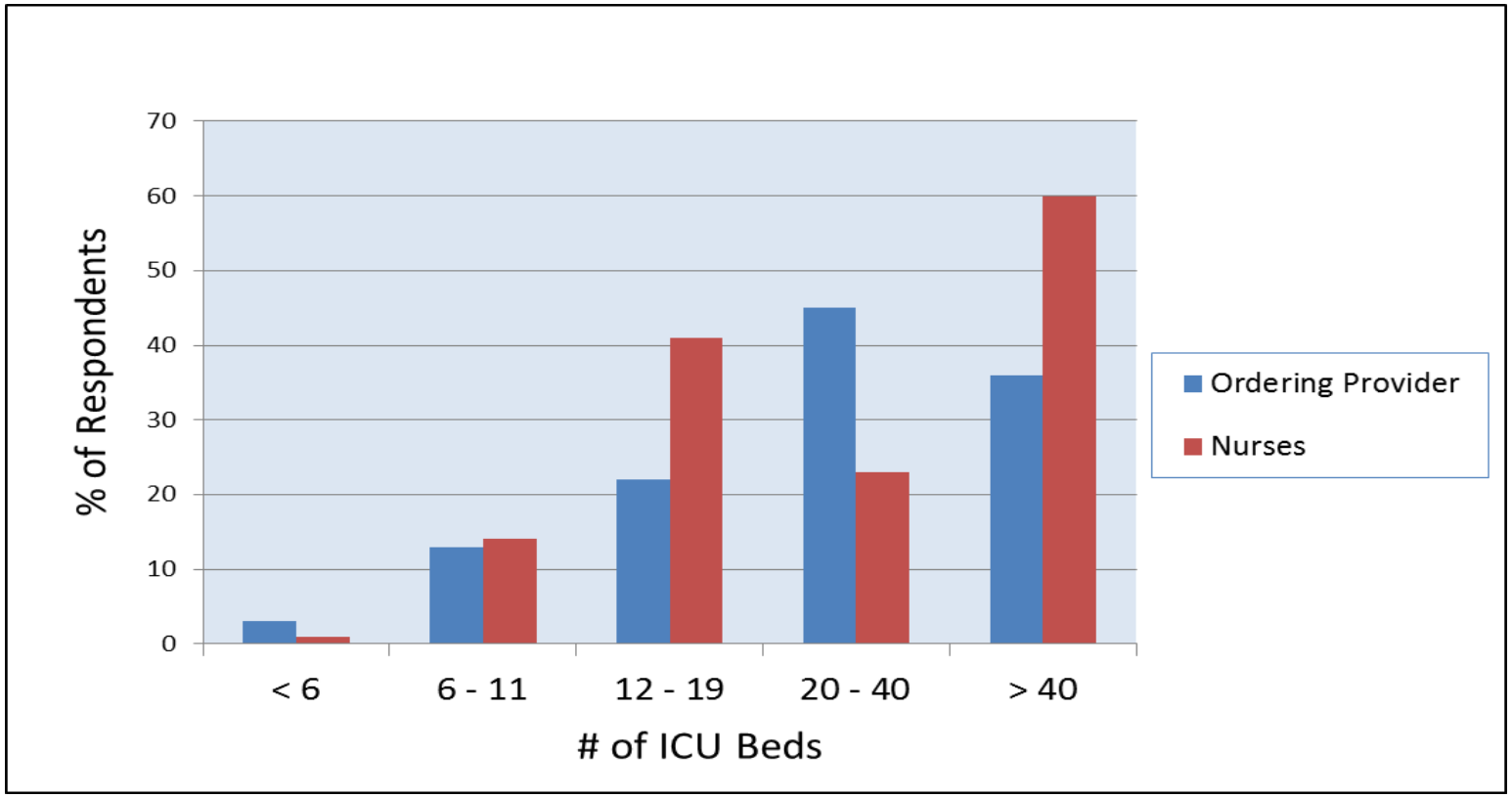
Note: values presented are % of respondents in each category

Results
Type of ICU



p value 0.07

Results
Number of ICU Beds



Results
Respondent Perceptions

	Ordering Provider (N = 119)	Nurses (N = 139)	p-value (significance < 0.05)
Importance of anthropometry	92	77	0.009
Timing of measurements after admission			
Day Shift	18	25	0.29
Night Shift	70	73	0.68
Weekend	0	9	0.003
Unknown	13	5	0.04
If not measured, source used for anthropometry values			
Previous EHR	54	41	0.01

Values are % of total respondents for each category

Results

Respondent Perceptions

	Ordering Provider (N = 119)	Nurses (N = 139)	p-value (significance < 0.05)
Weight			
Admission	92	71	0.001
Subsequent	70	36	0.001
Stature			
Admission	71	38	0.001
HC			
Admission	63	37	0.001

Ordering providers vs nurses perceived orders are placed in EHR at admission

Values are % of total respondents for each category

Results
Respondent Perceptions

	Ordering Provider (N = 119)	Nurses (N = 139)	p-value (significance < 0.05)
Weight Daily	(< 1 yr) 50	(> 1 yr) 17	0.001
Stature Weekly	40	12	0.001
HC (< 2 yrs) Unknown freq	7	21	0.001

Similar trends for both ordering providers and nurses:

Respondents favored daily weight in infants (< 1 year old)
Respondents favored weekly or monthly stature in infants (< 1 year old)

Values are % of total respondents for each category

Results
Respondent Perceptions

	Ordering Provider (N = 119)	Nurses (N = 139)	p-value (significance < 0.05)
Role of Reviewer			
Ordering provider	87	68	0.001
Review of data			
Other	13	4	0.01
Unknown	10	33	0.001

More ordering providers vs nurse perceived the ordering provider reviewed the anthropometry data

Nurses were unaware who reviewed the data or how often

Values are % of total respondents for each category

Results
Respondent Perceptions

- Only fragile bones approached significance as a barrier to obtaining weight
  (ordering providers 46% vs nurses 30%, *p* 0.007)
- Traumatic brain injury was the significant barrier to obtaining HC
  (ordering providers 42% vs nurses 24%, *p* 0.002)
- Dialysis was perceived as a barrier to obtain stature
  (ordering providers 9% vs nurses 21%, *p* 0.01)

Patient specific barriers	Ordering provider (n=119)	Nurses (n=139)	p-value
Critical airway, (%)*			
Weight	88 (74)	89 (64)	0.11
Stature	45 (38)	57 (41)	0.61
Head circumference	45 (38)	38 (27)	0.08
Mechanical ventilation, (%)*			
Weight	49 (41)	60 (43)	0.80
Stature	29 (24)	46 (33)	0.13
Head circumference	14 (12)	15 (11)	0.85
Hemodynamic instability, (%)*			
Weight	95 (80)	101 (73)	0.19
Stature	54 (45)	74 (53)	0.21
Head circumference	35 (29)	45 (32)	0.69
ECMO, (%)*			
Weight	93 (78)	113 (81)	0.54
Stature	53 (45)	69 (50)	0.45
Head circumference	38 (32)	49 (35)	0.60
Dialysis, (%)*			
Weight	31 (26)	42 (30)	0.49
Stature	11 (9)	29 (21)	**0.01**
Head circumference	6 (5)	11 (8)	0.45
Traumatic brain injury, (%)*			
Weight	63 (53)	64 (46)	0.32
Stature	30 (25)	42 (30)	0.41
Head circumference	50 (42)	33 (24)	**0.002**
Medical devices in place, (%)*			
Weight	77 (65)	75 (54)	0.10
Stature	60 (50)	63 (45)	0.45
Head circumference	86 (72)	79 (57)	**0.01**
Fragile bones, (%)*			
Weight	55 (46)	41 (30)	**0.007**
Stature	27 (23)	28 (20)	0.65
Head circumference	16 (13)	11 (8)	0.16
Obesity, (%)*			
Weight	56 (47)	69 (50)	0.71
Stature	18 (15)	36 (26)	**0.04**
Head circumference	2 (2)	5 (4)	0.46

Provider Specific Barriers	**Ordering provider (n=119)**	**Nurses** (n=139)	**p-value**
Nurses too busy, (%)*			
Weight	62 (52)	47 (34)	**0.004**
Stature	62 (52)	51 (37)	**0.02**
Head circumference	59 (50)	40 (29)	**0.001**
Patient does not want to be disturbed, (%)*			
Weight	52 (44)	60 (43)	1.00
Stature	43 (36)	52 (37)	0.90
Head circumference	41 (34)	46 (33)	0.90
Isolation, (%)*			
Weight	16 (13)	10 (7)	0.10
Stature	12 (10)	9 (7)	0.36
Head circumference	10 (8)	2 (1)	**0.01**
Not considered important, (%)*			
Weight	39 (33)	17 (12)	**0.001**
Stature	59 (50)	41 (30)	**0.001**
Head circumference	57 (48)	24 (17)	**0.001**
Lack of correct equipment, (%)*			
Weight	35 (29)	34 (25)	0.40
Stature	32 (27)	44 (32)	0.41
Head circumference	14 (12)	6 (4)	**0.03**
Unsure of correct technique, (%)*			
Weight	23 (19)	7 (5)	**0.001**
Stature	40 (34)	24 (17)	**0.004**
Head circumference	32 (27)	7 (5)	**0.001**

Discussion

From these data:

- Barriers to obtaining anthropometric measurements in critically ill children exist
- Ordering providers perceived more barriers than nurses
- More ordering providers vs nurses perceived anthropometry to be important, but don't know when measurements are obtained
- Although anthropometrics are perceived as important, more nurses were unaware of the frequency of obtaining anthropometric measurements and how often the data was reviewed in the ICU

Conclusions

- Nurses perceived more *patient specific* barriers
  (dialysis, TBI, medical device in place, fragile bones, obesity)
- Ordering providers perceived more *provider specific* and *work flow* related barriers
  (nurses too busy, pt isolation, do not disturb)

Interdisciplinary education is necessary to overcome perceived barriers associated with obtaining anthropometrics in critically ill children

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