Physical Activity Counseling in Children and Adolescents with Chronic Headaches

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Abstract

Background: The goal of this study is to explore the impact of physical activity counseling on the baseline activity and quality of life of children and adolescents with chronic headaches.

Hypothesis: We hypothesize that the physical activity counseling program will result in reduced headache-related disability in children and adolescents, and that encouraging increased daily activity will not increase headache symptoms.

Method: Children and adolescents experiencing chronic headaches, between the ages of 8 to 17 years, were approached through their neurologist. After baseline assessments were complete, participants were randomly assigned to either standard care or care + physical activity counseling. All participants repeated the study assessments 10 to 15 weeks after the baseline visit.

Methodology

Recruitment
Eligible participants were identified by neurologists from CHEO. The doctors introduce the study to patients and families. If the family wishes to speak to a researcher, the researcher would provide details of the study and obtain a written informed consent.

Baseline Activity Measurement
All participants were asked to wear a pedometer for 7 days and record the number of steps daily. The average steps per day was used in the data analysis.

Quality of Life
Health-related quality of life was assessed with Pediatric Quality of Life Inventory. The survey consists of 4 scales that measure physical, emotional, social and school functioning in children. The Total Scale Score, which is the mean computed as the sum of all the items over the number of items answers on all 4 scales, was used for data analysis[2].

PedMIDAS
PedMIDAS questions assess the impact of headache on school performance, disability at home and social/sport function. The total score was then converted to a migraine disability grade[1] (Table 2).

Counseling Intervention
The interventional group participants had one on one meetings with a physical activity counselor. The sessions focused on physical activity goal setting, identifying barriers to physical activities and cognitive restructuring.

Data Analysis
The average daily pedometer score and were expressed as mean standard deviation. The relationships between different variables were assessed using unpaired T-test. A P-value of < 0.05 was considered statistically significant.

PedMIDAS Score Range	Disability Grade	Females	Males	Average Steps
0 to 10	Little to none	1	1	6183.50 ± 3144.50
11 to 30	Mild	8	3	7439.27 ± 2572.43
31 to 50	Moderate	4	2	5543.20 ± 3364.367
> 50	Severe	2	1	3248.67 ± 702.252

Table 1

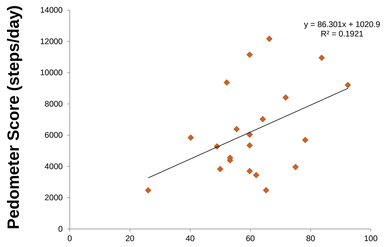

Chart 1. Pedometer Average Steps vs. PedsQL QoL Score in Females

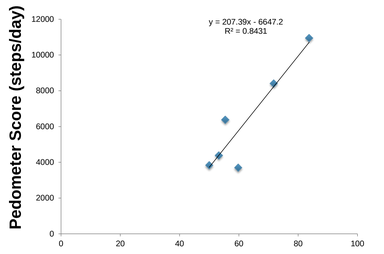

Chart 2. Pedometer Average Steps vs. PedsQL QoL Score in Males

Chart 1& 2: Pearson Correlation showed a significant correlation between baseline activity, measured by a pedometer and the quality of life, which was assessed with the PedsQL questionnaire (r= 0.438, P= 0.047, n= 21).
There was no correlation between gender and baseline activity. Both genders reported similar baseline activity levels (r= -0.002, P= 0.994, n=21).

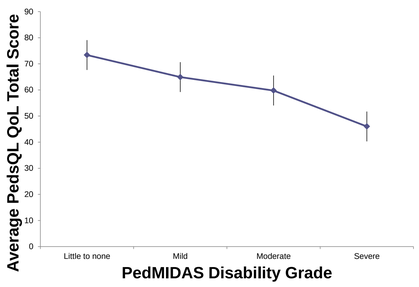

Chart 3. Average Child PedsQL QoL Total Score vs. PedMIDAS Disability Grade

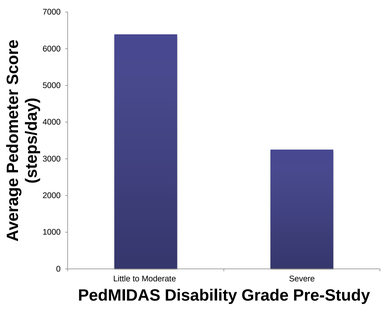

Chart 4. Average Steps in Children with Little to Moderate vs. Severe Headache Disability

Chart 4: Unpaired T-test comparing average steps between children with a PedMIDAS disability grade of severe vs. little to mild was performed. No significant difference in step count was observed, however, a partial eta squared of > 0.170 suggests that with larger number of participants, there may be a significant relationship (r^2= 0.198, p= 0.070, ηp^2= 0.180, N= 3). A mean of 3248.67 ± 702.252 steps/day was calculated for children with a PedMIDAS disability grade of severe compared to a mean of 6388.657 ± 3027.10 steps/day.

Chart 5: Unpaired T-test compared the mean difference in study scores in control vs. counseling group. The mean difference in scores were calculated by subtracting the pre-study score from the post-study score. The scores from PedMIDAS, PedsQL QoL child and parent questionnaires were used in the comparison. No significant difference was found (p= 0.214, p=0.430, p= 0.072 respectively). However, the counseling group subjects had better outcome which was indicated by higher PedsQL and lower PedMIDAS post-test scores.

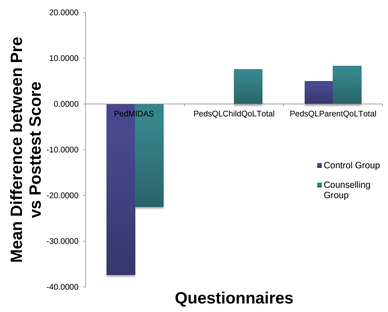

Chart 5. Comparison of Mean Difference in Pre vs Post-test Scores

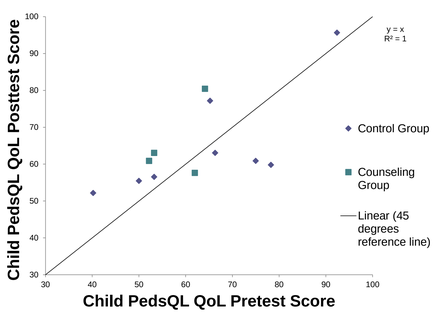

Chart 6. Child PedsQL QoL Pre vs Post-test Score

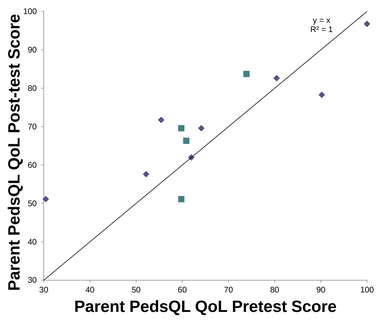

Chart 7. Parent PedsQL QoL Pre vs Post-test Score

Chart 6&7: The reference line represents x=y, where the pre-test score is equal to post-test score.75% of participants in the counseling group showed improved post-test quality of life scores in both the parent and child reports. Changes were more diverse in the control group.

Results

Baseline activity and quality of life (Pretest)
- Significant correlation between average step count and the quality of life.
- Both females and males showed a significantly increased quality of life as their step count increases (Chart1&2).

Quality of Life and PedMIDAS disability Grade (Pretest)
- No significant correlation between the PedsQL total score and the PedMIDAS disability grade.
- A trend was observed such that the higher the headache disability grade, the lower the PedsQL total score, which suggests lower quality of life in children with more severe headaches (Chart 3).

Comparing Mean Difference in Test Scores (Pre vs. Post-test)
- The mean difference in study scores from PedMIDAS, PedsQL QoL Child report and PedsQL QoL parent report were compared (Chart 5).
- Unpaired T-test showed no significant difference in the test scores in the control vs. counseling group due to small sample size (Chart 5).
- However, all the tests had shown a trend in improved test score with counseling intervention, which suggest counseling may help improve the quality of life and reduce headache disability (Chart 5).
- No significant changes in post-test scores were seen compared to the pretest scores. There was a trend that a high percentage of participants in the counseling group (75%) had higher post-test score compared to the control group (diverse changes), which suggested that counseling may improve quality of life (Chart 6&7).

Discussion

- Overall, children and adolescents with chronic headache are less active compared to the general population. The national average was 11,350 daily steps[3]. In comparison, children with chronic headache in this study has an average of 6269 daily steps (Table 1)

- Improved physical activity level significantly correlates to better quality of life in children and adolescents.

- Headache disability was not significantly correlated with the participants' step count. However, the p value was relatively close to 0.05 and a partial eta squared value of 0.180 indicate that the correlation could potentially be significant if a larger sample size was considered.

- Although the group received counseling intervention showed no significant improvement in test score, a trend was observed such that counseling reduces headache disability and improve quality of life. A larger sample size is required to observe small changes in the score.

Conclusions

- Limitations: pilot study, small sample size, not statistically significant.

- Further analysis evaluating the effect of exercise counseling will be performed once all the post-study questionnaire results are obtained.

- In the future, hopefully a larger study can be conducted and the impact of exercise counseling can be further evaluated. The ultimate goal is to look into the possibility of integrating exercise counseling into the healthcare system as an alternative approach to pharmacotherapy in the management of chronic headache in children and adolescents.

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