


## Parental perception of neonatal retro-transfers from level 3 to level 2 neonatal intensive care units

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### ABSTRACT

**Objective:** The primary objective of this study was to determine the overall parental satisfaction with retro-transfers from a level 3 to a level 2 Neonatal Intensive Care Unit (NICU). The secondary objectives were to explore factors that caused parental satisfaction associated with retro-transfer and investigate the factors that could be modified to improve the retro-transfer process.

**Methods:** This is a retrospective cross-sectional study. Questionnaires were mailed to all parents of infants transferred from level 3 to level 2 NICUs from 2016 to 2017. Independent samples t-tests, Spearman's rank correlations, and multiple logistic regression analyses were conducted to identify factors associated with parental retro-transfer satisfaction.

**Results:** Our response rate was 39.1% ( $n = 140$ ). Of all parents, 64.29% parents were extremely satisfied with the overall retro-transfer process. In our bivariate analyses, multiple factors were found to be strongly associated with parental retro-transfer satisfaction, including parental level of education, the amount of notice and rationale given for the retro-transfer and the level of parental communication and engagement with their infant's healthcare team before and after transfer. Multiple logistic regression analyses revealed that when questions regarding the retro-transfer were answered and the level 2 NICU team demonstrated a concrete understanding of the infant's medical issues and history, parental satisfaction increased.

**Conclusion:** Majority of parents were satisfied with the retro-transfer process. However, close collaboration and ongoing and open lines of communication between parents and the level 3 NICU healthcare teams will increase parental retro-transfer satisfaction rates.

### ARTICLE HISTORY

Received 18 October 2020  
Revised 26 January 2021  
Accepted 2 February 2021



### KEYWORDS

Newborn; parental perceptions; retro-transfer; neonatal intensive care unit

### Introduction

Parental experiences about their infant's care in a neonatal intensive care unit (NICU) are useful for monitoring the quality and continuity of healthcare provided in the hospital [1]. These parental experiences further lead to improving overall healthcare delivery [1]. Parental satisfaction levels are also related to the neonatal care and inter-hospital transfers. Alberta has an annual birth rate of approximately 24,000, and, even though Alberta has the second highest premature birth rate among Canadian provinces [2], only 54 level 3 NICU beds are available in Southern Alberta. Level 3 NICU beds are consistently in high demand in Southern Alberta, and efficient retro-transfers to level 2 NICUs are essential to creating space for infants

requiring level 3 care and appropriate utilization of intensive care beds [3]. Most of the extreme preterm infants are admitted to the level 3 NICU. Alberta follows a regionalized model of neonatal care with possible transfer between NICUs which is designed to provide appropriate utilization of intensive care beds as main benefit for regionalized healthcare systems [4,5]. These NICUs are classified into four distinct levels based on the level of care they provide [4]. Level 3 NICU facilities offer comprehensive care for infants born <32 weeks' gestation and weighing <1500 g and care for all critically ill infants requiring mechanical ventilation and parenteral nutrition. However, level 2 NICU facilities provide care for infants born >32 weeks gestation and weighing >1500 g in addition to level 1

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services. Unstable infants with or without complex conditions are transferred to a level 3 NICU whereas infants who require a lower level of care are admitted to a level 2 NICU. When infants are stable in level 3 NICU and  $\geq 32$  weeks gestational age, they are transferred to a level 2 NICU in Alberta (retro-transfer or back transfer).

There are many benefits to retro-transfers of infants to level 2. For example, parents are often relocated to regional hospitals closer to home with appropriate baby-friendly, smaller, less crowded NICUs which facilitate increased visitation [5] and successful ongoing breastfeeding. However, parental retro-transfer satisfaction rates need to be examined further. The available literature suggests that retro-transfer from level 3 to level 2 NICU is challenging which triggers parental distress [6–10] that stem from differences in care cultures between NICUs, inadequate information before the transfer [6–14], and deterioration of the clinical condition of the infant. During retro-transfers, parents reported feeling that their caregiving role was undermined, especially when they were not a part of the decision to transfer their neonate [6,8,11–17]. Additionally, parents may experience discomfort in the new NICU environment [11,18]. Although the healthcare team members view retro-transfers as a progression for newborn infants, parents may understand this to be a setback, especially if they are not well prepared [19].

It is significant to understand parental satisfaction and stress levels to improve neonatal outcomes [1]. However, limited information is available about parental satisfaction and their stress level associated with retro-transfers of infants from level 3 NICU to level 2 NICU. Therefore, the primary objective of this study was to assess the overall parental satisfaction associated with the retro-transfer from a level 3 to a level 2 NICU. The secondary objectives were to explore factors that caused parental satisfaction related to retro-transfer and explore the factors that could be modified to improve the transfer process.

## Methods

### Research design and sample

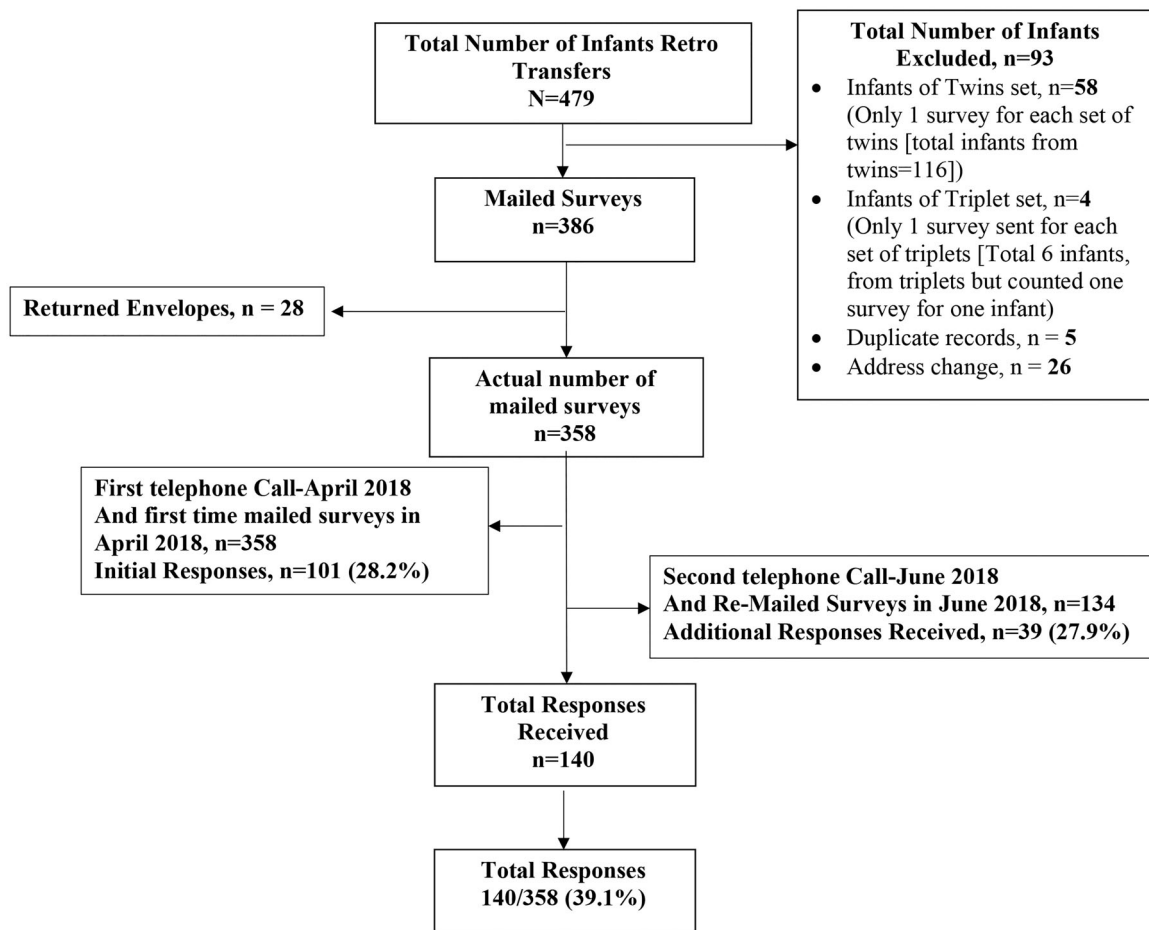
This was a multicentre retrospective cross-sectional study in Calgary, Alberta, Canada. A parental questionnaire was developed, including demographic and socioeconomic factors, health characteristics, events, experiences, and knowledge related to their retro-transfer experience. A detailed list of all admitted and discharged newborn infants is maintained in an electronic database at the level 2 NICU. Ethical approval was

received from the Conjoint Health Research Ethics Board of the University of Calgary (REB18-0240). All parents of infants transferred from level 3 to level 2 NICUs between 1 January 2016, and 31 December 2017, were invited to participate in the study. Exclusion criteria for the study were: infants born at the level 2 facility and transferred to a level 3 NICU, multiple pregnancies where one of the fetus did not survive, and infants transferred from outside Southern Alberta.

### Data collection

Potential study participants were identified by querying an electronic database at the level 2 NICU and participants were included in the study if they were transferred between 1 January 2016 and 31 December 2017. Data were collected retrospectively through questionnaires mailed to parents at a single time point after their infant was discharged home from the level 2 NICU. A consent form, study information letter, questionnaire, and pre-stamped envelope with a return address were sent to parents. Each questionnaire was given a unique identification number. After reviewing the literature, the study team developed the questionnaire following multiple iterations of discussions, parental feedback, and administration on one parent. This questionnaire was comprised of questions with Likert-scales and multiple-choice questions. The primary outcome was the level of parental satisfaction with the retro-transfer process from a level 3 to level 2 NICU. Parents were asked the question: How satisfied are you with the overall process of transfer from level 3 to level 2 NICU? A 7-point Likert-scale (1 = not really satisfied to 7 = completely satisfied) was chosen to increase the measurement's sensitivity since individuals tend to refrain from selecting extreme options on rating scales, which leaves five viable rating options when using a 7-point scale [20]. Questions on demographic factors and specific study questions were multiple choice.

Questionnaires were mailed out and if no response was received within eight weeks, parents were contacted by telephone by one of the research team members who used a standardized script. A second questionnaire was mailed to those parents who requested one during the telephone conversation. A second reminder by telephone was given if no response was obtained within eight weeks. Completed questionnaires were kept in a locked cabinet in the Principal Investigator's office.



**Figure 1.** Flow diagram of study.

### Data analyses

All patient identifiers were removed from the database to maintain anonymity and confidentiality. We explored descriptive statistics, including frequencies and percentage, for the categorical variables and then analyzed the mean and the standard deviation for the primary question using sociodemographic variables and the variables relating to communication and engagement with the questionnaire categories. We dichotomized Likert scores based on the distribution of data and the median score of 5.5. Means of the satisfaction level between the two categories were compared using Student's t-test. We used non-parametric tests where data were not normally distributed. We used Spearman's rank correlation of parents' satisfaction on the overall process of hospital transfer with the sociodemographic variables and communication/engagement related variables. The Spearman Rank Correlation coefficient  $\rho$  ( $\rho$ ), can take values from +1 to -1. A  $\rho$  of +1 indicates a perfect positive monotonic correlation; a  $\rho$  of zero indicates no monotonic correlation, while a  $\rho$  of -1 indicates a perfect negative monotonic correlation. For interpretations of

the Spearman Rank Correlation coefficient  $\rho$ , we used a standard guideline for correlations including very weak (0.00–0.19), weak (0.20–0.39), moderate (0.40–0.59), strong (0.60–0.79) and very strong (0.80–1.0). Finally, multiple logistic regression analyses were conducted to determine which factors regarding parent's satisfaction were associated with satisfaction with the overall process of hospital retro-transfer [21]. The dependent variable is a dichotomized version of seven-point Likert scale response of the question on overall satisfaction to retro-transfer, where the value from 1 to 5 was labeled as "Not Extremely Satisfied" and values 6 or more as "Extremely Satisfied." Independent variables with Likert scale-based responses were also dichotomized following the same cutoff. A two-tailed p-value  $\leq 0.05$  was considered statistically significant. All statistical analyses were performed using SAS (Version 9.40) [22].

### Results

There were 479 retro-transfers during the study period, of which 358 met our inclusion criteria (Figure 1). As

**Table 1.** Demographic characteristics of parents and neonates.

Variables	N (%)	Mean (SD) of back-transfer satisfaction	p-value
Respondents			
Mother	125 (91.24)	5.52 (1.76)	.0996
Father	12 (8.76)	5.17 (2.41)	
Current Relationship Status			
Non-married	7 (5.07)	4.71 (2.29)	.2830
Married	131 (94.93)	5.54 (1.79)	
Postal Code			
Calgary	111 (82.22)	5.51 (1.85)	.7801
Other AB/SK/BC	24 (17.78)	5.58 (1.74)	
Education			
High school and some College	42 (31.11)	5.81 (1.36)	.0122
Undergraduate, Masters, PhD	93 (68.89)	5.40 (1.96)	
Income			
<\$20,000 to <\$60,000	25 (19.08)	5.32 (2.12)	.1897
≥\$60,000	106 (80.92)	5.58 (1.75)	
Were you born in Canada?			
Yes	92 (66.67)	5.31 (1.86)	.4585
No	46 (33.33)	5.87 (1.68)	
Ethnicity			
White	96 (69.57)	5.47 (1.82)	.8993
Other Ethnicities	42 (30.43)	5.55 (1.84)	
Language			
English	114 (82.61)	5.49 (1.81)	.7353
Others	24 (17.39)	5.54 (1.89)	
Infant Sex			
Girl	63 (45.99)	5.65 (1.71)	.4048
Boy	74 (54.01)	5.34 (1.90)	
Infant Gestation			
<37 weeks	120 (85.71)	5.41 (1.82)	.7723
≥37 weeks	20 (14.29)	6.12 (1.69)	

AB: Alberta; BC: British Columbia; SD: Standard deviation; SK: Saskatchewan.

such, 358 questionnaires were mailed out. We received 140 out of 358 questionnaires, giving us a response rate of 39.1% with one survey received for multiple pregnancy. Demographic characteristics are presented in Table 1. Respondents were more likely to be married (94.93%), Caucasian (69.57%), and English speaking (82.61%). Most neonates were less than 36 weeks (85.71%) and majority (54.01%) were male. Bivariate analyses revealed that parents of neonates who had less than a bachelor's level of education reported significantly better retro-transfer satisfaction levels (*Mean* 5.40 vs. 5.81,  $p = .0122$ ) (Table 1). Our primary outcome demonstrated that 64.29% of parents were extremely satisfied with the retro-transfer process (Table 2). Parents who had a lower level of education were more satisfied with the retro-transfer (mean 5.81 vs 5.40,  $p = 0.0122$ ). Most parents felt they had sufficient information regarding the retro-transfer, with 65.41% of parents being given enough notice (mean 6.04 vs. 4.62,  $p = .0056$ ) and rationale for transfer (96.3%; mean 6.00 vs. 4.93,  $p = .0119$ ), opportunity to discuss (73.85%; mean 5.81 vs. 4.50,  $p = .0328$ ), and ask questions regarding the process.

The Spearman's Rank Correlation tests are presented in Table 3. Four variables pertaining to the level of parental communication and engagement in level 3 NICUs showed significant positive moderate to strong

correlations with the level of parental retro-transfer satisfaction. Level of satisfaction with the support available ( $\rho = 0.50$ ,  $p < .0001$ ), care provided ( $\rho = 0.42$ ,  $p < .0001$ ), and overall experience ( $\rho = 0.46$ ,  $p < .0001$ ) before transfer, all demonstrated moderate positive correlations with the dependent variable. Response satisfaction with the parent's questions about the retro-transfer showed a strong positive correlation with the dependent variable ( $\rho = 0.75$ ,  $p < .0001$ ). Four variables concerning the level of parental communication and engagement in level 2 NICUs showed significant positive moderate correlations with the level of parental retro-transfer satisfaction (Table 4). These variables include level of satisfaction with support available ( $\rho = 0.54$ ,  $p < .0001$ ), initial welcome ( $\rho = 0.56$ ,  $p < .0001$ ), care provided ( $\rho = 0.45$ ,  $p < .0001$ ), and new care team's understanding of the infant's medical issues ( $\rho = 0.59$ ,  $p < .0001$ ) after the retro-transfer.

The results from the multiple logistic regression analysis are summarized in Table 4. The logistic regression model included all sociodemographic and transfer experience variables. Parents were completely satisfied (OR 9.39; 95% CI: 3.40 – 25.87,  $p < .0001$ ) with their retro-transfer experience if the level 3 NICU team answered their questions. Additionally, parents were completely satisfied with their retro-transfer experience to level 2 NICU when the level 2 NICU staff

**Table 2.** The overall back-transfer satisfaction level of parents reporting different levels of engagement and communication with their health care teams in the NICUs.

Primary outcome	N (%)	Mean (SD)	p-value
How satisfied are you with the overall process of the retro transfer?			
Not extremely satisfied Likert 1–5(0)	50 (35.71)	3.32(1.38)	<.0001*
Extremely satisfied Likert 6–7 (1)	90(64.29)	6.63(0.49)	
<b>Variables</b>			
Were you given sufficient notice?			
Yes	87 (65.41)	6.04 (1.43)	.0056*
No	46 (34.59)	4.62 (2.04)	
How much time would you have liked?			
Less than 1 day	59 (57.84)	5.97 (1.58)	.0804
1 day or more	34 (33.33)	4.67 (2.03)	
Were you given a reason for transfer?			
Yes	130 (96.30)	5.60 (1.73)	.1794
No	5 (3.70)	2.80 (2.49)	
If given reason for transfer, what was the reason?			
1 = L2 will provide better care and baby is healthier	65 (52.85)	6.00 (1.45)	.0119*
2 = L3 is overfilled	58 (47.15)	4.93 (2.00)	
Were you given the opportunity to discuss the transfer with previous hospital team?			
Yes	96 (73.85)	5.81 (1.58)	.0328*
No	34 (26.15)	4.50 (2.11)	
Who did you have the discussion with?			
Doctor	53 (55.79)	5.89 (1.62)	.8355
Nurse and Other	42 (44.21)	5.64 (1.67)	
Were you made aware of the difference between Level 3 and Level 2 NICUs?			
Yes	106 (77.94)	5.73 (1.65)	.0729
No	30 (22.06)	4.70 (2.12)	
Were you given opportunities to ask question about the transfer?			
Yes	113 (83.70)	5.74 (1.64)	.0764
No	22 (16.30)	4.48 (2.16)	
Did you have any concerns related to your baby's feeding time pre/ during transfer?			
Yes	12 (9.16)	4.42 (2.31)	.1555
No	119 (90.84)	5.57 (1.77)	
Did anyone let you know that some babies find the transfer hard and this may make them more unstable for 24–48 h afterward?			
Yes	56 (43.41)	5.66 (1.72)	.3577
No	73 (56.59)	5.28 (1.94)	
Were you given any advice about parking?			
Yes	51 (40.48)	5.33 (1.86)	.9971
No	75 (59.52)	5.54 (1.87)	
If you already had a parking pass, were you aware of the ability to carry it over to RGH?			
Yes	44 (39.64)	5.36 (1.74)	.5784
No	67 (60.36)	5.36 (1.89)	
Were you able to find the RGH NICU easily?			
Easily	110 (79.71)	5.85 (1.58)	.0750
Difficult	28 (20.29)	4.07 (2.04)	

(continued)

**Table 2.** Continued.

Primary outcome	N (%)	Mean (SD)	p-value
Were you given the opportunity to discuss the transfer with anyone at RGH?			
Yes	78 (63.93)	5.62 (1.76)	.2687
No	44 (36.07)	5.11 (2.04)	
If yes, who did you discuss with?			
Doctor	34 (44.16)	5.70 (1.79)	.9759
Nurse and Others	43 (55.84)	5.42 (1.79)	
Were you asked of the type of support you will need with the process of transition?			
Yes	33 (28.45)	5.39 (2.05)	.4005
No	83 (71.55)	5.34 (1.82)	
How long did the baby stay at FMC/ACH before transfer to RGH?			
Less than 2 weeks	95 (69.34)	5.79 (1.67)	.1502
2 weeks or more	42 (30.66)	4.83 (1.99)	

Independent Sample T-Tests were used to generate this data. ACH: Alberta Children's Hospital; FMC: Foothills Medical Center; RGH: Rockyview General Hospital.

\*Differences in means with p-value  $\leq 0.05$  are statistically significant.

demonstrated an understanding of the infant's medical issues and history (OR 7.92; 95% CI: 2.42 – 25.93,  $p = .0006$ ).

## Discussion

This is the first study we are aware of, that identifies parental level of satisfaction with the experiences of retro-transfer from level 3 to level 2 NICUs and the factors that will improve satisfaction levels. In our study, parents with a university education reported significantly greater dissatisfaction levels with the retro-transfer experience than parents who were less educated. We speculate that this could be due to higher expectations and demands from parents who have higher education levels. The literature reports mixed results of parental education levels being correlated to healthcare satisfaction ratings [1,23,24]. Additionally, parents born in Canada and parents of premature infants had a very weak correlation that was positively associated with parental dissatisfaction levels. These findings are unique to this study; the existing literature does not identify country of parental birth as a factor associated with parental dissatisfaction of their infants' transfers.

One reason for parental dissatisfaction is communication gaps between parents and healthcare providers. Multiple factors relating to parental communication and engagement before the retro-transfer were found to be associated with parental transfer satisfaction. We found that parents were 9.39 times more likely to be

**Table 3.** Spearman's rank correlation coefficient for the overall back-transfer satisfaction level by demographic characteristics and different levels of engagement and communication with their health care teams in the NICUs.

Variables*	How satisfied are you with the overall process of transfer from level 3 to level 2 NICU? (1 = not really satisfied to 7 = completely satisfied) $\rho$ , $p$ -value
Canada Born	
No	0.1695, .0477
Yes	
Infant Gestation	
$\geq 37$ weeks	0.1824, .0329
$\geq 29 - < 37$ weeks	
$< 29$ weeks	
Level 3 Satisfaction: Were you satisfied with the care you received in Level 3 before your transfer to RGH? (1 = not really satisfied to 7 = completely satisfied)	0.4214, <.0001
Overall Experience: How would you rate your overall experience in your previous hospital? (1 = not really satisfied to 7 = completely satisfied)	0.4560, <.0001
Response Satisfaction: When you asked about the transfer, what was your level of satisfaction with the responses you received? (1 = not really satisfied to 7 = completely satisfied)	0.7485, <.0001
Level 2 NICU Welcome: How satisfied were you with your initial welcome at level 2 NICU? (1 = not really satisfied to 7 = completely satisfied)	0.5622, <.0001
Level 2 NICU Understanding: How satisfied were you with the team at level 2 NICU regarding an understanding of your baby's medical issues and background? (1 = not really satisfied to 7 = completely satisfied)	0.5909, <.0001
Level 2 NICU Progress: How satisfied were you regarding how informed you were regarding your baby's progress during your stay at level 2 NICU? (1 = not really satisfied to 7 = completely satisfied)	0.4693, <.0001
Level 2 NICU Satisfaction: Overall level of satisfaction with the care provided at level 2 NICU? (1 = not really satisfied to 7 = completely satisfied)	0.4498, <.0001
Support Before: How satisfied are you with the supports available prior to transfer? (1 = not really satisfied to 7 = completely satisfied)	0.5044, <.0001
Support After: How satisfied are you with the supports available after transfer? (1 = not really satisfied to 7 = completely satisfied)	0.5441, <.0001

$\rho$  presents Spearman's Rank Correlation coefficient. Tests were used to generate this data. RGH: Rockyview General Hospital.

\*Only significant factors ( $p \leq .05$ ) are presented in this table.

**Table 4.** Multiple logistic regression presenting factors associated with parents' satisfaction on the overall process of NICU back-transfer<sup>a</sup>.

Variables <sup>b</sup>	N	Odds ratio (95% CI)	$p$ -value*
<b>Response Satisfaction:</b> When you asked questions about the transfer, what was your level of satisfaction with the responses you received?			
Completely satisfied	69	9.39 (3.40 – 25.87)	<.0001
Partially satisfied	71	Reference	
<b>RGH Understanding:</b> How satisfied were you with the team at [level 2 NICU] regarding your baby's medical issues and background?			
Completely satisfied	98	7.92 (2.42 – 25.93)	0.0006
Partially satisfied	42	Reference	

\*Only significant factors ( $p \leq .05$ ) are presented in this table.

<sup>a</sup>The dependent variable is a dichotomized version of seven-point Likert scale response of the question on overall satisfaction to back transfer, where the value from 1 to 5 were labeled as "Not Extremely Satisfied" and values 6 or more as "Extremely Satisfied." Independent variables with Likert scale-based response also dichotomized following the same cutoff.

<sup>b</sup>All variables, including sociodemographic transfer experience variables, were included in the logistic regression model.

completely satisfied with the transfer if they believed that their healthcare team adequately answered their questions about the transfer in advance. This is consistent with the existing literature that parents who feel prepared for the transfer [10,12,14,15] and have the opportunity to communicate with the healthcare

team [8–10,14,15,17] are more satisfied with their transfer experiences. Open interactions, effective and frequent communication, using comprehensible language, willingness to answer questions, respect, and emotional support contribute to parental transfer satisfaction and need to be prioritized by healthcare

teams [25–27]. Gibbins and Chapman [7] reported that parents who were given detailed information regarding the retro-transfer looked forward to their infant's transfer. Therefore, it is prudent for healthcare professionals and parents to have multiple opportunities to discuss details of the transfer before the transfer occurs, as this may provide better psychological preparation [7,28,29]. These findings suggest that ongoing communication between parents and the level 3 NICU healthcare teams is vital to parental transfer satisfaction. Healthcare providers must find ways to ensure all questions are answered, and parents have sufficient information that makes them feel comfortable with the transfer.

Other factors were moderately correlated positively with parental satisfaction including the level of satisfaction with the support available, care provided, and overall experience before the transfer. While these factors are not directly related to the transfer, these findings show that parents having an overall positive experience in the level 3 NICU made them more likely to report positive transfer experiences. Moreover, parents who felt more prepared and involved in the transfer reported having better transfer experiences [10,12,14,15]. Having the opportunity to visit the new facility before the transfer [15], being present with their infant during the transfer [10], and receiving detailed information before the transfer [12,14,30] helped ease parental distress. Furthermore, parents reported significantly higher levels of transfer satisfaction when they felt they were given sufficient notice of the transfer.

Furthermore, parents were significantly more satisfied when the given reason for the transfer was that their infant is healthier and the new NICU environment would provide better care for their infant's current needs, instead of informing them that the current NICU has reached maximum capacity. This finding highlights the need for level 3 NICU care teams to positively reassure parents that the transfer is in the infant's best interest, not merely because there is no more room for them. Parents report dissatisfaction when they fear that the transfer could result in discontinuity of care [7].

Parental communication and engagement factors after the transfer was completed were also moderately correlated positively with satisfaction of retro-transfers. These factors included a level of parental satisfaction with available support, initial welcome, care provided, and the new care team's understanding of the infant's medical issues at the level 2 NICU. Parents were 7.92 times more likely to be satisfied with the transfer

process if they were pleased with the new care team's knowledge of the infant's medical issues and history. Helder et al. [17] identified parents notice when there is a lack of access to adequate and succinct documentation of transferred infants, which leads to confusion and a feeling of discontinuity of care. Concerns about the competency of the new healthcare team [15] and perceived differences in cultures of care between facilities were also themes associated with parental dissatisfaction found in the qualitative literature [6,8,10,16,17]. It is essential for healthcare teams to develop strong interpersonal relationships with parents and demonstrate competency and efficiency in their infants' care to ensure a satisfactory transfer experience for parents. It is this trustful relationship that parents depend on to tide them through stressful periods like transfers. Feeling welcome and that their neonate is being taken care of at the level 2 NICU increases parental transfer satisfaction. The results of this study can help improve policies, procedures, communication, and practices to increase parental satisfaction regarding retro-transfer of neonates from level 3 to level 2 NICUs and parents' needs for continuity of care.

One limitation of our study is its retrospective nature, which puts it at risk for recall bias. Although we tried to address this by carefully selecting the research questions, we could not avoid it altogether. For instance, some of the infants in our study were discharged over 2 years from our study date; there would certainly have been a loss of information due to this time lag. However, we provided parents with an opportunity to reflect on their experience, offering space for qualitative comments as part of the questionnaire. These results are reported elsewhere. Prospective data collection would have addressed the issue of recall bias. Secondly, we speculate that our sample had an overrepresentation of participants with a higher socioeconomic status, making the results of the study non-generalizable. This is likely due to the high degree of self-selection bias in survey studies [31]. To attain a more representative sample, future studies should employ a stratified sampling technique. Lastly, the questionnaire design did not allow us to test for the questionnaire's criterion validity and reliability. Future studies should develop measures that fit the criteria for testing these psychometric measures.

## Conclusion

In conclusion, majority of parents were satisfied with the retro-transfer process. However, close collaboration

and ongoing and open lines of communication between parents and the level 3 NICU healthcare teams will increase parental retro-transfer satisfaction rates.

### Acknowledgements

We would like to acknowledge and thank all parents who participated in our study. We would also like to thank, Dr. Rhodora Guillen, Dr. Daryoush Safdari and Leah Donnelly for assisting with data collection.

### Disclosure statement

No potential conflict of interest was reported by the author(s).

### Author contributions

PM, AD, JS & AKL conceptualized the study. PM & JS facilitated data collection. AD & BD cleaned the data. KS & AK analyzed the data. PM, AD & BD drafted the manuscript. All authors provided critical feedback and approved the final manuscript.

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