

Evaluation of a Community-based Concussion Prevention and Advocacy Program at the University of Ottawa

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ABSTRACT

Background: Injury prevention and advocacy often receives little attention in medical education despite constituting a leading cause of morbidity and premature deaths. Brain Waves is a national concussion prevention program where medical student volunteers (MSVs) deliver a one-hour interactive presentation at the classroom level. This paper reviews the data from the past eleven years of curriculum delivery, highlighting the successes and challenges towards initiating an injury prevention advocacy program at the medical school level.

Methods: Our database included demographics collected from 2007 to 2017 as well as online survey ratings and written feedback from participating teachers and MSVs for the 2016 and 2017 school years.

Results: The Ottawa's Brain Waves program has been successful in the recruitment of 636 MSVs and delivering the curriculum to 9848 elementary school students over the past 11 years. Survey responses from MSVs (N=36) rated their experience positively on a 5-item Likert scale for the following dimensions for the injury prevention curriculum: Training satisfaction (4.72 ± 0.46), Competence (4.80 ± 0.41) and Timing (4.51 ± 0.67). Teacher responses (N=10) showed that 90% rated the program as "Good" or "Excellent". Written feedback from MSVs and teachers highlighted the importance of time management, focused-lesson plans and activity-based engagement.

Conclusions: Through involvement in the Ottawa Brain Waves program, MSVs actively contributed to mitigating risks of accidental brain injuries, adapted to the needs of the classroom and heightened their curiosity in community-based advocacy.

RÉSUMÉ

Arrière plan: La prévention et défense des blessures reçoivent souvent peu d'attention dans l'éducation médicale, en dépit du fait qu'ils constituent une cause majeure de morbidité et de décès prématurés. Brain Waves est un programme national de prévention des commotions cérébrales où les étudiants bénévoles en médecine (MSV) offrent une présentation interactive d'une heure au niveau de la salle de classe. Cet article passe en revue les données des onze dernières années de mise en œuvre du programme, en mettant en évidence les succès et les défis liés à l'initiation d'un programme de sensibilisation à la prévention des blessures au niveau de la faculté de médecine.

Méthodes: Notre base de données comprenait des données démographiques recueillies de 2007 à 2017 ainsi que des évaluations de sondages en ligne et des commentaires écrits des enseignants participants et des MSV pour les années scolaires 2016 et 2017.

Résultats: Le programme Brain Waves d'Ottawa a réussi à recruter 636 MSV et à dispenser le programme à 9848 élèves des écoles élémentaires au cours des 11 dernières années. Les réponses au sondage de MSV (N = 36) ont évalué leur expérience de manière positive sur une échelle de Likert de 5 articles pour les dimensions suivantes du programme de prévention des blessures: Satisfaction à l'entraînement (4.72 ± 0.46), Compétence (4.80 ± 0.41) et sens du rythme (4.51 ± 0.67). Les réponses des enseignants (N = 10) ont montré que 90% d'entre eux ont jugé le programme «bon» ou «excellent». Les commentaires écrits des MSV et des enseignants ont souligné l'importance de la gestion du temps, du plan de cours ciblé et de l'engagement basé sur les activités.

Conclusions: Grâce à leur participation au programme Brain Waves d'Ottawa, les MSV ont contribué activement à atténuer les risques de lésions cérébrales accidentelles, adaptées aux besoins de la salle de classe et ont accru leur curiosité en matière de défense communautaire.

Accidental injury constitutes a prime reason for death and disability in youths, ranking fourth among all causes of mortality before the age of 70 (1,2). Brain injury, particularly concussions, is a significant public health concern affecting nearly 23,000 Canadian youths annually (3). The majority of hospitalized brain injuries, albeit preventable, present tremendous stress to the affected individual, their families and the health care system. Interventions through community advocacy groups such as Parachute Canada (formally known as ThinkFirst), an organization that promotes school education on the permanence of brain and spinal cord damage, helmet safety and harm reduction, play a critical role in mitigating injury. Such community-based programs have been shown to increase the adherence of helmet use among children in kindergarten to Grade 6 and effectively reduce the rate of bicycle related injuries in this age group (4).

The importance of injury prevention and advocacy cannot be understated and too often overlooked within the medical curriculum. The health advocate role is a core component of medical education and remains one of the seven competencies of the CanMEDS framework (5). The Royal College of Physicians and Surgeons of Canada's official definition of the health advocate role entails the "responsible use of physicians' expertise and influence to advance the health and well-being of individual patients, communities and populations" (5). The key competencies outlined in this framework advise that clinicians should be able to respond to issues of patients on an individual basis, respond to health needs of the community, identify the determinants of health for the population served, and promote the health of individual patients, communities and populations (6). Physicians, through their role as advocates, play a vital part in the promotion of health and prevention of disease in the general population. Encouraging medical students to implement and advocate for injury prevention can better help them incorporate these concepts in their future practice and thereby reduce injury related morbidity and mortality (7).

The health advocate role is frequently described by researchers as more difficult to incorporate and teach in medicine at both the undergraduate and postgraduate levels (8,9). One study by Leveque et al. explored attitudes of physicians in France on prevention awareness from private practice pediatricians to clinic pediatricians and general practitioners (10). Their survey responses revealed that physicians in general felt that they could contribute to injury prevention; nevertheless, many felt

they lacked awareness of injury-related mortality rates in the pediatric population. The lack of awareness in fact spans earlier in a doctor's educational training. In a national survey administered to urology residents, Leveridge et al. found that only 18% of respondents had engaged in health promotion or disease prevention initiatives prior to their residency (11). Likewise, in a survey of 76 internal medicine residents, most candidates agreed on the importance of the health advocate role (12). Most of the engagement in advocacy, however, was restricted to the candidates' high school and undergraduate studies (12). Seventy-six percent of residents reported no ongoing engagement in advocacy due to barriers such as insufficient time and stress while 36% were undecided on whether they would engage in advocacy during their continued training as residents, fellows and staff (12).

One effective approach for engaging future physicians to incorporate injury prevention advocacy is via integration at an early stage (i.e. the medical school level). Despite the efforts to integrate physician advocacy in the medical curriculum, medical students do not receive adequate exposure and opportunities for community engagement. The purpose of this paper is to explore the feasibility of implementing a concussion-based advocacy program, Brain Waves (developed by ThinkFirst/Parachute Canada), at the undergraduate medical level. We synthesized lessons, both successes and avenues for improvement, based on the past 11 years of program implementation at the University of Ottawa Faculty of Medicine.

METHODS

Brain Waves Curriculum

Medical students at the University of Ottawa partnered with Brain Waves, formerly called Brain Day or Brain Week, a national head injury prevention program offered to elementary school children in grades 4 through 6. The goal of this free didactic program is the prevention of brain and spinal cord injury through education aimed at promoting healthy behaviours among children and youth. Injury prevention presentations are delivered by University of Ottawa medical student volunteers (MSVs) in their first and second years of study during a week in April of each academic year.

Prior to the delivery of the Brain Waves injury prevention presentation, MSVs received in-class training by program site coordinators during a formal 1-hour training session. This session exposes potential volunteers to the content of the presentation,

suggested activities for implementation and importance of helmet safety and concussion awareness.

The injury prevention presentation curriculum delivered by MSVs consisted of a PowerPoint presentation introducing the brain, the senses and basic neuroanatomy at an age-appropriate level. The five senses were explored through interactive games and audio-visual activities. Most importantly, the MSVs demonstrated proper helmet fitting tips using the 2-V-1 rule. That is, 2 fingers between base of helmet and eyebrows, strap forming a V under the ears and 1 finger between strap and chin. The presenters also coached the children on the importance of injury prevention using proper protective equipment. Activity booklets that consolidated the lessons were distributed to the students at the beginning of the session as a guide to follow along with the presentation. Models of the brain were shown in the form of a Jell-O brain to aid in the understanding of the underlying anatomy and physiology. The Jell-O brain further reiterated how vulnerable the human brain is to injury and the importance of protection. At the end of the session, the students were given an opportunity to ask questions and encouraged to follow safe helmet wearing practices.

Teacher and MSV Recruitment

Teachers and classrooms were recruited from a database registry of elementary schools in the Ottawa-Carleton District School Board (OCDSB) and Ottawa Catholic School Board (OCSB). An initial letter of recruitment for participation in the Brain Waves program was sent to principals in schools across the OCDSB and OCSB, and follow-up arrangements were made with interested teachers. MSVs were recruited from the University of Ottawa, Faculty of Medicine through social media advertisement, interest group promotion and word of mouth. Two MSVs were matched to each participating classroom by local program coordinators and received a one-hour training session prior to outreach. MSVs received volunteer hours towards student interest groups (Pediatric/Neurology) for participation in the program, which may be documented on the Medical Student Performance Record (MSPR). Details regarding the program timeline are presented in **Figure 1**.

Program Assessment

Information regarding participant demographics was collected prospectively for 11 years of program delivery. The database consisted of information pertaining to MSVs including the number of University of Ottawa students recruited, their respective

year in medicine and their program stream (French/English). Collected classroom demographics included institution name, language preference for presentation (French/English), level of education and classroom size. Following the administration of the Brain Waves program, a brief online survey was distributed to participating MSVs and teachers. MSV surveys consisted of a 5-item Likert scale (with 1 being strongly disagree and 5 being strongly agree) evaluating training adequacy (training was adequate for a successful presentation delivery), timing (an hour was sufficient to get through the material) and competence (MSV felt confident in injury prevention and presentation delivery). Teachers rated the program in the following domains: presentation content (the information was age appropriate), presentation clarity (the content was easy to understand), presenter knowledge (presenters were knowledgeable in injury prevention), presenter engagement (enthusiasm of MSVs) and presentation timing (the length of presentation was appropriate for the students). Written feedback and avenues for improvement were also obtained.

RESULTS

Program Trend

The Ottawa program was initiated in 2007 with 177 students and outreached to 6 classrooms. Twelve medical students delivered the program in one official language, English. In 2009, the program expanded to include presentations in French, reaching 856 students in 33 classes (26 English and 7 French) facilitated by 55 MSVs. The peak of the program was in 2012 where 1615 students received the injury prevention presentation in 64 classrooms (46 English, 18 French) delivered by 119 MSVs. In the most recent cycle in 2017, the program reached 456 students in 17 classes (12 English, 5 French) facilitated by 22 MSVs (**Figures 2 and 3**).

Involvement in the Brain Waves program was possible at Canadian sites throughout two years: 2012 and 2013. In 2012, a total of 17418 students participated in the Brain program with 586 MSV presenters while in 2013, 18431 students were reached with 1193 classroom presenters. Ottawa, despite representing approximately 2.5% of the Canadian population, outreached to 9% and 8% of the national presentations for the 2012 and 2013 cycles, respectively.

Medical Student Volunteer Feedback

Electronic surveys were distributed in 2016 and 2017 to all participating MSVs for feedback regarding their experience

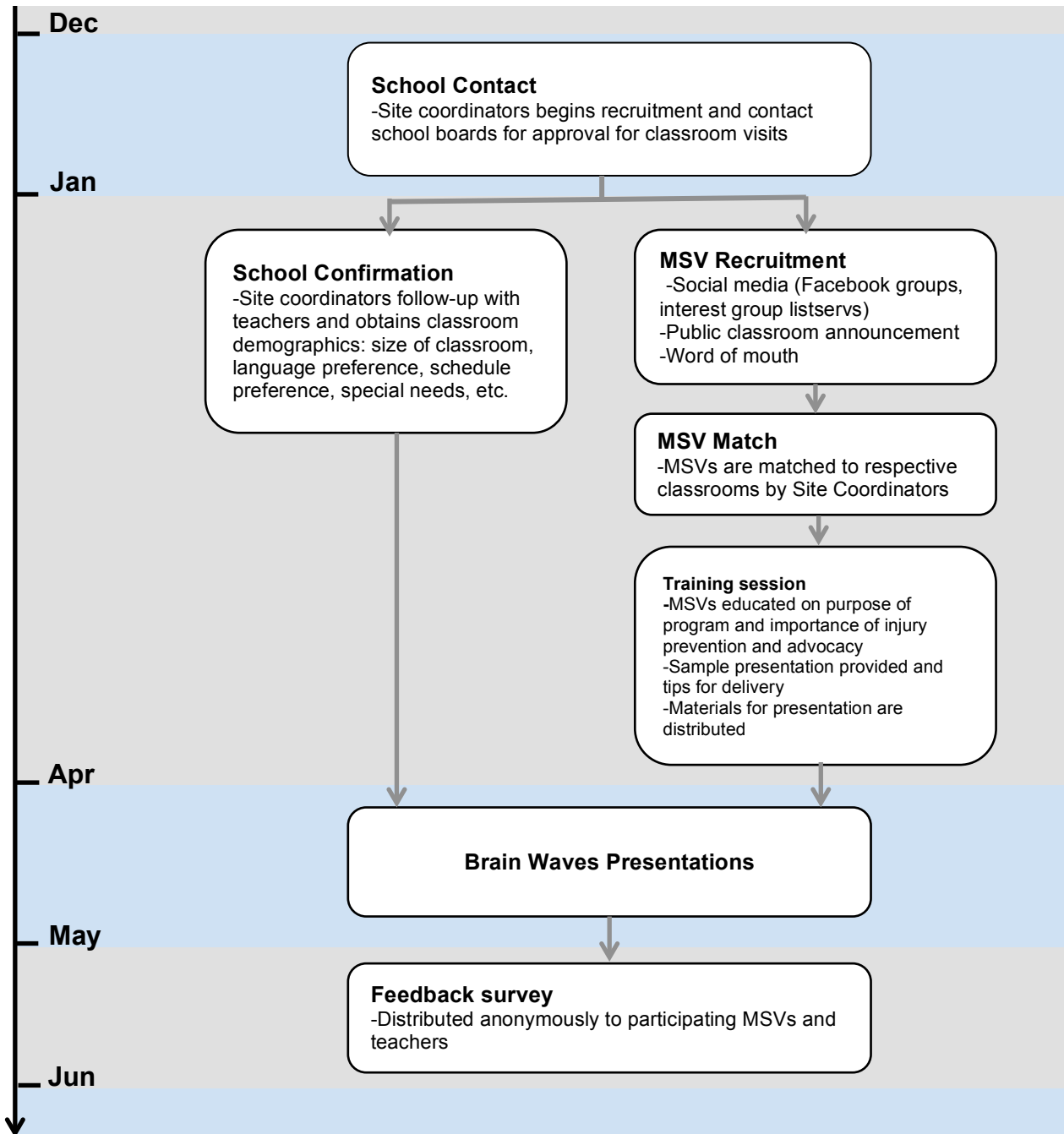


Figure 1. Sample timeline for the preparation and delivery of the Ottawa Brain Waves Program. Site coordinators are medical students working in a team to coordinate the classroom outreach, training session, MSV recruitment and matching. MSVs are medical students who deliver the Brain Waves Injury Prevention program to the elementary school classrooms.

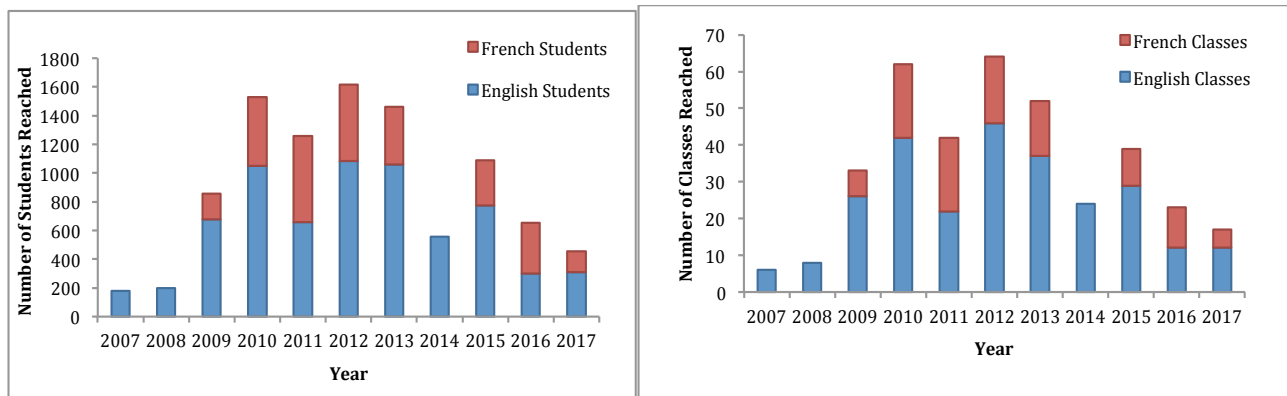


Figure 2. Demographics data for total number of elementary school students (left) and classrooms (right) out-reached between 2007 and 2017. A total of 9848 received the injury prevention presentation with the peak attendance year being 2012 with 1615 students (64 classes).

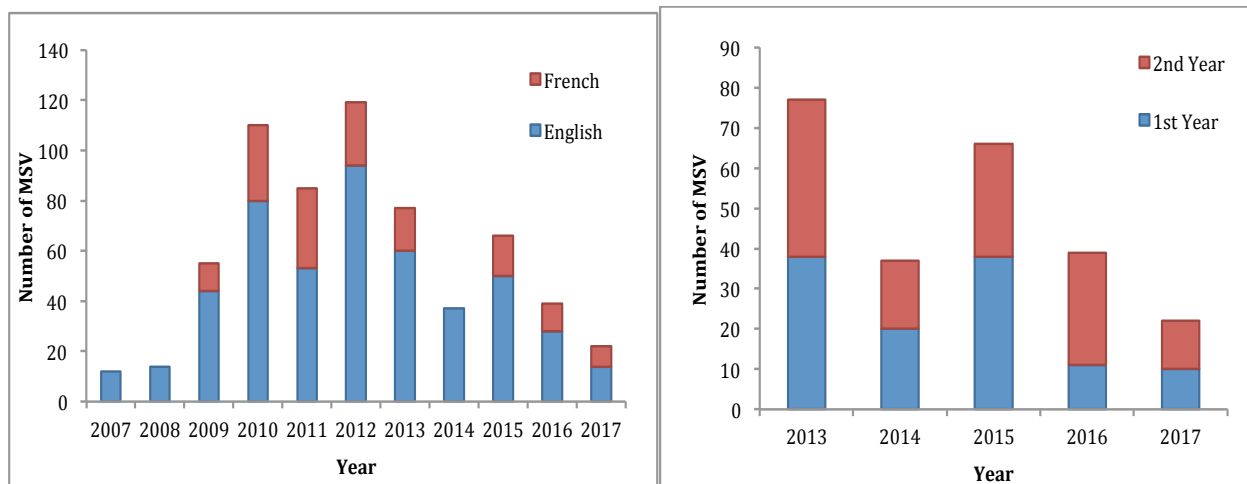


Figure 3. Demographics data for total number of medical school students (MSVs) who participated between 2007 and 2017 by language stream (left) and year of study (right)*. The distribution of English to French MSVs was approximately 4:1, reflecting the relative demand of the classrooms. First and second year MSVs were approximately equal.

*Note that MSV year of study was only documented in the most recent 5 cycles of program administration.

in the advocacy program. Survey response rate was 59%. Of the respondents, 70% of the participants were involved in the program for the first time, 25% had engaged in the program once before and 5% of participants participated in the program three or more times. Majority of the MSVs participated in one presentation (75%), while 15% participated in two presentations, and 10% participated in three or more. Twelve percent stated that they became involved in the program through peer advertisement while 88% were recruited through social media (including Facebook postings and Interest Group Listserv).

MSVs attended a training session prior to delivering their presentation with an overall 82% attendance rate and subsequently evaluated the training session on 4 domains: convenience (time, date, multiple sessions offered), organization (was the session well run?), presenters (were the presenters up-beat, knowledgeable?) and time allotted (was there enough time to cover the material). MSVs positively rated all 4 domains of the training session: convenience (4.54 ± 0.51), organization (4.67 ± 0.48), presenter (4.72 ± 0.46) and time allotted (4.68 ± 0.48) (**Table 1**; note that the Likert scale ranges from 1-5).

MSVs also rated the Brain Waves program on 3 domains: training adequacy, timing and competence. Survey results demonstrated that a high rating was given for training adequacy (4.72 ± 0.46) and confidence (4.80 ± 0.41) whereas the average score for timing was moderate (4.51 ± 0.66) (**Table 1**).

Qualitative feedback was taken from the students in the form of written responses to elicit strategies for quality improvement. The preponderance of comments from written feedback stated that the interactive activities were helpful in sustaining the students' attention. Multiple MSVs (3 out of 36) noted that one hour was not enough time to complete the planned material in its entirety. The activity booklets were described as a helpful adjunct to maintain students' fixation throughout the delivery of the presentation. The majority of MSVs were satisfied with their outreach experience and had a positive interaction with their collaborating classrooms with many volunteers (4 out of 36) expressing that they were able to challenge themselves by adapting to the demands of the students and achieving a heightened sense of advocacy in injury prevention.

Teacher Feedback

Survey response rate from participating teachers between 2016 and 2017 was 27.5%. Classroom demographic data re-

vealed the following: 5% grade 3 classes, 26% grade 4 classes, 39% grade 5 classes and 30% grade 6 classes.

Teachers rated the program on the following domains: presentation appropriateness (the program material was age appropriate), presentation clarity (the presentation was clear and easy to understand), presenter knowledge (presenters were knowledgeable in injury prevention), presenter engagement (the presenters were enthusiastic and engaging) and presentation timing (the length of the presentation was appropriate for the students (presentation timing). Overall, teachers rated the presenters highly for knowledge (4.70 ± 0.48) and engagement (4.80 ± 0.42) and moderately high for presentation appropriateness (4.50 ± 0.53) and clarity (4.60 ± 0.52). Teachers were in disagreement regarding the presentation timing (4.10 ± 0.99) (**Table 2**). Overall, teachers rated the program an average of 4.60 ± 0.52 ; moreover, all teachers who completed the survey, positively recommended the program. Teacher responses also revealed that 92% rated the program as "Good" or "Excellent" with all respondents expressing their interest in the program for the subsequent year.

Positive comments alluded to the well-organized nature of the presentations, the enthusiasm from the presenters and the activities and experiments with the students. Two teachers recognized the benefit of adding tangible props for the presentation such as using Jell-O brain moulds and helmet fitting exercises. Constructive feedback from teachers included distilling the presentations to fewer but more tangible key points, increasing the amount of interactive activities, engagement with the children, and that the one-hour time frame was too long to maintain the children's attention span.

DISCUSSION

Successes of the Brain Waves Curriculum

Advocacy remains an integral component of the CanMeds framework, despite difficulty implementing participation. Medical trainees often do not receive adequate exposure to injury prevention advocacy during their clinical education. One method of encouraging physician advocacy is through integration of community-based advocacy programs at the medical school level, such as through organizations like Thinkfirst/Parachute Canada, granting exposure to injury prevention and advocacy to medical students early in their training. Engaging medical students in an injury prevention program is important because they not only enable students to become exposed to



Table 1. MSV survey assessment of the quality of Brain Waves injury prevention program.

	No Response (% , n)	Strongly disagree (% , n)	Disagree (% , n)	Neither Disagree or Agree (% , n)	Agree (% , n)	Strongly Agree (% , n)	Average Rating
Training							
Convenient (timing and date)	33.3 (12)	0.0 (0)	0.0 (0)	0.0 (0)	30.6 (11)	36.1 (13)	4.54 ± 0.51
Organization (was the session well run?)	33.3 (12)	0.0 (0)	0.0 (0)	0.0 (0)	22.2 (8)	44.4 (16)	4.67 ± 0.48
Presenters (were they upbeat, knowledgeable?)	30.6 (11)	0.0 (0)	0.0 (0)	0.0 (0)	19.4 (7)	50.0 (18)	4.72 ± 0.46
Time allotted (was there enough time)	30.6 (11)	0.0 (0)	0.0 (0)	0.0 (0)	22.2 (8)	47.2 (17)	4.68 ± 0.48
Program							
Training was adequate for successful presentation	11.1 (4)	0.0 (0)	0.0 (0)	0.0 (0)	25.0 (9)	63.9 (23)	4.72 ± 0.46
An hour was enough time to get through the material	11.1 (4)	0.0 (0)	0.0 (0)	8.3 (3)	30.6 (11)	58.3 (21)	4.51 ± 0.67
I felt confident and competent in giving my presentation	2.8 (1)	0.0 (0)	0.0 (0)	0.0 (0)	19.4 (7)	77.8 (28)	4.80 ± 0.41

Participants were asked to rate the degree with which they agreed with each component of the program; responses ranged from 1 = strongly disagree to 5 = strongly agree.

Table 2. Teacher survey assessment of the quality of Brain Waves injury prevention program.

	Strongly disagree (% , n)	Disagree (% , n)	Neither Disagree or Agree (% , n)	Agree (% , n)	Strongly Agree (% , n)	Average Rating
The program was age appropriate	0.0 (0)	0.0 (0)	0.0 (0)	50.0 (5)	50.0 (5)	4.50 ± 0.53
The presentation was clear and easy to understand	0.0 (0)	0.0 (0)	0.0 (0)	40.0 (4)	60.0 (6)	4.60 ± 0.52
The presenters were knowledgeable	0.0 (0)	0.0 (0)	0.0 (0)	30.0 (3)	70.0 (7)	4.70 ± 0.48
The presenters were enthusiastic and engaging	0.0 (0)	0.0 (0)	0.0 (0)	20.0 (2)	80.0 (8)	4.80 ± 0.42
The length of time was appropriate for the student's attention span	0.0 (0)	10.0 (1)	10.0 (1)	40.0 (4)	40.0 (4)	4.10 ± 0.99
Overall rating of program	0.0 (0)	0.0 (0)	0.0 (0)	40.0 (4)	60.0 (6)	4.60 ± 0.52

Participants were asked to rate the degree with which they agreed with each component of the program; responses ranged from 1 = strongly disagree to 5 = strongly agree.

the community setting but also plant the seed of advocacy early on in a physician's training while encouraging future work in this avenue.

Over the past eleven years, the Ottawa's Brain Waves program has been successful in the recruitment of 636 medical students in delivering the curriculum to 9848 elementary school students. Since its initiation in 2007, the program has expanded considerably and currently offers the program in both official languages, English and French. Our data suggests that the distribution of English to French MSVs was approximately 4:1, reflecting the relative demand of the classrooms. Furthermore, MSV participants in first and second year were approximately equal in number. Prior assessment of the ThinkFirst curriculum effectiveness demonstrated a beneficial role of advocacy improving education and safety awareness in the community. A study conducted by Gresham and Zirkle assessed the impact of ThinkFirst program on the knowledge of 1st to 3rd grade children in San Diego in a 6-week intervention curriculum (13). Pre- and post-test results exhibited significantly improved knowledge in each grade level regarding brain and spinal cord. Safe behaviours to prevent traumatic injury and a reduction in self-reported, high-risk behaviours were also reported (13). Likewise, a Canadian study was conducted on teenagers and showed marked increase in students' knowledge of risk factors related to injury prevention (14). These preliminary findings suggest that school-based advocacy programs offered by ThinkFirst may have an impact on prevention education (14). Nevertheless, future studies should aim at investigating whether this gain in knowledge also leads to subsequent reductions in injury.

Challenges of the Brain Waves Curriculum

Several challenges in recruitment from both the MSV and school board side were observed. There was a noticeable serial drop after 2012. The reason is multifactorial and can be accounted for by factors such as the school teachers job action in 2013 with reduction in school extracurricular activities, emergence of an advocacy community outreach program by post-graduate students at another university in Ottawa, and involvement of medical students with other volunteer opportunities that were not previously available through alternative community-based groups.

Lessons for Future Integration

Several valuable lessons can be applicable to future advocacy or

service learning programs aimed at school outreaches at the medical school level. First, the timing of the didactic period should be a major point of consideration. While many MSVs expressed that 1h was insufficient to deliver all the planned content, the teachers felt that beyond this timeframe, the students would be unable to maintain attention. Strategies may be incorporated to address this issue such as incorporation of multiple breaks, use of activity booklets for students to follow alongside verbal lessons, distilling lessons to main points and saving questions for the end of the presentation.

Second, incorporation of activity-based learning can be successful with an emphasis on the students being an active participant of the pedagogical experience. This can entail group-oriented discussion, blackboard writing, models and demonstrations. Such a strategy also accounts for learning and shared experience for individuals who are ESL learners. Moreover, activity booklets given at the start of a presentation can augment the experience of the outreach session. Benefits of activity workbooks include increasing the engagement of school children, stimulating questions based on material presented in booklet and enabling students to remember the lesson and also have something tangible to take home to show their parents. Nevertheless, one should also be mindful that the use of activity booklets may also serve as a distraction and potentially prolonging the timing of the session.

Lastly, recruitment of schools is another challenge especially during the initiation phase of a program. This may be addressed by recruitment of schools from alternative boards within the same city and initiating the process of recruitment early (i.e., in the Spring). These lessons have implications for future service learning and advocacy programs at the medical level aimed at establishing partnerships with community schools.

In the upcoming 2018 cycle, the Brain Waves program has been incorporated into the Community Service Learning (CSL) curriculum with three incoming first year students taking part in the program as site coordinators. The CSL program at the University of Ottawa is an academic and experiential program where students contribute to 30 hours of community outreach and engagement through approved service placements. The added support from students through a Faculty recognized program not only improves recruitment efforts but also encourages communication with teachers and students, prob-

lem solving within a team environment and advocacy of injury prevention and awareness among the broader community.

Study Limitations

One limitation present in this study is that all data collected was limited to a local sampling of schools in the Ottawa region. Thus, the generalizability of the results is uncertain in other cities. Moreover, the questionnaires gathered are in a limited time frame of 2 years, which does not adequately reflect the changing nature of the program due to expansion and refinement. Another limitation is logistical, as the MSVs can only leave after their scheduled medical school classes which typically end at noon, and commute to the elementary school to be done by the time the school ends. As such, the elementary schools cannot be located too far away from the medical school, especially if the MSVs do not have a car and need to take public transport. Lastly, it would be beneficial for future studies to incorporate a reflection of the survey from medical students and their feelings on how this has enriched their thoughts on advocacy and their pre- and post- attitudes towards advocacy and injury prevention.

CONCLUSION

In conclusion, current and future physicians play a vital role in the education and prevention of injury. Brain Waves is both a fun and didactic initiative that reaches out to the community to educate children and their teachers regarding the importance of the brain, what happens when head injuries occur, and how to prevent this from happening by thinking first and wearing a properly fitted helmet. Through engagement in the program MSVs learned many useful skills including raising awareness on injury prevention, simplifying the complexity of the brain in words that are appropriate for a younger audience, adapting to the needs of the classroom, which ultimately enables them to be engaged in the community, and sparking their curiosity and interest in future advocacy-related work.

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REFERENCES

1. Volpe R, Lewko J, Batra A. A compendium of evidence-based best practices in prevention of neurotrauma. Toronto, Ontario: University of Toronto Press; 2002. 223–6.
2. Tuchfarber B, Garcia VF, Zins J. Injuries, Unintentional, Adolescence. In Encyclopedia of Primary Prevention and Health Promotion. Springer US; 2003.

3. Yanchar NL, Warda LJ, Fuselli P. Child and youth injury prevention: A public health approach. *Paediatr Child Health*. 2012 Nov;17(9):511-2.
4. Vassilyadi M, Duquette C, Shamji MF, Orders S, Dagenais S. Evaluation of ThinkFirst for kids injury prevention curriculum for grades 7/8. *Can J Neurol Sci*. 2009 Nov;36(6):761-8
5. Canadian Medical Association. The role of physicians in prevention and health promotion. *Can Med Assoc J*. 1995;153:208A-208D.
6. Dharamsi S, Richards M, Louie D, Murray D, Berland A, Whitfield M, et al. Enhancing medical students' conceptions of the CanMEDS Health Advocate Role through international service-learning and critical reflection: A phenomenological study. *Med Teach*. 2010;32(12):977-82.
7. Yoshii I, Sayegh R, Lotfipour S, Vaca FE. Need for injury-prevention education in medical school curriculum. *West J Emerg Med*. 2010 Feb;11(1):40-3.
8. Dobson S, Voyer S, Regehr G. Perspective: agency and activism: rethinking health advocacy in the medical profession. *Acad Med*. 2012 Sep;87(9):1161-4.
9. Earnest MA, Wong SL, Federico SG. Perspective: physician advocacy: what is it and how do we do it?. *Acad Med*. 2010 Jan;85(1):63-7.
10. Lévêque B, Baudier F, Janvrin MP. The contribution of physicians to childhood injury prevention in France. *Injury Prevention. Inj Prev*. 1995 Sep;1(3):155-8.
11. Leveridge M, Beiko D, Wilson JW, Siemens DR. Health advocacy training in urology: a Canadian survey on attitudes and experience in residency. *Can Urol Assoc J*. 2007 Nov;1(4):363-9.
12. Stafford S, Sedlak T, Fok MC, Wong RY. Evaluation of resident attitudes and self-reported competencies in health advocacy. *BMC Med Educ*. 2010 Nov 18;10:82.
13. Gresham LS, Zirkle DL, Tolchin S, Jones C, Maroufi A, Miranda J. Partnering for injury prevention: evaluation of a curriculum-based intervention program among elementary school children. *J Pediatr Nurs*. 2001 Apr;16(2):79-87.
14. Wesner ML. An evaluation of Think First Saskatchewan: a head and spinal cord injury prevention program. *Can J Public Health*. 2003 Mar-Apr;94(2):115-20.