



## AGILITY EXERCISE PROGRAM FOR SCHOOL EMERGENCY STUDENT-RESPONDERS' TEAM

Niño G. Acebo<sup>1</sup>

Joel A. Alfarero<sup>2i</sup>

<sup>1</sup>San Jose National High School,  
Division of Tacloban City,  
Department of Education,  
Tacloban City, Philippines

<sup>2</sup>Laboratory School Department,  
College of Education,  
Eastern Visayas State University,  
Tacloban City, Philippines

### Abstract:

This study assessed the effectiveness of the four-week agility exercise program for emergency student-responders. It employed a quasi-experimental with a single group where pretest and posttest results are paired. Twenty-nine participated in the study grouped to 19 male and 10 female student-responders. Hexagon agility test was used to assess the agility level of the research participants before (pretest) and after (posttest) participating in the exercise program. The student-participants underwent a 4-week agility exercise program to develop their agility using plyometric exercises. Findings revealed a significant difference between the pre-test and post-test agility levels among the research participants. These findings led to the conclusion that the agility exercise program improved the agility level of emergency student-responders and is recommended for the implementation for all members' emergency responding team and to the students in general.

**Keywords:** agility, hexagon agility test, exercise program, emergency student-responders, t-test of correlated samples

### 1. Introduction

The demand to be physically fit is essential to a person in times of emergencies and disasters. Physical fitness is the ability of every individual to fulfill the responsibility of work and still to have extra time and energy to do leisure activities and from unexpected emergencies (Pate, 2012). Physical fitness can be achieved through

---

<sup>i</sup> Correspondence: email [joel.alfarero@evsu.edu.ph](mailto:joel.alfarero@evsu.edu.ph)

participation in different physical activities. Individuals are encouraged to engage in any physical activity to develop physical fitness. By participating in physical activities, games, and sports, one can develop life skills and values of physical fitness and social responsibility (Alfarero and Mejarito, 2014). These skills are essential for a person to become an emergency responder.

An emergency like disasters may happen anytime, anywhere and to anyone. The Philippines is within the global region which experiences the highest frequency of tropical cyclones due to its geographical location (DOST - PAGASA, 2019). People must always be prepared for whatever disaster or any emergency may occur (Abocejo and Gubalane, 2013). The Republic Act (RA) 10121 of 2010 mandates all government agencies to form a “*Disaster Risk Reduction and Management (DRRM)*” team from national down to local levels. In response, the “*Department of Education (DepEd)*” of the Philippines issued an order to organize “*School Disaster Risk Reduction and Management Team*” composed of teachers and students as members of the emergency response team (DepEd Order No. 21, 2015).

The school emergency response team has a significant role to play in emergencies. Schools need to establish and maintain an active emergency management committee that would help preparing the school community (Fernandez and Abocejo, 2014) and mitigate the occurrence of accidents and hazards (International Finance Corporation, 2010). The San Jose National High School is one of the secondary schools with large students' population in Tacloban City, Philippines. The school is situated near a bay. The school was severely affected by super typhoon Haiyan in 2013 with the entire city of Tacloban and nearby municipalities (Almazan et al., 2018) affecting not only the students but all the school stakeholders (Inabangan, Garcia and Abocejo, 2019), including the elderly and vulnerable population groups (Alvarez, Ong and Abocejo, 2017). The school has a disaster risk reduction team which gives the first response in any school emergency. The team has student-responders who are trained and responsible for maintaining the school's safety towards unpredicted accidents. This paper argues that assessing the effectiveness of the agility fitness of student-responders will enable them to be physically fit, at the same time, respond emergencies situation quickly thus saving more lives at threat.

### **1.1 Study Objectives**

The study assessed the effectiveness of the four-week agility exercise program for emergency student-responders. It endeavored to answer the following questions: (1) Is there a significant difference between the pretest and posttest agility level of student-responders? (2) Is the four-week agility exercise program effective to the student-responders? The study tested the null hypothesis of no significant difference between the pre-test and the post-test agility level among the school emergency student-responders.

## 2. Literature Review

Responders need to have a high level of agility fitness for one to be quick in responding emergencies. Agility is to change ones' direction quickly and rapidly (Sheppard and Young, 2006). Plyometric training improves the agility level of athletes (Lim, Wee, Chan and Ler, 2012; Thomas, French and Hayes, 2009; Miller, Herniman, Ricard, Cheatham and Michael, 2006). Plyometric training is an exercise created in order for an individual to develop fast and powerful movements and to improve neuromuscular activity in order to maximize sports performance (Potteiger, 2011).

Plyometric training enhances the level of agility among individuals. Studies revealed that plyometric exercises and drills develop power and agility among basketball players (Asadi, 2013) as well as depth jump and countermovement jump among football players (Thomas, French and Hayes, 2009). An individual need to be exposed to plyometric training for a longer period to have remarkable effects to have an improve sports performance (Vácz, Tollár, Meszler, Juhász and Karsai, 2013).

Improvement of neuromuscular functions was supported in the study of Motte, Lisman, Gribbin, Murphy and Deuster (2017) stressing that there is a lack of evidence of agility being related to musculoskeletal injury risk. Further, agility is associated with weight where children with normal weight perform better in terms of agility than obese ones (Delextrat et al., 2019).

There is a variety of tests to assess the agility level of an individual. The "*Edgren Side Step (ESST)*", T-test, and the Illinois Agility Test (IAT) were tests that assess agility level of high mobility in different planes (Raya et al., 2013). The hexagon test for agility is another tool to assess agility level of individual. The hexagon agility test showed excellent reliability and is easy to administer (Beekhuizen, Davis and Cheng, 2009). In this study, the hexagonal agility test was adapted for it is the test recommended by the DepEd for basic education in the Philippine context.

Emergency response team is necessary in every school (Winn, 2016). This team is also a crisis response group trained to help during emergencies. Each school needs to create and sustain a "*School Disaster Management Committee*" which is tasked of making the school disaster management plan (International Finance Corporation, 2010). The creation of the Disaster Management committee encourages safety and mitigation of hazards both for personal and organization consumption.

Republic Act (RA) 10121 known as the "*Philippine Disaster Risk Reduction and Management Act of 2010*" mandated all government agencies for the creation of DRRM at all levels of government bureaucracy. The DepEd then passed its Office Order No. 37, s. 2015 through the "*Comprehensive Disaster Risk Reduction and Management (DRRM) in Education Framework*" mandated that the DepEd and other education partners need to implement DRRM programs, projects and activities which target education in the context of resilience building and basic education sustainability (Abocejo and Padua, 2010). The DepEd order also added the Comprehensive DRRM in "*Basic Education Framework*" which is guided by the Department's key strategic thrusts and the National DRRM framework. The education interventions on DRRM should be aligned with the

three (3) education outcomes and the four (4) DRRM thematic areas namely: *“Prevention and mitigation, Preparedness, Response, and Recovery and Rehabilitation”*. This is to maintain learner-centered (Rodriguez and Abocejo, 2018), rights-based implementation at all levels of basic education leadership (Jolejole-Caube, Dumlao and Abocejo, 2019) and higher education institution (Cuñado and Abocejo, 2018; Trazo and Abocejo, 2019) management.

The DepEd Order No. 21, s. 2015 known as the *“Disaster Risk Reduction and Management Coordination and Information Management Protocol”* mentioned the roles and responsibilities of School DRRM Coordinator which is also one of the members of the Emergency Responders Team (ERT). Among its responsibilities is to *“spearhead the conduct of multi-hazard drills and other disaster prevention, mitigation and preparedness activities in school”*, which cannot be possible without the help of the other members of ERT which include the teachers and the student-responders.

### **3. Materials and Methods**

The quasi-experimental with a single group undergoing pretest and posttest was used as the research design. This study follows the quasi-experimental design since it lacked some control like randomness of the participants (SAGE Publications, 2019). The respondents of the study were the members of the school emergency student-responders team. There were 29 student-responders ages 13-17 who participated in the study.

The study was conducted in San Jose National High School, Tacloban City, Philippines. The hexagon test of agility by Wood (2008) was used to assess the agility level of student-responders. It was administered to student-responders before and after the implementation of the program. The researchers asked permission from the School Principal and the School Disaster Risk Reduction Coordinator.

Upon the approval, the researchers administered the Physical Activity Readiness Questionnaire (PAR-Q) and asked for the parental consent of the respondents. The conduct of the pre-test was executed through the hexagon agility test in getting the agility level and the survey-questionnaire on the profile to student-responders.

The researcher-designed agility exercise program was used to enhance the agility level of student-responders. After the program was implemented, the hexagon test of agility was again administered to the student-responders as the post-test.

#### **3.1 The exercise program**

The four-week agility exercise program was made by researchers guided by the principles of exercise: overload, progression, specificity, recuperation, and reversibility (Powers, Dood and Noland, 2006). Some activities in the exercise program were patterned from the workout framework of Quinn (2018).

**Table 1:** The exercise program progression

Week	Frequency	Intensity	Time
Week 1	1 per week	Light	45 minutes
Week 2	2 per week	Moderate	75 minutes per session
Week 3	3 per week	Vigorous	75 minutes per session
Week 4	4 per week	Vigorous	90 minutes per session

Activities are composed of plyometric exercises. Components of the exercise prescription were taken into consideration to include elements of warm-up, workout proper, and cool-down (Powers, et al., 2006). The dynamic warm-up drills include quad walks, deep lunges, side lunges, Frankenstein movements, windmill movement, butt kicks, and high knee movements.

The main activity includes dot drills, speed ladder agility drills, forward and backward sprint, truck jumps, and shuttle runs. The cooling down activity include static stretching. The exercise program was validated by physical education teachers in a State University.

Frequency and the duration of the exercise were done progressively for 4 weeks. The exercise was done once in the week for 45 minutes. For week 2, it was done two times weekly lasting 60 minutes per session. For week 3, the exercise was done 3 times with 75 minutes for each session. For week 4, the exercise was done 4 times with 75 minutes per session. The intensity of the exercise program varied weekly. Light exercises were done for in week one. Moderate exercises for week two. Vigorous exercises were done for the third and fourth week.

The effectiveness of the 4-week agility exercise program was analyzed using a paired-sample t-test where it determined the mean gain of agility levels from the pre- to the post-test. T-test of correlated samples is the fitted test to assess if there was statistically significant improvement attained on the generated data (Jankowski, Flannelly and Flannelly, 2018).

#### 4. Results and Discussion

Table 1 displays the mean agility level of student-responders. The findings revealed that the agility levels of student-responders improved for each week from the pre-test results. The student-responders can do the set of tasks in a shorter possible time compared to the previous weeks. The mean agility level of the student-responders between pretest and posttest decreased relative to the time to finish the activity, implying that students can finish the given task in a shorter possible time. Further, there is a decrease in the SD from week 1 to week 4. It means that majority of the students have good agility level. This also indicated that there is an improvement in the agility level of the student-responders after the participation of the exercise program.

**Table 2:** Pre-test and post-test agility results per week (in seconds)

Test and Week	Mean	SD
Pre-Test	21.99	2.64
Week 1	21.47	2.39
Week 2	20.71	2.09
Week 3	19.57	1.82
Week 4 (post-test)	18.89	1.85

Table 3 shows that the difference in the pretest and posttest agility results is significant with a p-value of 0.000 lower than 0.05 alpha level. It shows a significant difference between pretest and posttest results of Hexagon Agility Test of the school emergency student-responders; thus, the null hypothesis is rejected. Furthermore, it is implied that the agility exercise program implemented is effective.

**Table 3:** Pre-test and post-test agility result of emergency student-responders

Test	Mean	SD	T-value	P-Value
Pre-test	21.99	2.64	6.913**	0.000
Post-test	18.89	1.85		

\*\* - highly significant at the level of significance  $\alpha < 0.01$

This finding confirms with the previously published works of Lim et al. (2012), Thomas et al. (2009) and Miller et al. (2006), which revealed that plyometric training improves agility level of athletes. In essence, the four-week agility exercise program can be adopted for the agility level enhancement of other students or individuals.

## 5. Conclusion and Recommendations

The study assessed the effectiveness of the four-week agility exercise program for emergency student-responders. The results of the pretest and posttest results using Hexagon Agility Test revealed a significant difference in the agility level of student-responders. The agility level of student-responders increased after participating in the exercise program. The four-week agility exercise program is a useful program for student-responders. Therefore, continuous participation in the exercise program would level up fitness level among all member of the emergency response team where the student-responders in particular. It is highly recommended that the agility exercises may be used by the students in general to improve their agility fitness level.

### About the Authors

**Niño G. Acebo** is affiliated with the Department of Education (DepEd), Tacloban City Division, Tacloban City, Philippines. He is the Head Teacher of the Physical Education Department at the Cirilo Roy Montejó National High School, also in Tacloban City. He completed his academic requirements for Master in Physical Education at Leyte Normal University (LNU), Tacloban City. His research interests are in the areas of Physical education and fitness program studies.

**Joel A. Alfarero** is a faculty at the Eastern Visayas State University, Tacloban City, Philippines. He handles Professional and Physical Education courses. He obtained his Master of Arts in Education in the University of Visayas, Cebu City. He is currently finishing his Doctor in Education Program in the same university. His researches are focused on physical education studies with emphasis on qualitative approaches and qualitative research methodologies.

## References

- Abocejo, F. T., & Gubalane, F. K. (2013). Implementation of the human anti trafficking law in Cebu City, Central Philippines. *International Forum*. 16(1), 36-48. Retrieved from <https://internationalforum.aiias.edu/images/vol16no01/article3-abocejo&gubalane.pdf>
- Abocejo, F. T., & Padua, R. N. (2010). An econometric model for determining sustainability of basic education development. *CNU Journal of Higher Education*. 4(1), 40-53. Retrieved from <http://www.jhe.cnu.edu.ph/index.php/cnujhe/article/view/39>
- Alfarero, J. A., & Mejarito, C. L. (2014). Traditional games in Leyte and the values learned by the players. *University of the Visayas-Journal of Research*, 8(1), 269-280. doi: 10.5281/zenodo.2139926
- Almazan, J. U., Cruz, J.P., Alamri, S.M., Alotaibi-Monahi, S.J., Albougami, A. S. B., Gravoso, R., Abocejo, F.T., Allen, K., Bishwajit, G. (2018). Predicting patterns of disaster-related resiliency among older adult typhoon Haiyan survivors. *Geriatric Nursing*. 39(6), 629-634. doi: 10.1016/j.gerinurse.2018.04.015
- Alvarez, I. C. C., Ong, M. B., Abocejo, F. T. (2017). Learning needs and quality care among family caregivers and elderly patients of Guadalupe, Cebu City, Central Philippines. *European Scientific Journal*. 13(24), 356-376. doi: 10.19044/esj.2017.v13n24p356.
- Asadi, A. (2013). Effects of in-season short-term plyometric training on jumping and agility performance of basketball players. *Sport Sciences for Health*, 9(3), 133-137. DOI: 10.1007/s11332-013-0159-4.
- Beekhuizen, K. S., Davis, M. D., Kolber, M. J., & Cheng, M. S. S. (2009). Test-retest reliability and minimal detectable change of the hexagon agility test. *The Journal of Strength & Conditioning Research*, 23(7), 2167-2171. doi: 10.1519/JSC.0b013e3181b439f0.
- Cuñado, A. G., & Abocejo, F. T. (2018). Lesson planning competency of English major university sophomore students. *European Journal of Education Studies*. 5(8), 395-409. doi: 10.5281/zenodo.2538422
- Delextrat, A., Hayes, L. D., Ghannami, S. S., Min, Y., Izzeldin Hussein, H. A., Cohen, D. D., & Ghebremeskel, K. (2019). Physical fitness characteristics of Omani primary school children according to body mass index. *The Journal of Sports Medicine and Physical Fitness*, 59(3), 440-8. doi:10.23736/S0022-4707.18.08136-7

- DepEd Order No. 37 (2015). *The Comprehensive and Management (DRRM) in Education Framework*. Retrieved from <http://www.deped.gov.ph/2015/08/12/do-37-s-2015-the-comprehensive-disaster-risk-reduction-and-management-drrm-in-basic-education-framework/>
- DepEd Order No. 21. (2015). *Disaster risk reduction and management coordination and information management protocol*. Retrieved from <http://www.deped.gov.ph/2015/06/01/do-21-s-2015-disaster-risk-reduction-and-management-coordination-and-information-management-protocol/>
- DOST-PAGASA. (2019). *About tropical cyclones*. Retrieved from <http://bagong.pagasa.dost.gov.ph/information/about-tropical-cyclone>
- Fernandez, R. C. C., & Abocejo, F. T. (2014). Child labor, poverty and school attendance: Evidences from the Philippines by region. *CNU Journal of Higher Education*. 8(1), 114-127. Retrieved from <http://www.jhe.cnu.edu.ph/index.php/cnunjhe/article/view/151>
- Inabangan, A. K.A., Garcia, L. L., & Abocejo, F. T. (2019). Evaluation of the Philippine expanded senior citizens Act (RA 9994) on mandated privileges for the elderly. *European Academic Research*. 6(10), 6112-6138. Retrieved from <http://www.euacademic.org/UploadArticle/3859.pdf>
- International Finance Corporation (2010). *Disaster and emergency preparedness: Guidance for schools*. World Bank Group. <https://www.ifc.org/wps/wcm/connect/8b796b004970c0199a7ada336b93d75f/DisERHandbook.pdf?MOD=AJPERES>
- Jankowski, K. R., Flannelly, K. J., & Flannelly, L. T. (2018). The t-test: An influential inferential tool in chaplaincy and other healthcare research. *Journal of Health Care Chaplaincy*, 24(1), 30-39. doi:10.1080/08854726.2017.1335050
- Jolejole-Caube, C., Dumlao, A. B., & Abocejo, F. T. (2019). Anxiety Towards Mathematics and Mathematics Performance of Grade 7 Learners. *European Journal of Education Studies*. 6(1), 334-360 doi: 10.5281/zenodo.2694050
- Lim, J. H., Wee, E. H., Chan, K. Q., & Ler, H. Y. (2012). Effect of plyometric training on the agility of students enrolled in required college badminton programme. *International Journal of Applied Sports Sciences*, 24(1), 18-24. doi: 10.24985/ijass.2012.24.1.18
- Miller, M., Herniman, J., Ricard, M., Cheatham, C., & Michael, T. (2006). The effects of a 6-week plyometric training program on agility. *Journal of Sports Science & Medicine*, 5(3), 459-65. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3842147/>
- Motte, S. D., Lisman, P., Gribbin, T., Murphy, K., & Deuster, P. (2017). A systematic review of the association between physical fitness and musculoskeletal injury risk: Part 3 – Flexibility, Power, Speed, Balance, and Agility. *Journal of Strength and Conditioning Research*. doi:10.1519/JSC.0000000000002382
- Pate, R. R. (2012). The evolving definition of physical fitness. *Journal Quest*, 40 (3), 174-179. doi: [10.1080/00336297.1988.10483898](https://doi.org/10.1080/00336297.1988.10483898)
- Potteiger, J. A. (2011). *ACSM's Introduction to exercise science*. Philadelphia: Lippincott Williams & Wilkins.



- Powers, S. K., Dood, S. L., & Noland, V. J. (2006). *Total Fitness and Wellness* (4th ed.). San Francisco: Pearson Benjamin Cummings.
- Quinn, E. (2018). *Best agility exercises for athletes*. Retrieved from <https://www.verywellfit.com/best-agility-drills-for-athletes-3120599>
- Raya, M. A., Gailey, R. S., Gaunaurd, I. A., Jayne, D. M., Campbell, S. M., Gagne, E., ... & Tucker, C. (2013). Comparison of three agility tests with male servicemembers: Edgren Side Step Test, T-Test, and Illinois Agility Test. *Journal of Rehabilitation Research & Development*, 50(7), 951-60. doi: 10.1682/JRRD.2012.05.0096
- Republic Act 10121. (2010). *An act strengthening the Philippine Disaster Risk Reduction and Management System, providing for the National Disaster Risk Reduction and Management Framework and institutionalizing the National Disaster Risk Reduction and Management Plan, appropriating funds therefor and for other purposes*. Retrieved from [http://www.ndrrmc.gov.ph/attachments/article/45/Republic\\_Act\\_10121.pdf](http://www.ndrrmc.gov.ph/attachments/article/45/Republic_Act_10121.pdf)
- Rodriguez, K. F. R., & Abocejo, F. T. (2018). Competence vis-à-vis performance of special education pre-service teachers. *European Academic Research*. 6(7), 3474-3498. Retrieved from <http://www.euacademic.org/UploadArticle/3707.pdf>
- SAGE Publications (2019). *Quasi-experimental and single-case experimental designs*. Retrieved from [https://us.sagepub.com/sites/default/files/upm-binaries/89876\\_Chapter\\_13\\_Quasi\\_Experimental\\_and\\_Single\\_Case\\_Designs.pdf](https://us.sagepub.com/sites/default/files/upm-binaries/89876_Chapter_13_Quasi_Experimental_and_Single_Case_Designs.pdf)
- Sheppard, J. M., & Young, W. B. (2006). Agility literature review: Classification, training and testing. *Journal of Sports Sciences*. 24(9), 919-932. doi: 10.1080/02640410500457109
- Thomas, K., French, D., & Hayes, P. (2009). The effect of two plyometric training techniques on muscular power and agility in youth soccer players. *The Journal of Strength & Conditioning Research*, 23(1), 332-335. doi: 10.1519/JSC.0b013e318183a01a
- Trazo, S. P., & Abocejo, F. T. (2019). International Phonetic Alphabet (IPA) front vowel sound recognition of beginner foreign learners. *European Journal of Education Studies*. 5(12), 183-196. doi: 10.5281/zenodo.2606194
- Vácz, M., Tollár, J., Mészler, B., Juhász, I., & Karsai, I. (2013). Short-term high intensity plyometric training program improves strength, power and agility in male soccer players. *Journal of Human Kinetics*, 36(1), 17-26. doi: 10.2478/hukin-2013-0002
- Winn, Z. (2016). *Campus Safety*. Retrieved from [https://www.campussafetymagazine.com/safety/a\\_path\\_to\\_developing\\_effective\\_incident\\_response\\_teams\\_at\\_your\\_school/](https://www.campussafetymagazine.com/safety/a_path_to_developing_effective_incident_response_teams_at_your_school/)
- Wood, R. (2008). *Hexagon Agility Test*. Retrieved from <http://www.topendsports.com/testing/hexagon.htm>

Creative Commons licensing terms

Authors will retain the copyright of their published articles agreeing that a Creative Commons Attribution 4.0 International License (CC BY 4.0) terms will be applied to their work. Under the terms of this license, no permission is required from the author(s) or publisher for members of the community to copy, distribute, transmit or adapt the article content, providing a proper, prominent and unambiguous attribution to the authors in a manner that makes clear that the materials are being reused under permission of a Creative Commons License. Views, opinions and conclusions expressed in this research article are views, opinions and conclusions of the author(s). Open Access Publishing Group and European Journal of Physical Education and Sport Science shall not be responsible or answerable for any loss, damage or liability caused in relation to/arising out of conflict of interests, copyright violations and inappropriate or inaccurate use of any kind content related or integrated on the research work. All the published works are meeting the Open Access Publishing requirements and can be freely accessed, shared, modified, distributed and used in educational, commercial and non-commercial purposes under a [Creative Commons attribution 4.0 International License \(CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/).