A comparison of attitudes toward HSCT and survival estimations post HSCT across two pediatric Hematology–Oncology and Intensive Care departments in Canada

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Dear Editor,

A proportion of 10–20% of children undergoing hematopoietic stem cell transplantation (HSCT) need to be hospitalized in an intensive care unit (ICU) as a result of life-threatening complications (e.g., pulmonary), infections, or graft-vs-host disease. It has been reported that patients surviving after an ICU admission during the transplantation process have a low survival rate in the long run, particularly if they received prolonged mechanical ventilation (e.g., 36% following ICU discharge) [1]. As a result of this low survival rate and the frailty of many hematology–oncology (HO) patients, ICU teams may consider HSCT with mixed feelings with regards to its necessity and associated concerns. Historically, HSCT patients are considered as complex, demanding, and particularly fragile [2]. These perceptions may lead ICU teams to question the benefit of HSCT itself, contrasting with the views of HO teams that the care plan should be followed through as long as there remains some hope for cure. These different outlooks may have pervasive consequences on how ethics dilemmas are approached and how professionals from different departments coordinate, an aspect that is of paramount importance when professionals and families have difficult decisions to make. Communication difficulties between ICU and HO teams may be exacerbated by the intense and dramatic experience of families who are directly confronted with the threat posed to their children’s life when these must be treated in ICUs. In these cases, families must deal with an unknown team and experience a complete lack of control [3, 4]. It is notable that how these different teams consider HSCT has not been studied quantitatively [5]. Although from the existing literature, we could speculate differences in perceptions, there is no data on to what extent teams hold different views. Positive and negative attitudes toward HSCT may result from different sets of factors, including education, regular exposition to scientific data, age, or seniority.

The present study aimed to compare attitudes toward HSCT and individual estimations of 5-year survival post HSCT in staff of HO and ICU departments of a pediatric hospital. In addition, we wished to identify explanatory factors of these attitudes. This study was approved by the institution’s Human Research Ethics Committee. Between September and December 2015 we surveyed members of the ICU and the HO departments from the CHU Sainte-Justine, a major tertiary hospital from the Québec province (Canada) and a labeled excellence center for pediatric HSCT in Canada. The paper–pencil survey was proposed during staff meetings and an e-mail prompt was sent to all eligible staff members, i.e., all members having direct experience with HSCT. Participants had to respond individually to an ad hoc questionnaire and hand it back in a sealed envelope. The survey was fully anonymous. Among the 152 eligible, 63 professionals accepted and handed their questionnaire back (participation: 41%, similar in both departments). Since 4 questionnaires had important missing data, the final sample is composed of 59 professionals (Table 1). To assess attitudes toward HSCT the research team framed two positive and three negative statements [6] for which respondents should provide their degree of agreement on a 7-point scale from 1 “Totally disagree” to

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7 "Totally agree" with 4 being the neutral point, which is a standard procedure in attitude surveys [7]. The statements were (1) HSCT is a beneficial treatment for children who have a condition that requires such transplantation; (2) HSCT is a harmful treatment for children who have a condition that requires such transplantation; (3) HSCT should always be considered when there is no other option for cure; (4) the odds of success of a HSCT are so small that they may outweigh benefits, p's < 0.001). However, when examining attitudes across departments using a repeated measures ANOVA with items being the within-subjects factor and the department being the between-subjects factor, we found that HO staff more strongly disagreed than ICU staff with the notion that expected benefits may not be worth it (95%CIs: 1.23–2.13 vs 2.57–3.43, d = 1.12) and that complications may outweigh benefits of HSCT (95%CIs: 2.09–3.06 vs 2.73–3.67, d = 0.53) (interaction F = 4.73 p = 0.002, partial η² = 0.26).

The same strategy was applied to survival estimations given by professionals (Fig. 1b). No interaction effect was found between respondents’ department (between-subjects factor) and ICU history (within-subjects factor) indicating that 5-year survival estimation did not differ across departments. As expected, we found a significant effect of ICU history, with professionals from both departments estimating a higher survival when children were not admitted in an ICU (95%CI: 63.79–71.93% vs 59.00–68.61%, d = 0.67) and that complications may outweigh benefits of HSCT (95%CIs: 2.09–3.06 vs 2.73–3.67, d = 0.53) (interaction F = 4.73 p = 0.002, partial η² = 0.26).

In addition, we included a sociodemographic questionnaire to collect age, gender, position, seniority, education level, prior experience with HSCT. The final sample included 29 (HO) and 30 (ICU) health care professionals. Both samples had similar characteristics on age, gender, position, education level, and seniority. The overall sample was composed of 22 physicians and 37 nurses and other professionals (physiotherapists, nutritionists, social workers) (Table 1). To explore attitudes toward HSCT, we described each attitude items rated on a 1–7 scale (Fig. 1a). This analysis showed a clear endorsement of positive attitudes in both departments (beneficial when needed, and recommended when no other options) with levels being significantly different from the neutral point (one-sample t test p's < 0.001). We also found clear disagreements with negative attitude items (harmful treatment when needed, benefits are not worth it, complications outweigh benefits, p’s < 0.001).

Table 1 Sample description

<table>
<thead>
<tr>
<th></th>
<th>Total sample (N = 59)</th>
<th>Hematology–Oncology (N = 29)</th>
<th>Intensive care (N = 30)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (M and SD)</td>
<td>39.57 (11.64)</td>
<td>40.83 (11.85)</td>
<td>38.31 (11.49)</td>
<td>0.773</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>18 (31%)</td>
<td>8 (28%)</td>
<td>10 (33%)</td>
<td>0.844</td>
</tr>
<tr>
<td>Women</td>
<td>41 (69%)</td>
<td>21 (72%)</td>
<td>20 (67%)</td>
<td></td>
</tr>
<tr>
<td>Position</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physicians</td>
<td>22 (37%)</td>
<td>11 (38%)</td>
<td>11 (37%)</td>
<td>1.000</td>
</tr>
<tr>
<td>Nurses and professionals</td>
<td>37 (63%)</td>
<td>18 (62%)</td>
<td>19 (63%)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>19 (32%)</td>
<td>8 (28%)</td>
<td>11 (37%)</td>
<td>0.712</td>
</tr>
<tr>
<td>Bachelor</td>
<td>18 (31%)</td>
<td>10 (34%)</td>
<td>8 (26%)</td>
<td></td>
</tr>
<tr>
<td>Master and doctorate</td>
<td>22 (37%)</td>
<td>11 (38%)</td>
<td>11 (37%)</td>
<td></td>
</tr>
<tr>
<td>Experience with HSCT</td>
<td>59 (100%)</td>
<td>29 (100%)</td>
<td>30 (100%)</td>
<td>–</td>
</tr>
<tr>
<td>Seniority (M and SD)</td>
<td>15.04 (10.56)</td>
<td>16.07 (10.65)</td>
<td>13.93 (10.54)</td>
<td>0.937</td>
</tr>
</tbody>
</table>
Comparison of attitudes toward HSCT and survival estimations

(beneficial treatment when needed, $\beta's = -0.22$–$-0.23$, $p's = 0.093$–$0.962$), and recommended if no other option, $\beta's = -0.34$–$-0.17$, $p's = 0.410$–$0.742$). When exploring whether the treatment was perceived as harmful when needed, we found a significant effect of position in both departments ($\beta = 0.38$, $p = 0.014$, and $\Delta R^2 = 0.14$ whole model) with physicians more strongly disagreeing with the item than nurses and professionals (means’ 95% CIs: 2.39–3.28 vs 1.48–2.62, $d = 0.57$).

The weaker rejection of negative statements in the ICU unit, especially the fact that the odds of success of a HSCT would be so small that potential benefits would not be worth it (very large effect size) suggests that negative feelings toward HSCT seems more frequent in the ICU team. This may be a reflection of the lower survival rate in HSCT patients who have been admitted in ICU. It is possible that recent advances have not still been perceived by some members of the team [10]. Perhaps, communicating specifically on at-risk subgroups (e.g., those receiving intubation or replacement therapy), could be beneficial to counter overall negative bias toward HSCT.

The results also stress the importance of working positions when studying beliefs. Nurses have a daily exposure to complications and adverse effects of transplantation and at the same time are less exposed to recent scientific data documenting improvements in HSCT effectiveness, which may explain differences observed here. This may also be linked with workload or burden associated with HSCT patients when they need intensive care. As for attitudes “Benefits are not worth it” and “Complications outweigh benefits”, results confirmed observations from Fig. 1 with no other effect being significant. Finally, we found no significant effect to account for estimated 5-year survivals.

It is important to note this study’s limitations. First, the results are based on only one-site and may not be reflective of the situation in other tertiary hospitals. Second, as the participation rate was 41% we cannot rule out the possibility of a self-selection bias. Third, although attitude statements were carefully developed by the team, they were not designed to cover the whole attitude spectrum toward HSCT. To do so would have required to lead a preliminary qualitative survey to collect relevant themes. Nevertheless, this research adds to the literature by suggesting that the balance between benefits and risks may be perceived differently by HO and ICU staff which is not surprising given their experience. The results also showed remarkable overall accuracy of survival estimation in the context of ICU and strong consistency across the teams on survival perceptions. Based on this consistency, interventions could be organized to exchange and harmonize views across departments. Future studies should explore these attitudes more thoroughly in order to better target such interventions.

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**Compliance with ethical standards**

**Conflict of interest** The authors declare that they have no conflict of interest.
References


