



# Evaluating the Outdoor Adventure Leadership Experience (OALE) program using the Aboriginal Children's Health and Well-being Measure (ACHWM©)

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## Abstract

The Outdoor Adventure Leadership Experience (OALE) is an outdoor health promotion initiative primarily designed for youth. This program was developed through community-based participatory research in a First Nations Community in northern Ontario: Wiikwemkoong Unceded Territory. It is a 9- or 10-day intensive program involving a wilderness canoe expedition homeward through the traditional territory of Wiikwemkoong. The purpose of this study was to evaluate the impact of the OALE on youth well-being, using a culturally appropriate measure of health: The Aboriginal Children's Health and Well-being Measure (ACHWM©). A pre- and post-intervention study design was used to assess the impact of the OALE on health and well-being. Twenty-eight participants completed both the ACHWM and the Global Health Rating (GHR) instruments before and after the OALE intervention. In total, 68% of participants reported higher ACHWM scores after the OALE ( $\Delta = 3.9$ ,  $p = 0.014$ ). There were improvements in the Medicine Wheel quadrants score of the ACHWM (spiritual, emotional, physical, and mental). Although 25% of participants had higher scores on the GHR, this did not reach statistical significance ( $p = 0.55$ ). However, this study highlights the value of evaluating local programming in a culturally-relevant way. Using the ACHWM, it was demonstrated that there was a significant change in the well-being of the OALE youth participants; this was something that the GHR was unable to capture. Thus, the ACHWM appears to be sensitive to short-term changes in health. More research is needed to confirm the specificity and sensitivity of the ACHWM in different populations and contexts.

**Keywords** Aboriginal children · First Nations · Outdoor leadership · Outdoor adventure · Health and well-being

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## Introduction

In Canada, the population of Aboriginal children is growing rapidly (Kelly-Scott and Smith 2015). Between 2006 and 2016 the population growth rate for First Nations, Métis, and Inuit (FNMI) was 42.5%, which is more than four times the growth rate of the non-Aboriginal Canadians (Statistics Canada 2017). However, Aboriginal children face significant health inequities (Adelson 2005; Greenwood and de Leeuw 2012), as is apparent from higher rates of suicide and mental illness (Canadian UNICEF Committee 2009; First Nations Information Governance Centre 2012; Macmillan et al. 2010; Public Health Agency of Canada 2011). Thus, improvement in the health and well-being of this specific population is urgently needed.

Outdoor adventure and wilderness therapy have been reported as effective interventions in facilitating positive change in psychological, behavioural, emotional and interpersonal domains in non-Aboriginal populations (Bowen and Neill 2013; Hattie et al. 1997). Takano has described examples of several land-based programs with unique elements, such as a deep bonding or connecting process with the land, within a few Aboriginal communities in Canada (Takano 2005) and Alaska (Takano et al. 2009). Yet despite the mounting evidence of the effectiveness of land-based programs in non-Aboriginal populations and the clear health inequities experienced by First Nations youth in Canada, there is a paucity of evidence related to the effectiveness of outdoor programs designed for Aboriginal youth.

The land-based program evaluated in this study is the Outdoor Adventure Leadership Experience (OALE), which is a multi-day canoe excursion in the traditional territory of an Aboriginal community in Canada. It was intentionally designed to promote resilience and well-being for the youth participants from the community. The OALE was originally developed in 2008 as a collaboration between researchers from a university and community leaders from an Aboriginal community in Canada (Ritchie et al. 2009), and it has been in continuous operation each summer since 2009. The OALE includes many natural challenges, such as rapids, portages, and open-water crossings. The travel route also passes through many areas of cultural significance such as harvesting areas, old battle sites commemorated by pictographs, sacred burial grounds, and abandoned village sites. Participants are assigned day leadership responsibilities, and the experience includes a half day solo component. Community Elders provide teachings and oversight, and the excursion finishes on the last day with a home-coming celebration and feast when the travel group arrives in the Aboriginal community. Training is provided to trip leaders and staff prior to the summer excursions, and there is a resource manual that can be referenced throughout the summer.

The OALE was originally evaluated with a set of main-stream measures that were approved by the community (Ritchie et al. 2014, 2015a, b). Findings confirmed that the OALE was effective in promoting resilience for Aboriginal youth in the short-term (Ritchie et al. 2014) with a mean improvement of 3.40 points ( $p = 0.011$ ) using the Resilience Scale (RS-14); other scales also portrayed a positive short-term improvement trend related to health and well-being (Ritchie et al. 2014). The measurement tools used to evaluate the program were the best available at the time, however they were not developed

for use with an Aboriginal population. Thus, they were not optimal because ideologies and conceptualizations of health and well-being among Aboriginal youth differ from those in non-Aboriginal contexts. This study was developed as an attempt to address these issues. Its purpose was therefore to evaluate the short-term impact of the OALE on the well-being of Aboriginal youth, using a culturally appropriate measure of health.

## Methods

This evaluation study used a pre- and post-intervention design to assess the impact of the OALE on health and well-being using the Aboriginal Children's Health and Well-being Measure (ACHWM) as the primary measure, and the Global Health Rating (GHR) as a confirmatory measure.

## Intervention

The OALE intervention was developed through a process of community-based participatory research (Israel et al. 1998; LaVeaux and Christopher 2009), as a collaboration between researchers from Laurentian University in Canada and community leaders from Wiikwemkoong Unceded Territory (Ritchie et al. 2014, 2015b; Young et al. 2013). The OALE is an outdoor health promotion initiative for youth 12–18 years of age that involves a nine or ten-day canoe excursion approximately 100 km long. The OALE travel groups usually include 8–12 youth with 2–4 program staff and guides from the community, and several excursions occur each summer. There is a preparation and introduction session on the first day, and many group discussions and talking circles each night around a campfire. The program staff and guides facilitate the experience, mentoring the youth participants, and they implement other intentionally designed program elements interwoven into the routine of the travel day. The study received approval from the Wiikwemkoong Chief and Council (632–2014) and the Laurentian University Research Ethics Board (REB file number: 2012-11-17).

## Outcome measures

Children's well-being was assessed using the Aboriginal Children's Health and Well-being Measure (ACHWM©), which was developed in 2011, to reflect Aboriginal children and youth conceptualizations and understandings of health (Young et al. 2013, 2015a). The ACHWM contains 62 questions representing the four quadrants of health as depicted by the Medicine Wheel (spiritual, emotional, physical and mental). The Medicine Wheel reflects the wholistic conception of health and well-being in Wiikwemkoong, and it is a framework that has been described elsewhere in the literature (Hill 2006; Isaak and Marchessault 2008; Waldram et al. 2006). The ACHWM questions were generated by Aboriginal children and youth from Wiikwemkoong using photo-voice methods; this offered a way for Aboriginal children to report on health

impacts from their own perspectives (Young et al. 2013). The ACHWM's validity was established based on a correlation of 0.52 ( $p < 0.0001$ ) with the PedsQL (Young et al. 2015a), and it is highly reliable with a Cronbach's coefficient of 0.93 and a test-retest intra-class correlation coefficient of 0.94 (Young et al. 2013, 2015a; Young et al. 2016a, b, 2015b). The measure produces an overall score and four quadrant scores. The scores are computed by averaging across the individual items (0–4 scores on each ordinal response) multiplied by 25. Thus, the overall score and four quadrant scores have a possible range of 0 (indicating poor well-being) to 100 (indicating optimal well-being).

The current version of the ACHWM contains 62 items reflecting different aspects of health (spiritual, emotional, physical and mental) according to the four quadrants of the Medicine Wheel (Young et al. 2013, 2015a, 2017). It is important to note that the spiritual component of health is a critically important domain in Aboriginal health frameworks, and it is usually not reflected in other health measures in non-Aboriginal contexts. The number of items within each quadrant and example items are displayed in Table 1. Children provided their self-reported health perceptions using the ACHWM application which was loaded on Android tablets; data was then uploaded to Laurentian University REDCap (Research Electronic Data Capture) secure server (Harris et al. 2009). This process was efficient and secure. Ownership of the data and access to the data was managed under a Research Agreement between Wiikwemkoong and Laurentian University, and was in accordance with the OCAP™ principles (Schnarch 2004).

The GHR was included as a second measure in this study. It is a single question that asks about overall health: “How would you describe your health this past month?” It has a 5-level response scale: Excellent, very good, good, fair, poor. The GHR is commonly used in epidemiological studies, including with Aboriginal populations. The GHR can be a simple global assessment, but it has high predictive validity for mortality, independent of other medical, behavioral, or psychosocial risk factors (Idler and Benyamini, 1997). We included the GHR as a simple confirmatory measure of health to support the ACHWM.

**Table 1** Number of items in the ACHWM and examples of each item

Quadrant	Number of items	Example item	Scale
Spiritual	16	I feel a connection to Mother Earth...	0–4 ordinal scale in either frequency (0 = Never; 4 = Always) or degree of importance (0 = Not important; 4 = Extremely important) for each item
Emotional	24	I enjoy celebrations (gatherings) in our home or community ...	
Physical	13	I eat healthy foods...	
Mental	9	I have time on my own to relax with an activity I like...	
Total	62		

## Data collection

Youth participants for the OALE health promotion program, offered in the summer of 2015, were recruited in the community through flyers and notices sent home from school. Both parent or guardian consent and child assent were required to participate in the study.

Each participating youth completed the GHR first, followed by the ACHWM. For the purposes of this study, both measures are described as the “survey.” The survey was completed twice; once on the first day and once on the last day of the OALE program. These procedures were similar to how the OALE was originally evaluated using the other measures, except that the post-test of the original OALE evaluation was completed one month after completion of the trip, rather than on the final day (Ritchie et al. 2014).

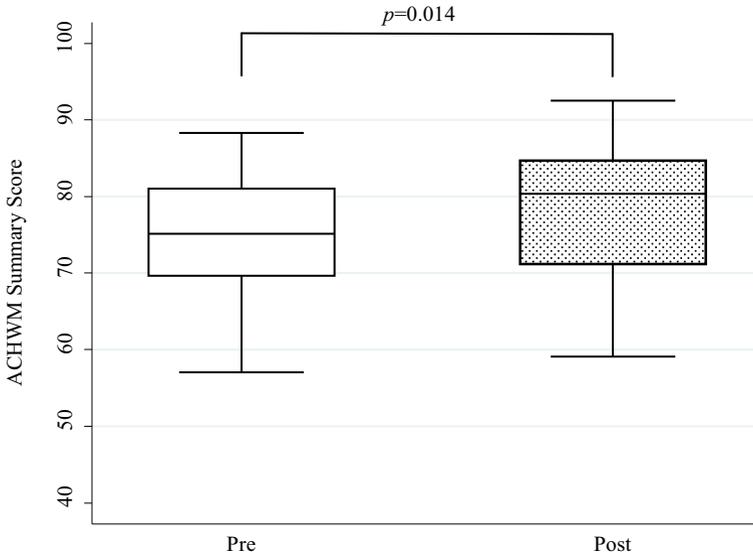
## Data analysis

Descriptive statistics were calculated to summarize the participants’ demographic characteristics. The paired *t*-test was used to assess the effect of the OALE on the ACHWM summary score. The Wilcoxon signed-rank test was used to assess the OALE’s impact on the GHR score. We also explored the score distributions for each of the OALE quadrant scores. Effect Size (ES) was calculated for the ACHWM score using the Hedge’s *g* (Hedges 1981; Katz et al. 1992), which typically ranges between  $-1$  and  $1$ , where a value close to  $0$  indicates no effect. Threshold values recommended by Kazis et al. (1989) were used to interpret the ES, where an ES less than  $|0.20|$  is defined as “not significant,” an ES between  $|0.2$  and  $0.49|$  is defined as “small,” an ES between  $|0.5$  and  $0.79|$  is defined as “moderate,” and an ES of  $|0.8|$  or more is defined as “large” (Kazis et al. 1989). All data analyses were performed using Stata 14 (StataCorp 2015).

## Results

In 2015, 32 youth from Wiikwemkoong completed the survey before and after the OALE canoe trip. Of these 32 youth, four were excluded due to missing ACHWM scores, and the remaining 28 were included in the analyses. The youth ranged in age from 12.8 to 18.1 years and the median age was 14.1 years. The majority of the respondents were male (64%).

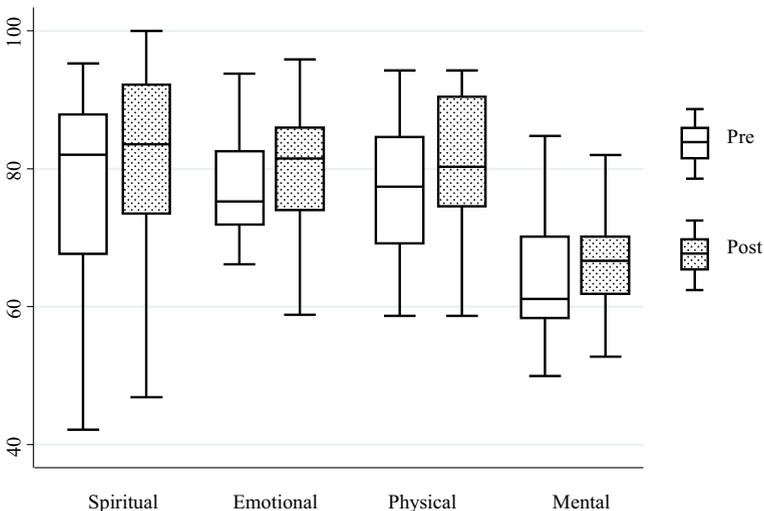
The ACHWM summary scores and the GHR were compared between pre- and post-OALE trip. The assumption of normality of score difference between pre and post-trip was met (Shapiro-Wilk test,  $p=0.44$ ). The mean score of the ACHWM was 74.5 (SD = 9.2) before the OALE trip, and 78.4 (SD = 8.8) after the trip (see Fig. 1). Of note, the pre-trip mean score was similar to the mean of 75.1 (SD = 11.7) from a 2015 community survey of youth using the ACHWM with a larger sample size ( $n=132$ ) (Young et al. 2016a, b). In total, 68% of participants reported higher scores (improved health and well-being) after the OALE. The mean difference in the ACHWM summary scores between pre- and post-trip was 3.9 (SD = 7.9) and was statistically significant (paired *t*-test,  $p=0.014$ ). The ES of 0.43 was small.



**Fig. 1** Distributions of ACHWM Summary Score at Pre and Post OALE. Note: outliers were excluded to protect the confidentiality of youth

In total, 25% of the youth reported a better GHR score after the OALE trip. The percentage of children who responded “excellent” or “very good” was 46.4% before the trip; while it was 57.1% after. However, this improvement was not statistically significant (Wilcoxon signed rank test,  $p = 0.545$ ).

The ACHWM quadrant scores (i.e., spiritual, emotional, physical and mental scores) were also explored in more detail, as shown in Fig. 2. The effect of participation in the OALE demonstrated improvement in all four quadrant scores:



**Fig. 2** Distributions of ACHWM Quadrant Scores at Pre and Post OALE. Note: outliers were excluded to protect the confidentiality of youth

spiritual ( $\Delta = 4.2$ ;  $SD = 8.7$ ), emotional ( $\Delta = 4.4$ ;  $SD = 11.7$ ), physical ( $\Delta = 3.2$ ;  $SD = 7.8$ ) and mental ( $\Delta = 3.6$ ;  $SD = 9.8$ ).

## Discussion

The ACHWM appears to be an effective and sensitive tool to evaluate the OALE health promotion intervention program for Aboriginal youth via short-term changes in well-being using a pre- and post-test study design. Based on the results derived from the ACHWM, the OALE program can be considered effective in promoting health and well-being for First Nations youth in the community of Wiikwemkoong.

The ES derived from this study was 0.43. This was similar to the ES of 0.36 in the previous OALE study in which the ES was computed based on the RS-14 (Ritchie et al. 2014). It was comparable to the ES of 0.34 from the meta-analysis of short-term adventure education outcomes compiling 1,728 ESs from 96 studies (Hattie et al. 1997), and slightly lower than the ES of 0.47 for adventure therapy outcomes compiling 2,908 ESs from 206 unique samples (Bowen and Neill 2013). This provides evidence for the argument that the magnitude of change using the ACHWM was appropriate and typical when compared to outdoor education and adventure therapy studies using other measures in non-Aboriginal contexts.

Participation in the OALE led to improved ACHWM quadrant scores for spiritual, emotional, physical and mental health, and this was also similar to findings from the earlier OALE study, where positive improvement was observed on all seven scales used in the study (Ritchie et al. 2014). Although it is not possible to confirm the relationship due to the nature of the study design, the improvement in quadrant scores in our study were likely influenced by specific aspects of the OALE program. For instance, spiritual aspects of the OALE included ceremonies (such as prayer and offering tobacco) and connecting with an Elder who attended the program, as well as visiting the cultural and sacred burial sites that were accessible along the route. Emotional aspects included the positive social elements of the experience, and the sense of community that develops among participants during an immersive experience (Ashworth & Learning 2017). The canoe trip was also physically demanding, thus likely influencing the physical quadrant. Finally, the mental quadrant reflects cognitive function and may have been influenced by the learning that occurred both experientially and facilitated by program leaders and staff.

The OALE is a short-term intervention (Ritchie et al. 2014), but given pressing child health inequities (Adelson 2005; Greenwood and de Leeuw 2012), youth mental health concerns in Aboriginal communities (Nelson 2012), and current limitations on resources for mental health, there is value in short-term interventions that have been effective in improving youth mental health. The results from this study build on the literature indicating that outdoor education programs (Cason and Gillis 1994; Hattie et al. 1997) and adventure therapy (Baker 2011; Bowen and Neill 2013; Gass et al. 2012; Hans 2000) can lead to improved mental health or well-being for non-Aboriginal youth (Baker 2011; Cason and Gillis 1994; Gass et al. 2012; Hans 2000; Hattie et al. 1997). The use of the ACHWM may provide a way to sensitively measure changes in well-being for the water- and land-based programming that many Aboriginal communities are already engaging in (Disant, Hébert, Bergeron, & Bruneau, 2008; Mental Health

Commission of Canada 2012); this builds quantifiable evidence of program effectiveness (Ritchie et al. 2014). Outdoor programs similar to the OALE should be considered by other First Nations, as a means to promoting health and well-being for their youth and communities.

Interestingly, spirituality is rarely included in other measures of health and well-being in non-Aboriginal populations. However, evaluation which includes spirituality is necessary to fully capture the effectiveness of health promotion initiatives within Wiikwemkoong because it is consistent with an Aboriginal worldview. Moreover, the OALE program was developed using the Medicine Wheel framework (Ritchie, Enosse, & Peltier, 2013). Thus, program evaluation results using the ACHWM are more interpretable for Wiikwemkoong and other Aboriginal communities than program evaluation using other generic measures of health. Therefore, using the ACHWM for other program evaluation initiatives in Wiikwemkoong will likely provide the appropriate community level health information to inform decision-making (National Collaborating Centre for Aboriginal Health, 2009). For instance, decisions from this information could lead to refinement of programming so as to target specific aspects of health and well-being (i.e., low quadrant score), where youth may be in need. Future evaluation research of the OALE using the ACHWM should consider a longitudinal study design to address long-term effects, and explore differences by participant characteristics, such as gender and age. Other studies are required to explore and extend the applicability and relevance of the ACHWM for program evaluation in Wiikwemkoong and other Aboriginal communities in Canada.

Limitations of this study include the small sample size and the immediate assessment after program completion. While it has been posited that measuring personal outcomes immediately after program completion may skew the results towards the positive because of the euphoria participants often feel after program completion (Marsh et al. 1986), study attrition is a problem if the post-measure is delayed (Ritchie et al. 2014). This was an important consideration given the small sample size in our study. However, meta-analyses of adventure studies have shown that the effects of programs are maintained over considerable time (Bowen and Neill 2013; Hattie et al. 1997). Our findings indicated that the effect of the OALE intervention is similar to those adventure programs; thus, the effect in this study was likely not overestimated.

## Conclusion

Using the ACHWM, it was demonstrated that there was a significant short-term improvement in the well-being of First Nations youth from Wiikwemkoong who had participated in the OALE, which was not captured in the previous study (Ritchie et al. 2014). While it is possible to achieve results that reasonably evaluate the effects of the OALE through the use of other measures of health and well-being (Ritchie et al. 2014), it is ideal to measure health and well-being outcomes using an evaluation tool that was designed by and for the people who developed the intervention. The results from this study demonstrate the value of evaluating local programming in a culturally-relevant way with an appropriate tool. The ACHWM specifically measures aspects of wholistic

health (physical, mental, emotional, and spiritual) based on the Medicine Wheel Framework, reflecting the community's own values and culture. Future evaluation research using the ACHWM should consider addressing different populations and contexts, and longitudinal monitoring of fluctuations or changes in health and well-being.

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## Compliance with ethical standards

**Conflict of interest** All authors stated that they had no interests which might be perceived as posing a conflict of interest or bias.

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