

# Effects of educational versus peer discussion interventions on perceived competence in adolescents with medulloblastoma

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## ABSTRACT

**Context:** Limited documentation exists on the effectiveness of education-based (EG) versus peer discussion-based (PDG) group interventions on perceived competence of adolescents suffering from medulloblastoma. **Aims:** This study was conducted to investigate which of these approaches offers the more beneficial outcomes to participants. **Settings and Design:** In a hospital in Zhenjiang, China, a total of 45 pediatric patients with standard risk or high risk medulloblastoma were randomly assigned to the EG or PDG interventions. **Methods and Material:** The Self-Perception Profile for Children (SPPC) and the Life Orientation Test—Revised (LOT-R) questionnaires were used to measure perceived competence and dispositional optimism or pessimism. **Statistical analysis used:** Adjustment was measured before the intervention, immediately after the intervention, at two weeks after, and six months after the intervention. **Results:** Participants in both groups showed improvement over time. The EG participants scored themselves higher on subscales including social acceptance, global self-worth and behavioral conduct at 2 weeks compared with those in the PDG ( $P < 0.05$ ). However, no significant differences were found between the groups at 6 months. Moreover, pessimists did not benefit more by attending an EG intervention than they did by attending a PDG intervention. **Conclusion:** The results show EG intervention seeming to enhance short-term, rather than long-term, perceived competence. Longitudinal studies are warranted to further identify targeted interventions to maximize healthy survivorship.

**Key words:** Adolescents, Education intervention, Medulloblastoma, Peer discussion intervention, Perceived competence.

## INTRODUCTION

Medulloblastoma is a type of malignant tumor that arises principally in the area of the cerebellar vermis within the posterior fossa of the cranium. Medulloblastoma accounts for 10–20% of all central nervous system (CNS) tumors in children, with peak incidence at 5 years of age. Two male occur for every female case.<sup>1</sup> Patients with medulloblastoma are classified into “standard” and “high” risk categories based on age at diagnosis, degree of surgical resection, and disease spread. In children older than 3 years of age, long-term survival can be achieved in almost 85% of standard risk patients and 70% of high risk patients. Over the past 10 years, treatment for medulloblastoma has experienced extensive modification. Cur-

rent protocols consist of maximal surgical resection, risk-based neuraxis radiation therapy, and adjuvant chemotherapy.

However, the quality of life in long-term survivors is still a major issue.<sup>2</sup> An overwhelming majority of medulloblastoma survivors continue to suffer academic failure, psychological sequelae and unpleasant external appearance, all of which influence perceived competence. Children with cancer, such as leukemia scored themselves more negatively on perceived competence.<sup>3</sup> Psychosocial research in recent decades has advanced our understanding of the psychosocial issues in pediatric cancer. In keeping pace with the medical achievement, psycho-

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social research has moved from helping children and parents deal with issues related to death to focus on health interventions for cancer survivors. Evidence exists that psychotherapeutic group interventions directed by therapists help the adjustment of cancer patients.<sup>4</sup>

Helgeson and Cohen published a review of group support interventions for people with cancer and concluded that there were clear and consistent benefits of education-based group interventions.<sup>5</sup> In a recent study, the psycho-educational intervention administered was acceptable for children with cancer and the intervention group reported significantly lower scores in pain.<sup>6</sup>

Moreover, the educational intervention can enhance capacity for self-expression, emotional stability, insight and self-reflection and expand knowledge on rehabilitation in cancer patients.<sup>7,8</sup> Through clinical education intervention, nurses can help adolescents maintain and improve their quality of life.<sup>9</sup> Peer discussion intervention offers patients emotional support, improving self-confidence and promoting helpful downward comparisons (feeling lucky in comparison with others who are worse off).<sup>10</sup>

Although the benefits of the education intervention can be maintained over a 3-year period on the quality of life of women with early stage breast cancer, yielding more reliable, constructive outcomes than peer discussion group interventions,<sup>11</sup> their influence on outcomes in pediatric medulloblastoma patients has not yet been documented.

A feeling of optimism has been shown to be positively associated with well-being.<sup>12</sup> Previous research suggests that optimism might buffer stress and protect against distress. Gustavsson-Lilius *et al.* reported that optimism has beneficial effects on mental and physical health.<sup>13</sup> It is also a predictor of good adjustment to a variety of somatic illnesses, including cancers.<sup>15</sup>

Positive self-regard serves as a coping mechanism for pediatric burn survivors. By contrast, pessimism has a negative impact on the self-esteem of young adults.<sup>14</sup> Whether or not EG intervention can help to strengthen pessimistic adolescents still remains uncertain. Our study aimed to explore whether or not educational interventions yielded better long-term effects than peer discussion group interventions in adolescents suffering from medulloblastoma.

The major measures examined here were perceived competence, including six subscales. We worked on the assumption that educational intervention would be more helpful for pessimistic adolescents than with optimistic adolescents.

## MATERIAL AND METHODS

### *Design and sample*

The local institutional review boards provided medical ethical approval. Childhood medulloblastoma survivors having medical follow-up procedures at the Department of Neurosurgery at the First People's Hospital of Zhenjiang and who met the inclusion criteria were invited to participate in the study if they were: (a) between 9 and 18 years of age, and (b) able to speak and read Chinese. Children with serious cognitive and psychological disability are excluded from the study. It is understandable that younger children may be more vulnerable to the sequelae of cancer treatment, but those younger than 9 years may have limited verbal and cognitive capacities for self-expression and be perplexed by the questionnaires. For this reason, only children aged 9 to 18 years were invited to participate in the study. Children were given verbal and written information prior to joining the study. They were invited to withdraw if they no longer wanted to participate after receiving the introduction to the day and after each activity.

### *Nurse participants*

The nurses, all female, had a mean of 11 years of experience in central nervous system (CNS) oncology. Because the communicative behavior of nurses differs with age and gender,<sup>15,16</sup> quota sampling was used to obtain a representative sample of nurses. Prior to the implementation of nursing consultations (approximately 9 months earlier), the nurses undertook a brief training seminar, provided by a clinical psychologist and a researcher. The seminar covered two topics: (1) patient assessment following a biopsychosocial model and (2) effective patient-centered consultation using exploratory communication skills.

### *Procedures*

Groups were held weekly for 8 consecutive weeks. The peer discussion and education groups lasted for 60 and 45 minutes respectively. Assessments were carried out at four time points: at baseline (T0, before intervention) and when intervention finished (T1). The T2 and T3 data, collected via mailed questionnaires, each took place 2 weeks and 6 months, respectively, after the intervention.

### *Peer discussion*

Two oncology nurses who had been previously trained attended all meetings. The peer discussion groups were facilitated by two nurses and followed semi-structured discussion. The aims were to counter feelings of alienation and isolation, to offer support and information within the group, to elucidate misperceptions and to avoid emotional distress. At the first session, after introductions

and delivery of general information, the adolescents were encouraged to share their experiences and feelings (positive and negative), but were guided to avoid deterioration into sessions of complaint.<sup>17</sup> Topics frequently discussed during the sessions were body image, hair loss, adjuvant therapy, nausea, and fear of recurrence. With patients' consent, a list of group members' names and addresses was shared. The discussion concluded with participants being asked to present as newspaper headlines what they felt were the most significant aspects of their experience. The research team grouped the newspaper headlines according to similar clusters and the thematic analysis was undertaken. It should be confirmed that clusters reflected their experiences and titled the clusters.

### Education intervention

The educational intervention aimed to provide expert information and to develop the adolescents' control over the illness experience. The intervention was conducted in a classroom atmosphere. Information was given in lecture format. Following topics were covered in the 8 sessions: an overview of medulloblastoma (presented by the nurses), adverse effects of chemotherapy (nurse), nutrition (dietitian), exercise (physical therapist), coping strategies (clinical psychologist), communication (nurse), future health care issues (physician), and body image (image consultant).

### Measures

Perceived Competence-Children's perceived competence was assessed using the revised version of SPPC.<sup>18</sup> The SPPC assesses children's global and domain-specific perceptions of self-esteem. Subscales included in this study were Global Self-Worth, as well as five specific domains, namely scholastic competence, social acceptance, athletic competence, physical appearance, and behavioral conduct.<sup>19</sup> The reliability of this scale has

been confirmed in Hong Kong, China.<sup>20</sup> The SPPC has a 4-point response format and six items on each subscale with adequate internal consistency and convergent validity. Total scores on each subscale were computed by summation of responses to items on that subscale.

The Life Orientation Test—Revised (LOT-R) is a revision of the original Life Orientation Test,<sup>21,22</sup> developed to assess individual differences in optimism and pessimism. The reliability of this scale has been confirmed in China.<sup>21</sup> The instrument contains 10 items. Each item is rated on a 5-point Likert scales ranging from strongly agree to strongly disagree. The items such as, "In uncertain times I usually expect the best" belong to the optimism subscale, while the items "If something can go wrong for me, it will" or "I rarely count on good things happening to me" belong to a pessimism subscale. Total LOT-R scores below the median score of 18 are used to define pessimists, whereas LOT-R scores of 18 or higher characterize optimists.

### Data Analysis

The characteristics of the EG and PDG samples were compared at baseline, to guarantee the comparability of groups. *t* tests were applied to compare the means of continuous variables for the two groups.  $\chi^2$  analysis was used when outcome variables were categorical. Relationships between continuous variables were examined using correlation coefficients. Changes over time from T0 to T3 were compared using general linear models. We evaluated the effect size of the results using partial  $\eta^2$  scores. Since most patients had received adjuvant therapy at the follow-up assessments, adjuvant therapy variables were used as covariates. The *a* values were adjusted for the final results, when multiple comparisons were carried out. All data analyses were performed using SPSS software (version 14.0).

## RESULTS

### Sample characteristics

Among the 55 patients who were asked to participate, ten patients had relapsed and were undergoing intensive treatment, and then failed to complete the assessment. 45 patients were randomly assigned to EG (n=22) or PDG (n=23) interventions. Most participants (96%) completed the questionnaires at both assessments points. Less than 15% of data was missing on any instrument subscale. There were no significant differences in demographics or medical variables between participants in the two groups (Table 1).

### SPPC for perceived competence

At baseline, no significant differences were shown between the total scores of PDG and EG participants

**Table 1: Participant's characteristics**

	PDG (n=22)	EG (n=23)
Age, mean (SD), years	12.2 (2.7)	12.9 (2.8)
Male/Female	14/8	16/7
LOT-R, mean (SD)	16.4 (3.8)	16.3 (4.0)
Education > 5 years, %	31.3	32.5
Age at diagnosis, mean, years	6.4	7.0
Stratification		
standard risk, M0	34.3	36.7
high risk, M1-M4	65.7	63.3
Surgery, %	35.4	38.1
Systemic treatment, %		
Radiotherapy	80.2	77.7
Chemotherapy	52.4	50.3

**Table 2: Comparison of mean scores between PDG (n=22) and EG (n=23), and the effect size of the results**

Outcome	Time				Effect					
	T0	T1	T2	T3	Group	Group × Time				
	Mean (SD)				F	P	$\eta^2$	F	P	$\eta^2$
<b>Global Self-Worth<sup>a</sup></b>					1.7	0.04	0.066	5.9	0.01	0.078
EG	10.2(1.8)	13.8(2.3)	15.7(3.5)	13.2(3.3)	-	-	-	-	-	-
PDG	10.4(1.6)	11.9(1.9)	12.7(2.6)	11.8(2.4)	-	-	-	-	-	-
<b>Scholastic competence<sup>a</sup></b>					0.42	0.16	0.004	0.87	0.08	0.009
EG	16.4(3.2)	18.3(4.0)	19.6(4.5)	18.7(5.1)	-	-	-	-	-	-
PDG	16.2(5.7)	18.1(3.4)	19.2(4.5)	18.2(3.9)	-	-	-	-	-	-
<b>Social acceptance<sup>a</sup></b>					1.6	0.04	0.061	3.4	0.02	0.068
EG	8.3(2.3)	10.5(2.0)	12.6(1.9)	10.4(3.1)	-	-	-	-	-	-
PDG	8.5(2.3)	9.6(2.5)	10.7(2.6)	9.7(2.2)	--	-	-	-	-	-
<b>Athletic competence<sup>a</sup></b>					0.55	0.12	0.003	0.81	0.09	0.007
EG	9.7(2.4)	10.4(2.5)	11.8(3.4)	10.2(3.1)	-	-	-	-	-	-
PDG	9.4(1.0)	10.7(2.3)	11.6(2.3)	9.9(2.3)	-	-	-	-	-	-
<b>Physical appearance<sup>a</sup></b>					3.5	0.03	0.028	6.3	0.01	0.035
EG	8.5(1.9)	9.3(1.6)	10.2(3.5)	9.4(3.5)	-	--	-	-	-	-
PDG	8.1(2.2)	10.7(2.5)	12.6(2.6)	10.8(2.6)	-	-	-	-	-	-
<b>Behavioral conduct<sup>a</sup></b>					0.45	0.11	0.054	1.9	0.04	0.061
EG	10.8(3.1)	13.4(3.3)	15.2(3.5)	13.5(4.2)	-	-	-	-	-	-
PDG	11.2(3.7)	12.5(3.4)	13.2(2.8)	12.7(2.7)	-	-	-	-	-	-

Abbreviations: EG, education group; PDG, peer discussion group<sup>a</sup> Higher score indicates better judgment.

according to Harter's SPPC. At both T1 and T2 assessments, children in PDG scored lower on the total score as compared to subjects in EG. On the subscales, EG participants scored themselves significantly lower on physical appearance ( $F=3.5$ ,  $P=0.03$ ) and considerably higher on global self-worth and social acceptance ( $F=1.6$ ,  $P=0.04$ ) than did children in PDG. After controlling for a time effect, the substantial group-by-time interaction suggested that the educational intervention had a positive effect on social acceptance, global self-esteem and behavioral conduct (Table 2). Repeating the analyses with adjuvant therapy variables (radiotherapy and/or chemotherapy) and LOT-R scores as covariates generated similar results. Chemotherapy was an important factor for athletic competence ( $P=0.05$ ), and LOT-R score was a significant factor for physical appearance, global self-esteem and behavioral conduct ( $P<0.05$ ).

#### **LOT-R for perceived competence**

Comparisons of the mean scores of the children in the two groups, of both the pessimists and the optimists, on the perceived competence subscale are shown in Table 3. At T2 assessments, the scores of optimists in the EG

were considerably higher on global self-esteem than those of optimists in the PDG ( $P=0.04$ ). Pessimists from the EG scored higher on behavioral conduct than did pessimists in the PDG ( $P=0.04$ ). Nevertheless, at T3 assessments, no significant differences between the two intervention groups were found.

## **DISCUSSION**

Adolescents in both groups displayed progress in perceived competence over time. Participants in the EG scored themselves higher at T1 and T2 after interventions compared with the patients in the PDG, but not at T3, signifying that the EG intervention exhibited short-term, rather than long-term, effects. Long-term neurologic, endocrinologic, and neurocognitive sequelae are well documented in medulloblastoma survivors. All these sequelae might contribute to the short-term effect of EG intervention.

A diagnosis of medulloblastoma during adolescence adds a significant stressor to this unique period of development. A diagnosis of cancer during adolescence has the

**Table 3: Comparison of pessimists and optimists**

		Optimists		Pessimists	
		EG (n=10)	PDG (n=10)	EG (n=13)	PDG (n=12)
T0	Global Self-Worth	11.4	11.5	9.3	9.5
	Scholastic competence	17.4	17.1	15.6	15.5
	Social acceptance	8.6	8.6	8.1	8.4
	Athletic competence	10.8	10.5	8.9	8.5
	Physical appearance	9.6	9.4	7.7	7.0
	Behavioral conduct	11.5	11.6	10.3	10.9
T1	Global Self-Worth	15.3	13.3	12.6	10.7
	Scholastic competence	19	18.7	17.8	17.6
	Social acceptance	10.9	10.0	10.2	9.3
	Athletic competence	10.9	11	10.0	10.5
	Physical appearance	10.2	12.5	8.6	9.2
	Behavioral conduct	14.7	13.8	12.4	11.4
T2	Global Self-Worth	18.3	13.8 a	13.7	11.8
	Scholastic competence	19.9	19.8	19.4	18.7
	Social acceptance	13.2	12.1	12.1	9.5
	Athletic competence	12.4	12.1	11.3	11.2
	Physical appearance	11.3	13.5	9.4	11.9
	Behavioral conduct	16.1	15	14.5	11.7 a
T3	Global Self-Worth	14.3	13.4	12.4	10.5
	Scholastic competence	19.1	18.8	18.4	17.7
	Social acceptance	11.7	10.8	9.4	8.8
	Athletic competence	10.9	10.4	9.7	9.5
	Physical appearance	9.8	10.9	9.1	10.7
	Behavioral conduct	14.4	13.7	12.8	11.9

Abbreviations: EG; education group; PDG; peer discussion group<sup>a</sup> Significance was set at  $P=0.05$ .

potential to challenge the development of strong peer relationships, a positive body image and future plans.<sup>23</sup> Confidence may be difficult to attain as major decisions regarding health and well being tend to be made by others.<sup>24</sup> Consistent with Helgeson's report, educational intervention improved psychological functioning mainly by augmenting self-perceptions, and implanting a positive body image.<sup>10</sup> Obtaining information about one's illness and possible ways to handle it may make adolescents feel better about themselves in general and about their bod-

ies. The information may have directly influenced health behaviors, which in turn enhanced self-perceptions. Interestingly, children with cancer had a more negative judgment of themselves in all the other subscales at baseline (T0), except in scholastic performance, because this is a relatively more objective construct than the other subscales.<sup>25</sup> Other studies found social skills training and cognitive behavioral methods can improve psychosocial adjustment and coping in these situations.<sup>26</sup>

Curiously, in our research, peer discussion exhibited a more potent effect on physical appearance than educational intervention did. These findings are meaningful since this domain is vulnerable in children. Likewise, adolescents with cancer tend to think they are socially undesirable or a burden to parents and siblings.<sup>27</sup> Downward comparisons (i.e. feel lucky when compared with others) can be accounted for by the positive effect of peer discussion on physical appearance. However, downward comparisons are not always positive. Children may compare other aspects of their experience, such as varying side effects of chemotherapy or number of cancerous lymph nodes. The following themes which the children were most concerned about emerged during the semi-structured peer discussion process: parents' burdens, individually tailored information, future prospects, isolation, guilt, mortality, and online social interaction. Understanding these themes may assist healthcare professionals provide age-appropriate information and support services that help young people deal with the impact of cancer on daily life.<sup>24</sup> Moreover, people who know that they are being filmed are susceptible to act and talk in a socially desirable way. This phenomenon may have influenced patients and nurses. In several studies, optimism has been proposed as playing an important role on the multiple pathways to resilience.<sup>28</sup> As expected, the EG intervention facilitated better perceived competence in participants with pessimistic life orientations over time. However, the same result was obtained for the optimists. Therefore, we cannot conclude that EG intervention was more helpful for pessimistic adolescents compared with optimistic adolescents.

Whether the effect is sufficiently large to justify the use of resources required for the EG intervention is yet to be determined. The improvement in perceived competence might represent a statistical regression to the mean,

with some participants benefiting substantially and others much less. Regardless of the type of intervention, all patients displayed progress in all the subscales over time.

## CONCLUSION

Our study has some limitations that should be addressed in future research. Firstly, the majority of the patients participating were able to read and speak. Therefore the results cannot be generalized to children too young to read. Pediatric medulloblastoma is typically diagnosed early, with peak incidence at 5 years of age. Secondly, this study drew its data from a small sample and the data analysis was conducted by a single researcher. Thirdly, it is possible that the benefits of the educational group were due to the group context rather than to the information provided. Future research needs to distinguish the effects of information-giving from the effect of group interaction. Finally, risk-stratification may also be a confounder which influences the outcomes. At the onset of the study, there were no significant differences in medical variables (including risk-stratification) between participants in the two groups, as shown in Table 1. However, as the intervention goes on, high-risk patients might expose to more intensive therapies and harmful over-treatment.

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