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**A JOURNAL DEVOTED TO DISCUSSION
AND INVESTIGATION IN THE HUMANITIES AND SCIENCES**

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SILLIMAN JOURNAL welcomes submission of scholarly papers, research studies, brief reports in all fields from both Philippine and foreign scholars, but papers must have some relevance to the Philippines, Asia, or the Pacific. All submissions are refereed.

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All articles must be accompanied by an abstract of 200 words and keywords of not more than ten words, and must use gender-fair language.

SILLIMAN JOURNAL likewise welcomes submissions of “Notes,” which generally are briefer and more tentative than full-length articles. Reports on work-in-progress, queries, updates, reports of impressions rather than research, responses to the works of others, even reminiscences are appropriate here.

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*"There may be people that have
more talent than you,
but there's no excuse for anyone to work
harder than you do."*
- **Derek Jeter**

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Editorial Notes

*"Most people never run far enough
on their first wind
to find out they've got a second."*
- **William James**

Welcome to the first issue of 2016, one in which majority of the studies are in sports science and exercise psychology.

First, Jon Cagas looks into after-school sports participation and the psychological needs fulfillment of high school students at Philippine schools. Results indicate relationships between after-school participation and students' needs fulfillment, autonomy support, and subjective well-being in physical education. The author suggests that special attention be given to those, therefore, who do not participate in afterschool sports and ensuring they then have positive experiences in physical education.

Next, John Paul Jalandoni and colleagues investigate football varsity athletes examining in particular the relationship between squat pattern and countermovement jump measures. The next full-length articles study injuries in novice male Jiu Jitsu practitioners (by Christian Wisdom M. Valleser), rater reliability of videotaped performance of the Movement Competency Screen-2 (MCS-2) by Inovero and others, deadlift training and core strength in previously-untrained males by Valleser and Santos, and female university basketball athletes eye-foot reaction time by Jeffrey Pagaduan. In the final full-length article, our colleagues at nutrition and dietetics look into the implementation of a nutrition program for pre-school children in Dumaguete City.

REVIEW SECTION

The lone review in this issue is by Monica Macasantos who examines Edilberto K. Tiempo's *To Be Free* with "Is There Only One Way To Be Free?"

ACKNOWLEDGMENTS

I wish to thank all contributors to this issue as well as our reviewers. Exercise and nutrition are oft-neglected topics in health research as well as in dimensions of wellness (i.e., in addition to physical, mental, spiritual, intellectual, and emotional wellness). While Oliver Wendell Holmes, Sr. (1891) had said "If you mean to keep as well as possible, the less you think about your health the better", Izaak Walton (1653) had earlier said, "Look to your health; and if you have it, praise God, and value it next to a good conscience; for health is the second blessing that we mortals are capable of; a blessing that money cannot buy."



Margaret Helen F. Udarbe
Editor

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Afterschool Sports Participation and Psychological Needs Fulfillment in Physical Education among Filipino High School Students

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Physical education (PE) has long been promoted as an important context to teach lifelong physical activity and other health-related behaviors among young people. However, some students may not be motivated to participate in physical education because of perceived lack of physical competence or sports experience. Research has shown that students who participate in afterschool sports are generally more motivated in PE compared with their nonsports participant peers. Knowledge on how afterschool sports participation is associated with motivation specifically psychological needs fulfillment in PE among Filipino students is limited. Hence, this study compared levels of basic needs fulfillment, perceived autonomy support, and subjective vitality in PE among students with different afterschool sports experiences. A total of 408 students (age: $M = 13.97$; $SD = 1.38$) studying in two public high schools in Metro Manila participated in this study. Results indicated that afterschool sports participation is associated with students' needs fulfillment, autonomy support, and subjective well-being in PE. Findings suggest that special attention should be given to students who do not participate in afterschool sports and ensure that they have positive experiences in physical education. Recommendations for practice based on self-determination framework are discussed.

Keywords: afterschool sports, basic needs, psychological needs, needs fulfillment, self-determination, motivation, physical education

INTRODUCTION

Regular sports participation during childhood and adolescence has been shown to have positive influences on the young persons' physical activity later in life (Telama, Yang, Hirvensalo, & Raitakari, 2006). It may reduce their risk of developing metabolic syndromes, and it equips them with skills that would help them cope with job pressures in the future (Yang et al., 2009). Youth participating in afterschool sports, or extracurricular sports activities, has also been found to have higher self-efficacy, prosocial behavior, and sense of responsibility (Carreras-Ponsoda, Carbonell, Cortell-Tormo, Fuster-Lloret, & Andreu-Cabrera, 2012).

Physical education (PE) plays an important role in promoting lifelong physical activity to young people (Bryan, Sims, Hester, & Dunaway, 2013), and this includes encouraging students to participate in afterschool sports. One of the aims of PE is to teach children and adolescents fundamental skills of various sports activities so that they may enjoy sports and physical activities in their free time (National Association for Sports and Physical Education, 2004). Research has shown that children who enjoy learning these various sports skills in PE are most likely to continue participating in sports even after school and when they become adults (Telama et al., 2006).

Previous studies indicated that students who participate in afterschool sports generally have higher motivation (Goudas, Dermitzaki, Bagiatis, 2001; Koka & Hein, 2003; Shen, 2012) and psychological needs satisfaction in PE than nonparticipants (Viira & Koka, 2012). According to self-determination theory (SDT: Deci & Ryan, 2000), these three basic psychological needs are the needs for competence, relatedness, and autonomy. Self-determination theory argues that these needs are innate to every individual; universal across gender, age, and culture; and essential nutriments for psychological growth and well-being (Ryan & Deci, 2002). A study by Cagas and Hassandra (2014) on the basic psychological needs in PE among Filipino high school students provided initial support for SDT's usefulness as a framework in understanding motivation in Filipino culture. A student's psychological needs in PE are fulfilled when he/she perceives that he/she is capable to do the activities in class (competence), senses that he/she has options and choices on which activities to perform (autonomy), and feels that he/she belongs and connects to his/her peers (relatedness).

Viira and Koka (2012) examined the differences in fulfillment of three

basic needs, perceived teacher-autonomy support, and other motivational constructs among Estonian students with and without afterschool sports experience. They found that boys who had afterschool sports experience reported higher levels of perceived autonomy support, competence needs, relatedness needs, and autonomy needs fulfillment than those who had no afterschool sports experience. Moreover, they also reported that girls who participate in afterschool sports reported higher levels of autonomy and competence needs fulfillment than their nonparticipant peers. Their results echoed earlier findings that afterschool physical activity participants experienced higher competence, relatedness, and autonomy needs fulfillment than nonparticipants (Coulter, Panayiotou, Patterson, Borchardt, & Shen, 2008; Ntoumanis, Barkoukis, & Thøgersen-Ntoumani, 2009).

Participation in regular physical activity is a health behavior which is associated with good physical and psychological well-being (Biddle & Mutrie, 2008). Despite PE's role in promoting lifelong physical activity participation, it is still considered a low-priority subject (Dwyer et al., 2003). In the Philippines, Filipino children and adolescents are becoming insufficiently active (FNRI-DOST, 2008), and this makes them 'at-risk' of developing lifestyle-related diseases during adulthood. Hence, research understanding Filipino students' motivation in PE and its correlates is timely. Results of such studies can provide knowledge base for interventions aimed at promoting sports and physical activity participation among young Filipinos.

The present study aimed to determine if levels of basic needs satisfaction, perceived autonomy support, and subjective vitality in PE are different among students with and without afterschool sports participation. Gender differences are also examined. Based on previous literature (e.g., Viira & Koka, 2012), the hypothesis is that students who participate in afterschool sports perceive their teacher to be more autonomy-supportive and experience higher needs fulfillment and subjective vitality in PE compared with their nonafterschool sports participant peers. In addition, boys will report higher needs fulfillment in PE than girls.

METHODOLOGY

Participants

Participants were 408 students (192 boys; 216 girls) from two public high schools in Metro Manila. Age ranged from 11 to 19 years ($M = 13.97$; $SD = 1.38$). All four year levels were represented adequately (27.2% in 1st year, 22.8% in 2nd, 24.8% in 3rd, and 25.2% in 4th year). Of these 408 students, only 137 (33.6%) reported to participate in afterschool sports. Out of this 137, 75 (54.70%) were boys, and 62 (45.30%) were girls. Frequency of participation was on average two times a week and for about 60 minutes per session.

Students listed a total of 29 different sports activities that they participate in. Basketball (29.9%), badminton (26.3%), and volleyball (20.4%) were the 3 most mentioned. For boys, the top 3 sports were basketball (52.0%), badminton (25.3%), and volleyball (14.7%). While for girls, the top 3 activities were volleyball, (27.4%), badminton (27.4%), and soccer (12.9%) or table tennis (12.9%).

Measures

All instruments were translated to conversational Filipino using a standard translation procedure. Validity and reliability of these translated instruments were reported in Cagas and Hassandra (2014).

Psychological Needs Fulfillment. The Filipino version of the Basic Psychological Needs in Physical Education scale (BPNPE: Vlachopoulos et al., 2011; Cagas & Hassandra, 2014) was used to measure students' level of needs fulfillment in PE. The original 12-item BPNPE scale was reduced to 10 items based on the study of Cagas and Hassandra (2014). The subscales are needs fulfillment for competence (4 items; $\alpha = .83$), relatedness (4 items; $\alpha = .76$), and autonomy (2 items; $\alpha = .64$).

Perceived Autonomy Support. This was measured using the abbreviated 6-item version of the Health Orientation Climate Questionnaire (Williams, Grow, Freedman, Ryan, & Deci, 1996) modified slightly to suit the PE context (Vlachopoulos et al., 2011). Internal consistency of this modified scale has been reported to range from 0.81 (Vlachopoulos, 2012) to 0.93 (Hagger et al., 2003). In this study, Cronbach's alpha coefficient of the scale was adequate at $\alpha = .76$.

Subjective Vitality. The 7-item Subjective Vitality Scale was also used in this study. It is designed as a proxy measure of well-being (Ryan & Frederick, 1997). Bostic, Rubio, and Hood (2000) suggested that deleting item 2 would increase the effectiveness of the scale hence it was not included in computing the composite score for vitality. Internal consistency reliability of this scale is more than acceptable at $\alpha = .88$.

Procedure

A letter requesting to conduct research study in public high schools was sent to the Department of Education Quezon City Division Office. After the permit was released, the author contacted the principals of 2 target institutions and requested the dates for data gathering.

At the day of data collection, the students were instructed to answer the questionnaire as honestly as they could. The respondents were also informed that their participation in the study was voluntary and that they may choose not to answer the questionnaires. They were instructed to return the questionnaires unmarked at the end of the period if they decided not to participate in the study.

To decrease the influence of social desirability, the PE teachers were requested to leave the room for the duration of the data collection. Students were also assured that the questionnaires would remain anonymous and in no way can be traced back to them. Upon submission of the completed instrument, the students were also asked to fold the questionnaire in half and to drop their papers in an unmarked box located near the exit. This ensures that even the researcher would not be able to identify the students who completed the survey. The students took 20 to 30 minutes to complete the questionnaire.

Data Analysis

Preliminary examination of descriptive statistics, alpha coefficients, and correlations among all variables was conducted to check initial reliability and validity of the instruments. A multivariate analysis of variance (MANOVA) was used to test possible group differences (i.e., with versus without afterschool sports participation) in all study variables. All assumptions for this multivariate test were met (e.g., sample size, normality, outliers).

RESULTS

Descriptive statistics and internal consistency reliability coefficients are presented in Table 1. Mean scores of all five variables were above the midpoint value of 4.0 (except autonomy need) implying that the students in general have positive experiences in their PE classes.

Table 1. Descriptive Statistics of 3 Needs Fulfillment, Perceived Autonomy Support, and Subjective Vitality.

Variable	N	Mean	SD	α	Skewness	Kurtosis
Competence Need (COM)	408	5.10	1.28	.83	-.79	.33
Relatedness Need (REL)	408	5.39	1.23	.76	-.72	-.18
Autonomy Need (AUT)	408	4.09	1.66	.64	-.13	-.88
Autonomy Support (PAS)	408	5.63	0.98	.76	-1.02	1.57
Subjective Vitality (VIT)	408	5.72	1.10	.88	-1.15	1.67

Note. PAS (6 items). COM (4 items). REL (4 items). AUT (2 items). VIT (6 items).

To determine which of the three basic needs was rated highest by the participants, a repeated measures ANOVA was conducted. Results showed that significant difference was observed among the three basic needs fulfillment, $F(2,406) = 146.50$, $p = 0.000$. Posthoc analyses indicated significant difference between REL and COM, $p = .000$, REL and AUT, $p = .000$, and between COM and AUT, $p = .000$.

Differences in Basic Needs, Perceived Autonomy Support, and Subjective Vitality

A one-way between groups multivariate analysis of variance (MANOVA) was conducted to determine differences in all 5 study variables. Assumptions of normality, linearity, and univariate outliers were satisfied. However, seven cases (1.72%) were detected as multivariate outliers with Mahalanobis distance values greater than $\chi^2(5) = 20.52$, $p = .001$. These outliers were removed from data set reducing the sample size to 401. The COM, REL, AUT, PAS, and VIT were entered as dependent variables and afterschool sports participation as independent variable.

Table 2. Descriptive Statistics of All 5 Study Variables by Afterschool Sports Participation in Boys (n = 188) and Girls (n = 213)

Overall With (n = 136) Without (n = 265)								
	M	SD	M	SD	M	SD	F	η^2
COM	5.10	1.28	5.32	1.20	5.02	1.26	*5.03	.012
Boys			5.41	1.19	4.99	1.19	5.49	.029
Girls			5.21	1.21	5.05	1.31	.69	.003
REL	5.40	1.22	5.39	1.26	5.40	1.20	.01	.000
Boys			5.34	1.37	5.34	1.18	.00	.000
Girls			5.46	1.13	5.45	1.22	.00	.000
AUT	4.09	1.66	4.31	1.67	3.99	1.63	3.38	.008
Boys			4.34	1.77	4.02	1.66	1.53	.008
Girls			4.28	1.54	3.97	1.61	1.67	.008
PAS	5.65	.93	5.78	.85	5.58	.96	*3.84	.010
Boys			5.71	.95	5.45	1.02	3.13	.017
Girls			5.85	.71	5.68	.91	1.65	.008
VIT	5.74	1.06	5.62	1.12	5.97	.89	***10.57	.026
Boys			5.93	.88	5.66	1.16	3.04	.016
Girls			6.02	.90	5.58	1.09	**7.86	.036

Note. N = 401. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Results showed statistical difference between groups on the combined dependent variables, $F(5,395) = 4.12$, $p = .001$, $\Lambda = .95$, $\eta^2 = .05$. Separate univariate analysis of variance showed that significant differences were observed in COM, $F(1,399) = 5.03$, $p < .05$, $\eta^2 = .01$; PAS, $F(1,399) = 3.84$, $p < .05$, $\eta^2 = .01$; and VIT, $F(1,399) = 10.57$, $p = .001$, $\eta^2 = .03$. Results from examining the mean scores suggest that students who do not participate in afterschool sports reported lower levels of competence needs fulfillment, perceived autonomy support, and subjective vitality in PE compared with those who do.

The previous procedure was repeated to examine boys and girls separately. This procedure was similar to the one performed by Viira and Koka (2012) in their study. All preliminary assumptions were met for both boy and girl data. Results indicated significant difference in 5 study variables in girls, $F(5,207) = 2.54$, $p = .03$, $\Lambda = .94$, $\eta^2 = .06$, but not in boys. Examining the results of the 5 dependent variables separately revealed that only subjective vitality reached statistical significance, $F(1,211) = 7.86$, $p = .006$, $\eta^2 = .04$. More specifically, girls who participated in afterschool

sports ($M = 6.02$, $SD = .90$) reported higher level of subjective vitality in PE compared with their peers who did not have sports experience ($M = 5.58$, $SD = 1.09$).

DISCUSSION

The purpose of this study was to examine if levels of basic psychological needs fulfillment, perceived autonomy support, and subjective vitality were different between students who participate in afterschool sports and those who do not. Findings were consistent with previous researches indicating that students who participate in afterschool sports experience higher competence needs fulfillment in PE, perceived autonomy support, and subjective vitality compared with nonparticipants (Ntoumanis et al., 2009; Viira & Koka, 2012). Viira and Koka (2012) explained that afterschool sports participation influences students' perception of competence in PE probably because these students were already skillful and competent in sports. The authors further explained that PE activities fulfilled students' basic needs for competence, and hence, they felt more energized and alive in class.

In the present study, results suggest that afterschool sports participation may have empowered students to feel more competent and able to do the activities in PE. In addition, these students perceived their PE teachers to be more supportive and provide them with options and choices in class which may have also facilitated their feelings of energy and alertness. On the other hand, students with no afterschool sports experience felt that their PE teachers provide them with fewer options and convey less confidence in their ability to do well in class. They felt that their need for competence was not fulfilled and experienced less vitality in PE. Results further indicate that girls who played sports after school experienced higher subjective vitality in PE compared with their nonactive peers. Filipino adolescents, especially girls, are expected to do household chores after school hours (Tudor-Locke et al., 2003). One possible explanation why girls with afterschool sports participation in this study feel more energized and alert in PE is that the tasks in this setting provide them with opportunities to perform physical activity without thinking of work or pressure. Because of the cross-sectional nature of this study, it can also be argued that girls' experience of high vitality in PE might have led them to participate in afterschool sports. This result is interesting and warrants more investigation.

Bryan and Solmon (2007) discussed several strategies to fulfill students'

psychological needs in PE. To enhance competence, PE teachers can focus on self-improvement, place less emphasis on competition, and provide feedback as well as optimally challenging tasks. To enhance relatedness, PE teachers can convey warmth and care towards the students, be more considerate and compassionate, and be more respectful of students' feelings. Lastly, to enhance autonomy, teachers can provide students with opportunities to choose the activities in class, avoid controlling behaviors, and minimize pressure of performing at a certain level. Filipino PE teachers should aim to provide an environment that will support students' need for competence in PE especially for those with limited sports participation to achieve PE's goal of encouraging students to participate in sports and physical activity outside of school.

SUMMARY

In summary, this study demonstrated that afterschool sports participation plays a role in students' psychological experiences in PE. It supports previous studies indicating that students who participate in afterschool sports experience higher need satisfaction, autonomy support, and vitality in physical education. Physical education teachers are encouraged to support students' psychological needs for competence, relatedness, and autonomy because this facilitates not only their leisure-time physical activity and well-being but their self-determined motivation for learning and academic performance as well (Niemic & Ryan, 2009).

REFERENCES

- Biddle, S.J.H., & Mutrie, N. (2008). *Psychology of physical activity: Determinants, well-being and interventions* (2nd ed.). London: Routledge.
- Bostic, T.J., Rubio, D.M., & Hood, M. (2000). A validation of the subjective vitality scale using structural equation modeling. *Social Indicators Research*, 52, 313–324.
- Bryan, C.L., Sims, S.K., Hester, D.J., & Dunaway, D.L. (2013). Fifteen years after the surgeon general report: Challenges, changes, and future directions in physical education. *Quest*, 65(2), 139–150. doi: 10.1080/00336297.2013.773526
- Bryan, C.L., & Solmon, M.A. (2007). Self-determination in physical education: Designing class environments to promote active lifestyles. *Journal of Teaching in Physical Education*, 26, 260–278.

- Cagas, J. & Hassandra, M. (2014). The basic psychological needs in physical education scale in Filipino: an exploratory factor analysis. *Philippine Journal of Psychology*, 47, 19–40.
- Carreras-Ponsoda, F., Carbonell, A. E., Cortell-Tormo, J. M., Fuster-Lloret, V., & Andreu-Cabrera, E. (2012). The relationship between out-of-school sport participation and positive youth development. *Journal of Human Sport and Exercise*, 7(3), 671–683. doi:10.4100/jhse.2012.73.07
- Coulter, J., Panayiotou, D., Patterson, P., Borchardt, H., & Shen, B. (2008). Influence of outside-school physical activity on motivation in physical education. Posted presented at the 2008 AAHPERD National Convention and Exposition, April 11, 2008.
- Deci, E.L., & Ryan, R.M. (2000). The “what” and “why” of goal pursuits: human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227–268.
- Food and Nutrition Research Institute, Department of Science and Technology. (2008). *7th National Nutrition Survey*. Retrieved from http://www.fnri.dost.gov.ph/images/stories/7thNNS/clinical/clinical_health_partii.pdf
- Goudas, M., Dermitzaki, I., & Bagiatas, K. (2001). Motivation in physical education is correlated with participation in sport after school. *Psychological Reports*, 88, 491–496.
- Hagger, M., Chatzisarantis, N.L.D., Culverhouse, T., & Biddle, S.J.H. (2003). The processes by which perceived autonomy support in physical education promotes leisure-time physical activity intentions and behavior: a trans-contextual model. *Journal of Educational Psychology*, 95(4), 784–795.
- Koka, A., & Hein, V. (2003). The impact of sports participation after school on intrinsic motivation and perceived learning environment in secondary school physical education. *Kinesiology*, 35, 86–93.
- National Association for Sports and Physical Education. (2004). *Moving into the Future: National Standards for Physical Education* (2nd ed.). United States: McGraw-Hill.
- Niemiec, C.P., & Ryan, R.M. (2009). Autonomy, competence, and relatedness in the classroom: applying self-determination theory to educational practice. *Theory and Research in Education*, 7, 133–144. doi: 10.1177/1477878509104318
- Ntoumanis, N., Barkoukis, V., & Thøgersen-Ntoumani, C. (2009). Developmental trajectories of motivation in physical education: course, demographic differences, and antecedents. *Journal of Educational Psychology*, 101(3), 717–728. doi:10.1037/a0014696

- Ryan, R.M., & Frederick, C. (1997). On energy, personality, and health: subjective vitality as a dynamic reflection of well-being. *Journal of Personality*, 65(3), 529–565.
- Ryan, R. M., & Deci, E. L. (2002). An overview of self-determination theory: An organismic dialectical perspective. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of Self-Determination Research* (pp. 3–33). Rochester, NY: The University of Rochester Press.
- Shen, B. (2012). Outside-school physical activity participation and motivation in physical education. *British Journal of Educational Psychology*, 84, 40–57. doi:10.1111/bjep.12004
- Telama, R., Yang, X., Hirvensalo, M., & Raitakari, O. (2006). Participation in organized youth sport as a predictor of adult physical activity: a 21-year longitudinal study. *Pediatric Exercise Science*, 17, 76–88.
- Tudor-Locke, C., Ainsworth, B.E., Adair, L.S., & Popkin, B.M. (2003). Physical activity in Filipino youth: the Cebu longitudinal health and nutrition survey. *International Journal of Obesity*, 27, 181–190. doi:10.1038/sj.ijo.802207
- Vlachopoulos, S.P., Katartzis, E.S., & Kontou, M.G. (2011). The basic psychological needs in physical education scale. *Journal of Teaching in Physical Education*, 30, 263–280.
- Vlachopoulos, S.P. (2012). The role of self-determination theory variables in predicting middle school students' subjective vitality in physical education. *Hellenic Journal of Psychology*, 9, 179–204.
- Viira, R., & Koka, A. (2012). Participation in afterschool sport: relationship to perceived need support, need satisfaction, and motivation in physical education. *Kinesiology*, 44(2), 199–208.
- Williams, G.C., Grow, V.M., Freedman, Z.R., Ryan, R.M., & Deci, E.L. (1996). Motivational predictors of weight loss and weight-loss maintenance. *Journal of Personality and Social Psychology*, 70, 115–126.
- Yang, X., Telama, R., Hirvensalo, M., Hintsanen, M., Hintsanen, T., Pulkki-Råback, L., & Raitakari, O. T. (2009). Sustained involvement in youth sport activities predicts reduced chronic job strain in early midlife. *Journal of Occupational and Environmental Medicine*, 52(12), 1154–1159. doi:10.1097/JOM.0b013e3181fe68bf



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Analysis of the relationship of MCS-measured squat pattern and countermovement jump measures of collegiate football varsity athletes

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The aim of this study was to investigate if there was a correlation between squat pattern and countermovement jump (CMJ) measures. The participants in the study were 15 collegiate male football varsity players in the University of the Philippines — Diliman (age = 18 ± 1.10 ; height = 170.1 ± 5.31 cm; weight = 63.36 ± 8.79 kg). The measures used for the analysis and correlation were squat score from the MCS, vertical jump flight time, height, power, and initial speed. The MCS score sheet was used for the squat. The Boscosystem Chronojump application was used to gather the measures for the vertical jump. The test yielded the following results for the CMJ Test: flight time: 0.485 ± 0.0516 s; jump height: 29.177 ± 6.111 cm; power: 734.136 ± 100.140 J; and initial speed: 2.377 ± 0.252 m/s. The Pearson Correlation between the squat score from MCS and the 4 vertical jump measures are as follows: flight time = 0.360; jump height = 0.369; power = 0.162; and initial speed = 0.359. The analysis showed that there was a weak significant relationship between squat pattern and 3 CMJ measures — flight time, height, and initial speed. However, the correlation between squat pattern and jump power appeared to be too low and, thus, showed low correlation.

Keywords: football, squat, movement competency screen, MCS, countermovement jump, CMJ, vertical jump

INTRODUCTION

Information presented by Kritz (2013) has shown the implications of the squat as a movement screen, demonstrating the bodyweight squat as an optimal movement screen to determine stability in the knee, ankle, hip, and lower back.

Kritz (2013) states that movement competency is one's ability to perform a movement without dysfunction or pain. He also states that movement dysfunctions contribute to the likelihood of contracting injury rather than improving performance. Hence, the criteria in the Movement Competency (MCS) score sheet are geared towards the proper form of performing, in the case of this study, a squat. A higher score indicates a better form. This would also mean that the individual was able to comply with the standard movement expectations of the squat without any compensation.

The vertical jump is a common movement in most sports, such as volleyball, handball, and football (Leard et al., 2007). In football, this may be evidently seen when a player attempts to perform a header. Positioning and body movement demonstrate the preparatory form of the vertical jump from that of an athletic stance to almost a squat.

Recent research has shown that adjusting muscle stimulation patterns is crucial for vertical jump performance (Prokopow et al., 2005). Bobbert and van Soest (1993) have demonstrated that the musculoskeletal system is very sensitive to precise control and that muscle properties play an important role in movement control. The studies also showed that better coordination and proper order of muscle stimulation improve vertical jump measures. A study on the relationship of Functional Movement Screen (FMS) and CMJ has been conducted by Conlon (2013). In his thesis, he showed that there was a significant correlation between FMS and CMJ height. Further, he stated that this result implies that better functional movement not only reduces injury but also improves performance on the vertical jump. The purpose of this study, in contrast, was to identify if there is a relationship between the score in the MCS for squat and kinetics of the vertical jump from the Countermovement Jump (CMJ) Test.

Much attention has been given to squat-loading and its effect on the vertical jump; however, few studies have been geared towards the relationship between squat pattern efficiency (i.e., accounting a greater score in the MCS for squat) and vertical jump. Moreover, little research has been done in relation to these movements in the sport of football.

METHODOLOGY

Participants

The participants for this study were 15 collegiate male football varsity

players in the University of the Philippines, Diliman (age = 18 ± 1.10 ; height = 170.1 ± 5.31 cm; weight = 63.36 ± 8.79 kg). The participants' activity orientation, as mentioned above, is categorized as varsity athlete. The participants in order to participate must not have been carrying any form of injury or illness. The participants must have refrained from any strenuous activity between their training time and designated time for testing. The participants were given an informed consent and a copy of the Declaration of Helsinki.

Procedures

The venue for testing was in the UP College of Human Kinetics Exercise Laboratory. There was only 1 session throughout the testing period. Gathering of anthropometric measures marked the beginning of the procedure. These measures were mainly the participants' height and weight. After the measurement, the researchers introduced the subjects to the warm-up and procedures of the MCS and CMJ Test. After this was the testing proper.

The experimenters collected the following vertical jump measures: power (Joules), initial velocity (meters/second), jump height (centimeters), and flight time (seconds). The main program used was the Boscosystem Chronojump as it has a specialized function for jump-testing. For the squats, the score sheet for the Movement Competency Screen was used for assessment.

The subjects were first asked to perform specific warm-up exercises; each had 10-second transition intervals. Warm-up is a necessary component of the testing and has been observed to have positive impacts on performance in the rate of force development and improvement of muscle strength and power (Jeffreys, 2008). One of the testers guided the subjects. First was a 5-minute jog around the venue. This was followed by 3 repetitions of lunge and reach for each leg, where the participants held their lunge for 4 seconds and held the reach for 4 counts as well, with a final 4-count set for returning to original position. Next is the knee hug to quad stretch. There was a 4-second hold for the knee hug and another 4 seconds for the quad stretch. This was repeated in the other leg. After this was the cradle to side lunge. The cradle was held for 4 counts, as well as the side lunge. The cradle to side lunge warm-up also had 3 repetitions

per leg. The participants were then asked to perform 5 repetitions of half squats. Lastly, there was an inch-worm exercise for 3 repetitions. After the warm-up, the subjects were given a 1-minute rest interval before the testing proper began.

There were 2 stations, 1 for each test. For the station designated for the squat test, a camera and tripod was set up. The participants were asked to perform squats as they normally would and were videotaped from the frontal and sagittal planes. The squats of the subjects were assessed and scored by only 1 of the testers, using the Movement Competency Screen. This was done to assure the reliability of the rating.

The test for the countermovement jump was a slightly modified version of the Bosco Countermovement Jump Test. The station for this part of the test was separate from the squat station. Chronojump platforms and a laptop were set up in order to record the data from the jumps. The participants were required to wear shoes as the platform may cause pain.

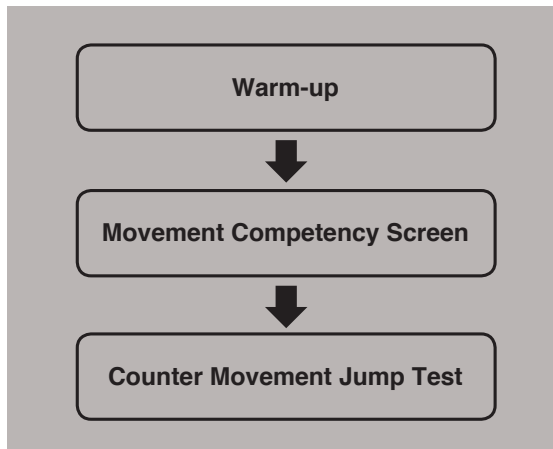


Figure 1. Testing Flow

Measures

Squat Pattern — MCS. The Movement Competency Screen was the first measure taken. The participants were asked to execute squats as they normally would, with their hands at the back of their head. Each participant was videotaped for later assessment by the researcher. The participants performed 1 trial. A trial consisted of 2 squat repetitions in the frontal view, followed by 2 repetitions in the sagittal view. The squat portion of the MCS score sheet was used.

Countermovement Jump Performance. The participants were asked to stand on a Chronojump platform, feet shoulder-width apart. The subject performed a countermovement jump as high as possible. Certain rules that were applied include (1) hands must have been on the waist at all times; (2) take-off must have used both feet and no initial movements allowed; (3) movement must have been continuous — it was a bad trial if the subject paused in the squat sequence; and (4) the subject must have landed on both feet at the same time. If the subject failed to follow any of the guidelines, the trial would be void, and another would immediately ensue. After a successful trial, the subjects were given a 30-second rest interval before moving to the next trial. A total of 3 trials were recorded for each participant. The average of the trials was taken under consideration. The Boscosystem Chronojump displayed the desired information — power, initial velocity, jump height, and flight time.

Analysis

The researchers made use of the Pearson Bivariate Correlation for their statistical analysis. Paired data — MCS score and any of the 4 vertical jump measures — were given a value from 1 to -1, and the strength and relationship depended on the value given by the correlation.

RESULTS

The test yielded the following results: flight time: 0.485 ± 0.0516 s; jump height: 29.177 ± 6.111 cm; power: 734.136 ± 100.140 J; and initial speed: 2.377 ± 0.252 m/s. Individually, the data were much varied, especially that of power.

The Pearson Correlations between the MCS score and the 4 vertical jump measures are flight time = 0.360; jump height = 0.369; power = 0.162; and initial speed = 0.359.

Table 1. Individual measures of the 15 participants.

Participant	Height	Weight	Flight Time	Height	Power	Initial Speed	MCS Score
1	176	73.2	.456	25.9	802	2.24	1
2	171	67.5	.475	27.6	770	2.33	2
3	168	62.2	.587	31.6	758	2.49	1
4	177	65.0	.543	36.5	851	2.673	2
5	161	54.0	.474	27.6	615	2.33	2
6	161	48.5	.523	33.5	609	2.57	1
7	171	66.0	.477	28.1	756	2.34	1
8	174	65.0	.444	24.2	693	2.18	2
9	167	56.0	.386	18.5	520	1.90	2
10	170	60.0	.597	43.7	860	2.93	3
11	177	64.5	.504	31.0	780	2.47	3
12	168	56.0	.494	29.9	664	2.42	2
13	164	58.5	.487	29.0	684	2.39	2
14	172	69.0	.494	29.9	818	2.42	3
15	175	85.0	.408	20.5	833	2.00	1

Table 2. Correlations between the vertical jump measures and MCS score for squat.

		Flight Time	Height	Power	Initial Speed	MCS
Flight Time	Pearson Correlation	1	.996(**)	.442	1.000(**)	.360
	Sig. (2-tailed)	.000	.000	.099	.000	.188
	N	15	15	15	15	15
Height	Pearson Correlation	.996(**)	1	.446	.997(**)	.369
	Sig. (2-tailed)	.000	.	.095	.000	.176
	N	15	15	15	15	15
Power	Pearson Correlation	.442	.446	1	.441	.162
	Sig. (2-tailed)	.099	.095	.	.100	.564
	N	15	15	15	15	15
Initial Speed	Pearson Correlation	1.000(**)	.997(**)	.441	1	.359
	Sig. (2-tailed)	.000	.000	.100	.000	.189
	N	15	15	15	15	15
MCS	Pearson Correlation	.360	.369	.162	.359	1
	Sig. (2-tailed)	.188	.176	.564	.189	.000
	N	15	15	15	15	15

DISCUSSION

The data acquired showed that there is a weak significant correlation between squat pattern and the flight time, jump height, and initial speed components of the CMJ. On the other hand, there is a low correlation between the squat pattern and power. It can be seen that the correlation between the MCS score and the jump height is the highest, while the lowest is between the MCS score and power. As stated earlier, few studies have focused on showing the relationship between movement competency in squat and vertical jump measures. The data above has shown that the movement competency of the athletes in the squat had a weak significant correlation with the vertical jump variables. It should be noted that the correlation is at least positive, indicating that an improvement of one may lead to a small or significant improvement in the other, although possibly not significantly. The researchers also observed that the correlation was more significant or that it mostly followed in extremely high and extremely low values. These outlier values may have caused the shift in the data (i.e., skewed to the left graphically, due to an extremely high value). Consequently, the extreme values along with the large variations in the data of nonextremes may have affected the outcome of the correlation.

The study was done to present and assess the existence of any significant relationship between the squat pattern via MCS score and the countermovement jump variables. Findings of the study showed a weak significant correlation, given the data.

The study is not without limitations. The first is that the sample size of fifteen may be too small in order to generalize or form a significant conclusion. This is seen through the results that exhibit different correlation measures that demonstrate the varied relationship of the MCS and components of the vertical jump. Another is that the participants are all male football players, and hence, the study will be only applicable to male football players of the same activity orientation. However, the weak correlation for MCS score and power output for males follows the same small correlation in squat score from the MCS and lower body power found by Kritz (2012). Squat pattern may not be the only factor for determining vertical jump performance. Another factor to consider would also be the build or the musculature of the player. Players with stronger leg muscles will tend to have better vertical jump performances, but that does not automatically suggest that their squat

patterns are fundamentally correct. However, the weak significant correlation indicates that correcting the squat pattern may help improve performance but not to a great magnitude. In line with this, better coordination may be seen with the necessary correction, which also helps produce better performance as Prokopow's (2005) study suggests.

Lastly, it should be noted that the MCS rater is a student and does not consider himself an expert, though experienced.

One possibility for the weak correlations found may be that of the compensation that the players commit. Although players compensate for their movements, they may still be able to perform well but not always as well compared with those who meet the standards of the movement. The players' habituation to compensated movements may be a factor in determining the varying measures among the players despite having the same score for the MCS. The same can be said for those having a lower MCS score, yet scoring only slightly higher than the other.

Interestingly, these components were shown to have a medium correlation to squat movement competency. An implication of this is that, although it may not be the priority, improving the basic squat movement of the athletes can be beneficial for overall performance.

REFERENCES

- Conlon, J. K. (2013). *The relationship between the functional movement screen and countermovement jump height* (Master's thesis). University of Wisconsin—Milwaukee, USA.
- Jeffreys, I. (2008). *Warm-Up and Stretching*. Strength Training and Conditioning. National Strength and Conditioning Association. Human Kinetics.
- Jezdimirovic, M., Joksimovic, A., Stankovic, R., Bubanj, S. (2013). *Differences in the Vertical Jump in Soccer Players According to the Position on the Team*. Series Physical Education and Sport Volume 11. Fact Universitatis, Nis, Serbia. [not cited in the body]
- Kritz, M. (2012). *Development, reliability and effectiveness of the Movement Competency Screen (MCS)* (Doctorate thesis). Auckland University of Technology, New Zealand.
- Kritz, M. (2013) *The Movement Competency Screen*. Scoring and Screening Instructions. Retrieved from www.movementcompetencyscreen.com

- Leard, J. S., Cirillo, M. A., Katsnelson, E., Kimiatek, D. A., Miller, T. W., Trebincevic, K., & Garbalosa, J. C. (2007). Validity of two alternative systems for measuring height. *Journal of Strength and Conditioning Research*, 21(4): 1296–1299.
- Prokopow, P., Hay, D., Fukashiro, S., & Himeno, R. (2005). Quantitative evaluation of the importance of coordination on jump achievements and kinematics in human vertical squat jump. *Japanese Journal of Biomechanics in Sports & Exercise*, 9(2), 69–82.
- Spiotta, A.M., Bartsch, A.J., Benzel, E.C. (2011). Heading in Soccer: Dangerous Play. Department of Neurological Surgery. Congress of Neurological Surgeons. Cerebrovascular Center Cleveland, Ohio. [not cited in the body]
- van Soest, A. J., & Bobbert, M. F. (1993). The contribution of muscle properties in the control of explosive movements. *Biological Cybernetics*, 69(3), 195–204.



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Injuries in Novice Male Jiu Jitsu Practitioners

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Sports, especially combat sports, carry an inherent risk of injuries compared with purely exercise-based physical activities. Reports on combat sports injuries mainly focus on injuries obtained during competition, and the incidence may not be as severe when done recreationally. Jiu Jitsu is a unique martial art style that emphasizes on takedowns, throws, joint locks, and choke holds to immobilize, control, or submit an attacker. The purpose of this research is to evaluate the common injuries in recreational, novice Jiu Jitsu practitioners. A descriptive epidemiology using a self-inventory of injuries was utilized in this study. The subjects participated in 32 twice-per-week, one-hour No-gi Jiu Jitsu lessons spanning a total of 17 weeks. There was a 77% incidence of injuries among the participants. Those injured had an average of 3.9 injuries each. The data revealed that, of all reported injuries, abrasions, wounds/cuts, and strains occurred most frequently while the anatomical regions at risk the most were the feet and knees. Despite the high incidence of injuries, they were all considered to be minor, acute injuries with none requiring serious medical attention or causing the participants to discontinue the course. The recreational practice of Jiu Jitsu is generally safe with an inherent risk for minor injuries that can be further managed with good coaching and personal protective equipment.

Keywords: injuries, novice, Jiu Jitsu

INTRODUCTION

Modern day Jiu Jitsu has greatly increased in popularity along with the rise of the sport of mixed martial arts (MMA). It is a unique martial art

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style which emphasizes on takedowns, throws, joint locks, and choke holds to immobilize, control, or submit an attacker. Victory may also be achieved via an opponent's tapout, a maneuver wherein a combatant concedes by tapping the opponent, tapping the mat or verbally signaling a tapout. A tapout typically occurs when a combatant is caught in an inescapable situation such as a choke hold or joint lock but may also occur when he or she can no longer continue because of fatigue or injury. While it is deeply rooted in the Japanese martial art of Judo, Jiu Jitsu has evolved into a different discipline on its own developed in the 20th century in Rio de Janeiro, Brazil (Gracie & Gracie, 2000). It has two subcategories — Gi, wherein participants use a Gi or Kimono similar to that in Judo, and No-gi, wherein participants wear more regular clothing like shorts and t-shirts.

The efficacy of Jiu Jitsu became internationally recognized when Royce Gracie, a descendant of the originator of Brazilian Jiu Jitsu Helio Gracie, became a multiple champion of the Ultimate Fighting Championship (UFC) using Jiu Jitsu techniques. The first UFC, called "War of the Worlds", featured a sumo wrestler, a boxer, a savateur, two kickboxers, a karate fighter, a shootfighter and the lone Brazilian Jiu Jitsu representative who eventually won the event (Gentry III, 2001). Through the years MMA fighters have learned to integrate Jiu Jitsu into their fighting style in order to be an effective combatant. Even as MMA evolved and became more popular, Jiu Jitsu still remains an essential skill for MMA fighters. Furthermore, it continues as a sport and self-defense system in its own right with more and more competitors participating in various tournaments worldwide (Scoggin et al., 2014).

Based on studies on the physiological responses to the demands of Jiu Jitsu, it is considered as a predominantly aerobic activity (Franchini et al., 2005; Del Vecchio, 2007; Andreato et al., 2012) with a high demand for isometric grip strength and muscular endurance. Because of the physical nature of the sport, Jiu Jitsu is a good form of exercise even when not pursued as a professional career. As a recreational activity in itself, Jiu Jitsu provides a well-rounded base of health benefits because of the wide variety of skills incorporated in the activity. Body size and weight discrepancies are not much of a concern as practices are often done with a partner who is in the same weight category.

The Medical Subject Headings primarily defines injuries as damage inflicted on the body as the direct result of an external force, with or without

disruption of structural continuity (MeSH, 2015). As such, injuries may vary in severity as well as in type. Although by definition any part of the body can be injured during sport or exercise, the focus of sports injuries is typically limited to musculoskeletal injuries which include damage to muscles, bones, and surrounding tissue like ligaments and tendons. Sports, especially combat sports, carry an inherent risk of injuries compared with purely exercise-based physical activities. Gould's (1987) research has shown that injury is a major factor in dropout from sports. Svoboda and Vanek (1982) believe that the repeated stress and strain of injury affect longevity in sport for recreational as well as professional athletes. Since the threat of injury is ever-present in sport, Heil (1993) warns that the ability to remain relatively injury-free and to recover rapidly when injured is important to any athlete's longevity and success.

The risk of injury in combat sports is further increased during competition and continues to increase as the level of competition increases. In a comparative study of injuries in martial arts and combat sports (Kickboxing, Judo, Jiu Jitsu, Karate), Cynarski and Kudlacz (2008) observed an 88.9% occurrence of serious injuries in the competitors' careers not including minor injuries such as bruises and abrasions. These included a 21% occurrence of broken bones and 16% occurrence of damage to knee ligaments with most injuries occurring either during competition or while training in preparation for competition. A one-year retrospective cohort on martial arts injuries by Zetaruk et al. (2005) on Karate, Aikido, Taekwondo, and Tai Chi practitioners revealed that the rate of injuries that required time off from training varied according to style as different martial arts showed significantly different types and distribution of injuries. Moreover, martial arts appear to be safer for young athletes especially those at the beginner or intermediate level as those with at least three years experience were found to be twice as likely to sustain injuries.

James and Pieter's (2003) research on British Judokas revealed a higher degree of injuries in men (48.54 for every 1000) than in women (34.25 for every 1000). As expected, the main cause of injury was the throws done during a match. This was previously observed by Sterkowicz (1987) when he estimated that the accident risk in Judo practice is over four times higher than the average risk in other sporting activities. Macan et al. (2001) found that among male Karate practitioners in Croatia, injuries occurred the least in the young group (17.7%) and got significantly higher in the older groups

(juniors, 27% and seniors, 26.7%). Injuries in Kickboxing were found to be more serious (Cynarski & Kudlacz, 2008) wherein the most frequent injury was a broken nose (60%) and other broken bones (16%). Interestingly, they found that most injuries occurred during training for competition (79%) while only 14% happened during competition fights.

In Taekwondo, the foot receives about 18% of the injuries usually during sparring according to Burks and Satterfield (1998). The toes are easily jammed, resulting in contusion, dislocation, or fracture. More serious foot injuries can occur in sparring, particularly fracture of the metatarsals (Birrer, 1996). Fractures also occur because of the stresses placed on the foot during kicks and jumps (Shamus & Shamus, 2001). Of the traumas of the extremities, however, most occur at the knee. Knee traumas are predominantly soft-tissue in nature (Burke et al., 2003). The knee is prone to both accidental and intentional traumas in Taekwondo. Classic injuries caused by a kick to the lateral aspect of the knee are fractures of the proximal fibula, contusions on the shin, and sprains to the knee joint (Birrer, 1996). A collective study by Hapek (1981) that followed participants of Karate and Taekwondo courses cited “incorrect conduct of classes” as the main cause of injuries which mostly lead to sprains and bruises.

Research by Bledsoe et al. in 2006 concerning professional MMA competitions documented that the majority of recorded injuries were on the face/head region. Hand injuries were the second most common injury followed by injuries to the nose and eyes. They also stated that the giving and receiving of high-velocity blows seem to show the best correlation of whether a sport will have an increased risk of injury. Styles that include striking — such as Boxing (Bledsoe, Li, & Levy, 2005), Kickboxing (Gartland, Malik, & Lovell, 2001; Zazryn et al., 2003), and Taekwondo (Kazemi & Pieter, 2004) — have been shown to have a higher incidence of injury than styles that involve only grappling (Jarret, Orwin, & Dick, 1998) such as Wrestling, Judo, and Jiu Jitsu. Strikes from elite athletes, especially professional boxers, can generate a significant amount of force (Walilko, Viano, & Bir, 2005) which seems to explain why many injuries in the striking arts are prevalent not only in the target areas of the face and torso but also the extremities used for striking such as the hands for boxing and the upper and lower extremities in kickboxing and karate.

In Jiu Jitsu competitions, a 6-year injury review by Scoggin et al. (2014) observed an injury incidence of 9.3 per 1000 exposures. Orthopedic injuries

were the most common accounting for 78% of all injuries followed by rib injuries and lacerations requiring medical care. The elbow was found to be the most commonly injured joint during Jiu Jitsu competition with the arm bar — a joint lock which involves forcefully hyperextending an opponent's elbow — being the most common cause. They further stated that, compared to injury data from Judo, Taekwondo, Wrestling, and MMA competitions, Jiu Jitsu competitors were at a substantially lower risk of injury.

Reports on combat sports injuries mainly focus on injuries obtained during competition. As established earlier, most injuries are reported to occur either during competition or when training in preparation for competition. The less competitive nature of recreational practice of combat sports may lead to fewer as well as less severe injuries compared with that of competitive practices. Since most people who engage in sports are recreational practitioners rather than serious competitors, information from this research will cater to a larger proportion of sports enthusiasts especially those involved in Jiu Jitsu.

Thus, the purpose of this study was to evaluate the common injuries in recreational, novice Jiu Jitsu practitioners. Specifically, the study aimed to determine the incidence rate of injuries, injury types, anatomical regions affected, and common mechanisms for injury through a self-reported injury inventory. The participation of uninjured, novice Jiu Jitsu practitioners aimed to limit the contributing factors to any injuries that may have occurred. Furthermore, this may help in the risk awareness and expectations of people who may want to start engaging in Jiu Jitsu but are hesitant because of the nature of the sport and physical dangers it may pose.

MATERIALS AND METHODS

Research Design

A descriptive epidemiology using a self-inventory of injuries was utilized in this study. An inclusion criterion that they should not have had any previous training in combat sports and were not suffering from any chronic or acute injuries prior to the intervention period was imposed. The responses were then tallied as obtained through the Sports Injury Report (Duco, 2005; Reyes, 2005). Data was collected through a recall of injuries incurred over a period of 16 weeks.

Participants of the Study

Thirty-five Filipino males (Mage 18 ± 1.7 years), previously-untrained (novice) in Jiu Jitsu, participated in the study. A survey of the subjects' injuries was done at their training area during the respective training sessions for their convenience.

Instruments of the Study

The survey instrument used was the Sports Injury Report adapted from Duco (2005) and Reyes (2005). Modifications were done to make it more suitable for Jiu Jitsu injuries. These included (1) the message in the project information box, (2) details in the demographic information being asked for, (3) addition of other types of injuries, (4) the definition of the types of injuries, (5) a more detailed enumeration of musculoskeletal regions, and (6) a specified area for other injuries that may not have been covered in the questionnaire such as other anatomical areas or multiple injuries in the same anatomical region.

Data obtained included name, age, and gender. The injury inventory was divided into 20 different anatomical regions namely head/face, neck, spine, upper back, lower back, shoulders, ribs, abdominals, arms, elbows, forearms, wrists, hands, groin, thighs, knees, shin and calves, ankles, and feet and toes. From the 20 anatomical regions, twelve (12) different types of injuries were identified and defined in the questionnaire for the respondent's convenience. The defined types of injuries were abrasion, concussion (for the head), contusion, crushing, dislocation, fracture, inflammation, sprain, strain, stress fracture, tendinitis, and wound/cut.

Test Procedure

The subjects participated in 32 twice-per-week, one-hour No-gi Jiu Jitsu lessons spanning a total of 17 weeks. An additional two days were needed — the first day for orientation and introduction and a final “refresher” day to review all the techniques that were covered in the 16-week program. Letters asking for consent for participation were handed out prior to data collection. Once the survey questionnaire was finalized, the researcher individually gave out the survey forms. The researcher explained the purpose of the study

and was available for questions or clarifications if the respondents had any as they read through the information and the instructions page. The subjects were clearly instructed to indicate all injuries incurred from participating in the program. Their ability to accurately indicate all their injuries was thus limited to their ability to recall all incidences in the past 16 weeks.

Tools for Analysis

Data gathered are interpreted using descriptive statistics and presented in frequency and percentage distribution tables. Graphs are also used to present the data while pictographic views on the summary of injuries are employed to provide a portrait of injury trends in novice Jiu Jitsu participation.

RESULTS

Incidence and injury rate

There was a 77% incidence of injuries among the participants. Those injured had an average of 3.9 injuries each. Despite this rate and occurrence, none of the injuries required serious medical attention and/or hospitalization.

Types of injuries

The data revealed that, of all reported injuries, the following occurred most frequently: abrasions (52%), wounds/cuts (15%), and strains (12%). The percentage distribution of injury type is outlined in Figure 1.

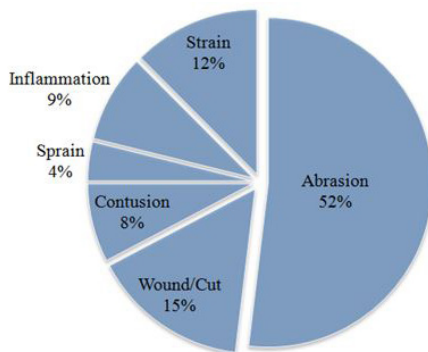


Figure 1. Percentage distribution of injury types.

The overwhelming majority of all the injuries were abrasions (52% of all injuries). Of these, most were on the feet (35%), knees (20%), and toes (15%). The occurrence of abrasions in other anatomical regions was less than 15%. Anecdotal follow-ups on the subjects indicated that the abrasions were in the form of mat burns (friction burns on the skin) as a result of brushing against the padded floor. Padded floors or mats are a prerequisite in combat sports like Jiu Jitsu, Judo, and Wrestling so as to protect the practitioners from hard impact on the floor. The mats, usually in the form of Judo mats or Wrestling mats, need to have some texture so as not to be slippery. As a result, abrasions are almost inevitable in body parts that are in constant contact with the mats. They can be minimized through protective measures such as athletic tapes, knee pads and elbow pads. Naftulin and McKeag (1994) have previously advised that protective equipment is most important in combat sports. These should prevent injury and protect injured areas from further injury. Ideally, the equipment should not interfere with function and performance nor be harmful to other athletic participants. Hutson (1996) further reports that major strides in injury prevention have been made in certain sports though progress is slow particularly where there are financial implications. Table 1 summarizes the result for the occurrence of abrasions.

Table 1. Descriptive statistics on the occurrence of abrasions.

	Frequency	%
Feet	19	35
Knees	11	20
Toes	8	15
Elbows	4	7
Hands	3	6
Arms	3	6
Forearms	2	4
Neck	1	2
Head/Face	1	2
Ankles	1	2
Abdomen	1	2
Total	54	100

The second most common injuries were wounds and cuts accounting for 15% of all reported injuries. Wounds and cuts were reported on the hands (38%), head/face (31%), forearms (13%), and neck (13%). Wounds and cuts on the hands and forearms would have been completely avoidable as the respondents noted that these were brought about by inadvertent scratches from the opponent. Just like all grappling sports, controlling the opponent is important. One of the ways to control an opponent is by grabbing the wrists and hands. Long fingernails combined with the resistance by the other combatant sometimes lead to scratches. Since the first session, which includes the orientation and introduction, the participants were reminded to keep their fingernails short. However, as the weeks went on and as their fingernails grew back, some may not have remembered to clip their nails regularly. As such, inadvertent scratches occur as they try to grab an opponent's wrist and hands. Thus, it is important to constantly remind Jiu Jitsu practitioners to maintain short fingernails. Furthermore, keeping nail clippers at the training area is deemed necessary.

The respondents also commented that wounds and cuts in the head/face region were on the lips and mouth area and incurred as a result of defending against chokes — strangle holds that are meant to cut off the opponent's breathing causing them to either submit or pass out. In order to effectively defend against chokes, one has to tuck the chin down towards the upper chest thereby protecting the neck from the opponent's pressure. In the process, however, the chin and mouth take on the pressure instead of the neck. When the attacker does not let go, the lips continue to push against the teeth and this sometimes causes wounds and cuts on the inner lips. As a precaution, this can be avoided by using mouthpieces. The descriptive statistics on the occurrence of wounds and cuts is presented in Table 2.

Table 2. Descriptive statistics on the occurrence of wounds and cuts.

	Frequency	%
Hands	6	38
Head/Face	5	31
Forearms	2	13
Neck	2	13
Feet	1	6
Total	16	100

The third most common injuries were strains which represent 12% of all reported injuries. The neck and shoulders seem to be the most vulnerable to strains, accounting for almost half of all reported strains. The participants were quick to comment that strains on the neck were caused by opponents attacking with a choke — the squeezing around the neck combined with the flexion of the neck makes it particularly vulnerable to strains during chokes. The shoulder muscles were susceptible to strains during the application of shoulder locks — twisting the shoulders towards an awkward angle but not to the extent of dislocation. Just like the occurrence of wounds and cuts, strains were most likely to occur during an attempt to defend against an opponent’s attack. Since choke holds and joint lock are the essence of Jiu Jitsu offense, practitioners should be more conscious about tapping out or letting go before serious damage occurs. Table 3 further details the occurrence of strains.

Table 3. Descriptive statistics on the occurrence of strains.

	Frequency	%
Neck	3	23
Shoulders	3	23
Thighs	2	15
Lower Leg	2	15
Abdomen	1	8
Lower Back	1	8
Wrists	1	8
Total	13	100

Other types of injuries reported were inflammation (9%), contusion (8%), and sprain (4%). Table 4 shows the occurrence of these other injuries. They represent a much smaller proportion of the reported injuries, and as mentioned earlier, none of the injuries were severe enough to require serious medical attention or withdrawal from participation. Based on this, Jiu Jitsu may be perceived as a relatively safe activity with minor inherent risks. Additionally, casual conversations with the participants revealed that even at the moment of injury they still continued on until the end of the session. They perceived their injuries as not being serious enough for them to consider taking the rest of a session off.

Table 4. Descriptive statistics on the occurrence of inflammations, contusions, and sprains.

Infammation	Frequency	%
Neck	2	22
Shoulders	2	22
Arms	2	22
Lower Back	1	11
Spine	1	11
Upper Back	1	11
Total	9	100
Contusion		
Ribs	3	38
Groin	3	38
Neck	1	13
Head/Face	1	13
Total	8	100
Sprain		
Ankles	2	50
Elbows	1	25
Wrists	1	25
Total	4	100

Anatomical regions

Regarding the anatomical regions at risk, injuries commonly occurred at the feet (19%), and knees (11%). All other injury sites were reported to be injured at a rate of less than 10%. Table 5 outlines the occurrence of injuries per anatomical region.

Table 5. Descriptive statistics on the incidence of injuries per anatomical region.

Injury Site	Frequency	%
Feet	20	19.2
Knees	11	10.6
Neck	9	8.7
Hands	9	8.7
Toes	8	7.7
Head/Face	7	6.7

Shoulders	5	4.8
Arms	5	4.8
Elbows	5	4.8
Forearms	4	3.8
Ribs	3	2.9
Groin	3	2.9
Ankles	3	2.9
Lower Back	2	1.9
Abdomen	2	1.9
Wrists	2	1.9
Thighs	2	1.9
Lower Legs	2	1.9
Spine	1	1.0
Upper Back	1	1.0
Total	104	100

Being the most injured anatomical region, the feet suffered abrasions 95% of the time. As mentioned earlier, this was mainly because of mat burns caused by the rough texture of the mats and may be avoided through the use of athletic tapes. As with the feet, abrasions were the main cause of injuries on the knees. In fact, 100% of reported knee injuries were abrasions. As also mentioned earlier, this may be avoided by wearing knee pads. Figures 2 and 3 further outline the distribution of injuries per anatomical region.

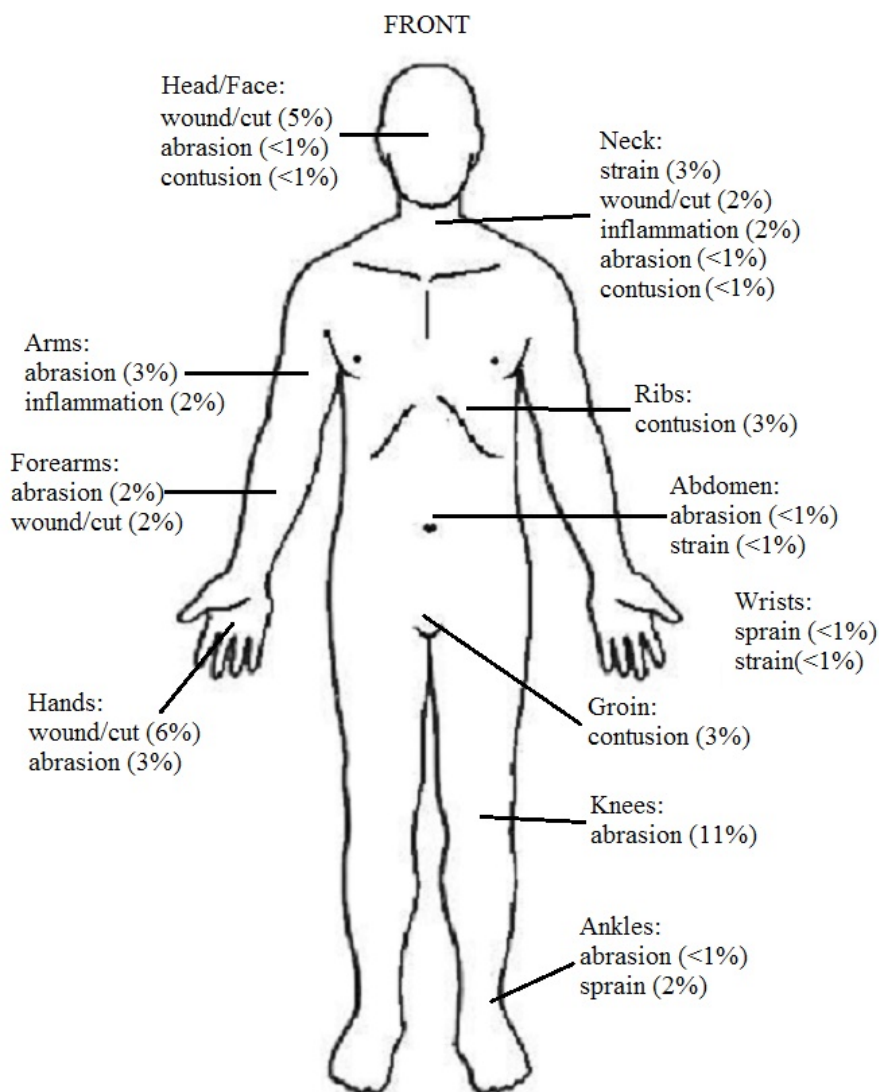


Figure 2. Incidence rate of injuries by anatomical region and type per 100 injuries.

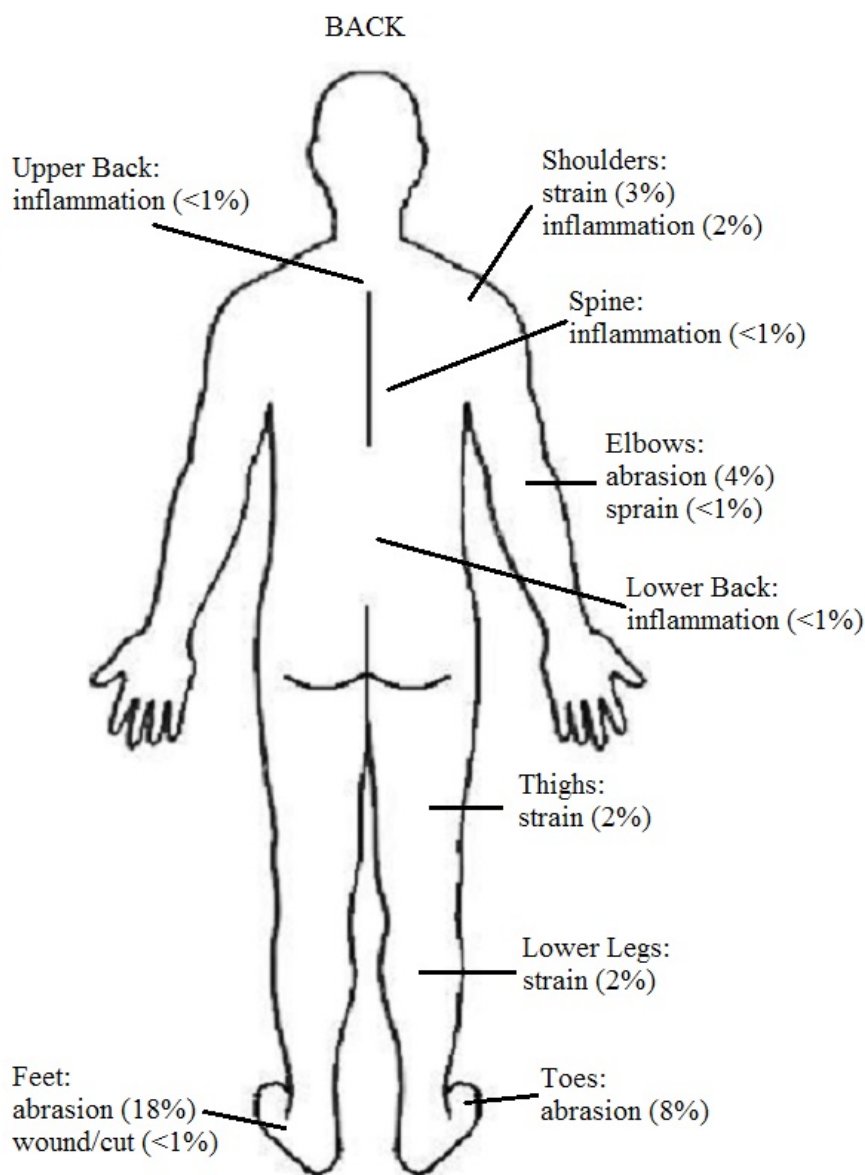


Figure 3. Incidence rate of injuries by anatomical region and type per 100 injuries (continued).

SUMMARY AND CONCLUSIONS

Jiu Jitsu is a unique martial art style which emphasizes on takedowns, throws, joint locks, and choke holds to immobilize, control, or submit an attacker. While it is deeply rooted in the Japanese martial art of Judo, it has evolved into a different discipline of its own. Jiu Jitsu rose to prominence because of its effectivity in MMA competition. As MMA has evolved and become more popular, Jiu Jitsu still remains an essential skill for MMA fighters and continues as a sport and self-defense system in its own right.

Sports, especially combat sports, carry an inherent risk of injuries compared with purely exercise-based physical activities, and the risks of injury further increase during competition and continue to increase as the level of competition increases. When compared with other combat sports practitioners, Jiu Jitsu competitors are found to be at a substantially lower risk of injury.

Reports on combat sports injuries mainly focus on injuries obtained during competition, and the incidence is expected to not be as severe when done recreationally. The purpose of this study was to evaluate the common injuries in recreational, novice Jiu Jitsu practitioners. A descriptive epidemiology using a self-inventory of injuries incurred was utilized in this study. Thirty-five (35) Filipino males, previously-untrained in Jiu Jitsu, participated. A survey of the subjects' injuries was done at their training area during their respective training sessions for their convenience. The subjects participated in 32 twice-per-week, one-hour No-gi Jiu Jitsu lessons spanning a total of 17 weeks. An additional two days were needed — the first day for orientation and introduction and a final “refresher” day to review all the techniques that were covered in the 16-week program.

There was a 77% incidence of injuries among the participants. Those injured had an average of 3.9 injuries each. The data revealed that of all reported injuries, the following occurred most frequently: abrasions (52%), wounds/cuts (15%), and strains (12%). Of all the injuries, the overwhelming majority were abrasions (52% of all injuries). Of these, most were on the feet (35%), knees (20%), and toes (15%). The occurrence of abrasions in other anatomical regions was less than 15%. Anecdotal follow-ups on the subjects indicated that the abrasions were in the form of mat burns (friction burns on the skin) as a result of brushing against the padded floor. The anatomical regions at risk were the feet (19.2%) and knees (10.6%). All other injury

sites were reported to be injured at a rate of less than 10%. Despite the high incidence of injuries, they were all considered to be minor, acute injuries with none requiring serious medical attention or causing the participants to discontinue the course. These minor injuries may be further minimized through the use of personal protective equipment such as mouthpieces, knee pads, and elbow pads.

The researcher thus concludes that the recreational practice of Jiu Jitsu is generally safe with an inherent risk for minor injuries that can be further managed with good coaching and personal protective equipment. Instructors and practitioners alike should thus be aware of these risks and take precautionary measures to further minimize the probability of injury.

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REFERENCES

- Andreato, L.V., Franzói de Moraes, S.M., Esteves, J.V.D.C., Miranda, M.L., Pastorio, J.J., Pastorio, E.J., Branco, B.H.M. & Franchini, E. (2012). Physiological responses and rate of perceived exertion in Brazilian Jiu-Jitsu athletes. *Kinesiology*, 44:173–181
- Birrer, R.B. (1996). Trauma epidemiology in the martial arts: The results of an eighteen-year international survey. *American Journal of Sports Medicine*, 24(6): 72–79
- Bledsoe, G. H., Hsu, E., Grabowski, J.G., Brill, J. & Li, G. (2006). Incidence of Injuries in professional mixed martial arts competitions. *Journal of Sports Science and Medicine: Combat Sports Special Issue*, 5: 136–142
- Bledsoe, G. H., Li, G. & Levy, F. (2005). Injury risk in professional boxing. *Southern Medical Journal* 98, 994–998
- Burke, D.T., Barfoot, K., Bryant, S., Schneider, J.C., Kim, H.J. & Levin, G. (2003). Effect of implementation of safety measures in tae kwon do competition. *British Journal of Sports Medicine*, 37(5): 401–404
- Burks, J.B. & Satterfield, K. (1998). Foot and ankle injuries among martial artists: results from a survey. *Journal of the American Podiatric Medical Association*, 88(6): 268–278

- Cynarski, W. & Kudacz, M. (2008). Injuries in martial arts and combat sports — a comparative study. *Archives of Budo*, 4: 91–97
- Del Vecchio, F.B., Bianchi, S., Hirata, S.M., & Chacon-Mikahili, M.P.T. (2007). Análise morfo-funcional de praticantes de Brazilian Jiu-Jitsu e estudo da temporalidade e da quantificação das ações motoras na modalidade [Morphofunctional analysis of Brazilian Jiu-Jitsu practitioners and study of the temporality and quantification of motor actions in the modality]. *Movimento e Percepção*, 7(10), 263–281
- Duco, L. (2005). *Injuries among Elite and Non-elite Filipino Gymnasts*. Undergraduate Thesis. College of Human Kinetics, University of the Philippines, Diliman. Quezon City, Philippines
- Franchini, E., Bezerra, P.L., Oliveira, R.S.F., Souza, L.C. & Oliveira, D.L. (2005). Blood lactate concentration, heart rate and handgrip strength during a Jiu-Jitsu combat. *Corpoconsciência*, 9(1), 35–44
- Gartland, S., Malik, M.H. & Lovell, M.E. (2001). Injury and injury rates in muay thai kick boxing. *British Journal of Sports Medicine*, 35, 308–313
- Gentry III, C. (2001). *No Holds Barred: Evolution*. 1st Ed. Richardson, TX: Archon.
- Gracie, R. & Gracie, C. (2000). *Brazilian Jiu-Jitsu: Theory and Technique*. Montpelier, Vermont: Invisible Cities Press
- Gould, D. (1987). Understanding attrition in children's sport. In *Advances in pediatric sport sciences: Behavioral Issues* (Vol. 2). Eds. Gould, D. & Weiss, M.R. Champaign, IL: Human Kinetics
- Hapek, F. (1981). Urazowość i profi laktyka uszkodzeń w karate. *Rocznik Naukowy AWF Krakow*, 18: 165–86
- Heil, J. (1993). *Psychology of sport injury*. Champaign, IL: Human Kinetics
- Hutson, M. A. (1996). *Sports injuries: Recognition and management* (2nd edition). NY: Oxford University Press.
- James, G. & Pieter, W. (2003). Injury rates in adult elite judoka. *Biology of Sport*, 20(1): 25–32
- Jarret, G.J., Orwin, J.F. & Dick, R.W. (1998). Injuries in collegiate wrestling. *American Journal of Sports Medicine*, 26, 674–680
- Kazemi, M. & Pieter, W. (2004). Injuries at the Canadian National Tae Kwon Do Championships: A prospective study. *BMC Musculoskeletal Disorders*, 5:22

- Macan, J., Bundalo, D. & Romić, G. (2001). The prevalence and distribution of injuries in karate (kumite). *Kinesiology*, 33: 137–45
- MeSH. (2015). *Wounds and Injuries*. Retrieved 05 July 2015 from: <http://www.ncbi.nlm.nih.gov/mesh/68014947>
- Naftulin, S. & Mckeag, D. (1994). Protective Equipment: Baseball, Softball, Hockey, Wrestling, and Lacrosse. In *Sports Medicine Secrets*. Ed. M. B. Mellion. Philadelphia, PA: Hanley & Belfus.
- Reyes, M. (2005). *Injuries Common to Recreational Badminton Players*. Undergraduate Thesis. College of Human Kinetics, University of the Philippines, Diliman. Quezon City, Philippines
- Scoggin, J., Brusovanik, G., Izuka, B., van Rilland, E.Z., Geling, O. & Tokumura, S. (2014). Assessment of injuries during Brazilian Jiu-Jitsu competition. *Orthopaedic Journal of Sports Medicine*, 2(2). Retrieved 06 July 2015 from: <http://ojs.sagepub.com/content/2/2/2325967114522184.full.pdf+html>
- Shamus, E. & Shamus, J. (2001). *Sports injury: prevention and rehabilitation*. NY: McGraw-Hill.
- Sterkowicz, S. (1987). Wypadki w judo w świetle wieloczynnikowej analizy epidemiologicznej [Accidents in judo in multifactorial epidemiologic analysis]. *Rocznik Naukowy AWF Krakow*, 22: 199–243.
- Svoboda, B. & Vanek, M. (1982). Retirement from high level competition. In *Mental training for coaches and athletes*. Eds. Orlick, T., Partington, J.T., Salmela, J.H. Ottawa, ON: Sport in Perspective.
- Walilko, T.J., Viano, D.C. & Bir, C.A. (2005). Biomechanics of the head for Olympic boxer punches to the face. *British Journal of Sports Medicine*, 39, 710–719
- Zazryn, T.R., Finch, C.F. & McCrory, P. (2003). A 16-year study of injuries to professional kickboxers in the state of Victoria, Australia. *British Journal of Sports Medicine*, 37, 448–451.
- Zetaruk, M.N., Violán, M.A., Zurakowski, D. & Micheli, L.J. (2005). Injuries in martial arts: a comparison of five styles. *British Journal of Sports Medicine*, 39(1): 29–33.

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Inter-Rater and Intra-Rater Reliability of Videotaped Performance of the Movement Competency Screen - 2 (MCS-2)

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The purpose of this study was to determine the intrarater and interrater reliability of the Movement Competency Screen—2 (MCS-2) in seven college female volleyball athletes (age = 17.7, ± 1.39 yrs; height = 163.1 cm, ± 5.09 cm; and weight = 58.1, ± 6.11 kg). The subjects were videotaped performing the ten (10) movements of MCS-2. The videos were then independently analyzed and scored by three separate raters of different backgrounds for two separate sessions with an interval of five days. Interrater reliability was calculated for each movement. Data were presented using mean \pm standard deviation. Typical error was represented by %CV to establish absolute reliability. Intraclass correlation coefficient (ICC) was determined to indicate relative reliability. Smallest worthwhile change (SWC) was computed using $0.2 \times$ between-subject standard deviation. Results showed that the %CV of 16.0, 16.9, and 32.8 was seen in raters 1, 2, and 3, respectively. The ICC was 0.75 for rater 1 while 0.50 ICC was posted by rater 2 and ICC = 0.40 for rater 3. The SWC was 0.58 for rater 1, 0.62 for rater 2, and 1.77 for rater 3. For interrater values, day 1 delivered %CV = 18.1, ICC = -0.52, and SWC = 1.48. For day 2, MCS-2 %CV was 20.8 with ICC = 0.47 and SWC = 0.60. In conclusion, intrarater absolute and relative reliability for MCS-2 was poor. Test usefulness was also low for all raters. In addition, interrater absolute and relative reliability for MCS-2 was poor. Test usefulness for day 1 and day 2 was marginal.

Keywords: movement competency screening, reliability, athletes

INTRODUCTION

Movement competency and consequent muscular power production are a fundamental concern for sport and health professionals when considering long-term athlete development and injury prevention (Kritz, Cronin, & Hume, 2012). Coaches and athletes use movement description to evaluate sport-specific movement demands and force characteristics (Zernicke & Whiting, 2000); and that the level of movement competency is dependent on dysfunction and/or pain (Kritz, 2012; McGill, Andersen, & Horne, 2012). There has been an increasing interest in multijoint movement screenings in determining movement patterns. One of these is the Movement Competency Screen (MCS) (Kritz, 2012; Kritz, Cronin, & Hume, 2012). The MCS uses 5 movement tasks that aim to assess squat, lunge, upper body push, upper body pull, trunk flexion or bend, trunk rotation, and unilateral lower limb function patterns. In a study made by Kritz, Cronin, and Hume (2012), it was found that interrater and intrarater reliability for MCS ranged from 0.70 to 0.85 and 0.72 to 0.92, respectively.

Recently, MCS-2 has been developed to address advanced movement screening patterns of the athletes. The MCS-2 consists of ten (10) movement tasks such as the squat, bilateral counter movement jump, lunge-and-twist, bilateral broad jump to a unilateral land, single leg squat, bilateral counter movement jump to a unilateral land, push up, explosive push up, bend-and-pull, and bend-and-pull at speed. Given the potential of MCS-2 in athletes, there has been no inter- and intrarater reliability studies up to date. Tester reliability refers to the reproducibility of test values or other measurements in repeated trials on the same individuals by the tester (Hopkins, 2000a; Lagumen et al., 2008). Tester reliability can be interpreted using absolute and relative reliability. Absolute tester reliability refers to the degree of tester variation from repeated measurements. On the other hand, relative tester reliability is the degree of a tester's positional maintenance in a sample with repeated measurements. The purpose of this study was to determine the intra- and interrater reliability of MCS-2.

METHODS

Participants

Seven ($n = 7$) college female volleyball athletes from a university in Northern

Luzon, Philippines participated in this study (age = 17.7, ± 1.39 yrs; height = 163.1 cm, ± 5.09 cm; and weight = 58.1, ± 6.11 kg). Written informed consent was gathered from the participants prior to further participation. The procedures of the study agreed with the Declaration of Helsinki for Human Experimentation.

Procedures

The participants underwent two sessions in this study. The first session included measurement of anthropometrics and familiarization. In this session, the participants were oriented with MCS-2 wherein a MCS-2 video was shown. After, the athletes were asked to perform MCS-2 for 1 set. In the second session, MCS-2 recording was facilitated. A standardized warm-up consisting of a five-minute jog and dynamic stretching exercises of 2 sets of 6 repetitions per limb (lunge and reach, reverse lunge and twist, leg swing to toe touch, knee hug to quadriceps stretch) was performed by the subjects. A two-minute rest interval after the standardized warm-up was observed. This was succeeded by the performance of MCS-2 movement tasks.

The MCS-2 starts with 2 repetitions of bodyweight squat in the frontal and sagittal planes. After the bodyweight squat, the participants performed 2 countermovement jumps (CMJ) both in the frontal and sagittal planes. The third movement task of the MCS-2 is the lunge and twist which was performed at self-selected and at a faster speed. Two repetitions were performed with alternate legs in the frontal plane. Then facing left, the participants performed 2 repetitions of lunge and twist with the right leg forward. Facing right, the participants performed the same movement for 2 repetitions with the left leg forward. The next task performed by each participant was a broad jump with unilateral land (a broad jump with a two-foot take off and a one-foot land). This was performed for 2 repetitions with alternate legs in the frontal plane. Facing left, 2 repetitions of the broad jump with unilateral land was performed with the participants landing on the right leg. Facing right, the participant landed on the left leg. Each participant then performed 2 repetitions of a single leg body weight squat with alternate legs in the frontal plane. Then with the participants facing left, 2 repetitions of the right single leg squat was performed. Facing right, a left single leg squat was performed for 2 repetitions.

The next movement task of the MCS-2 is the countermovement jump

with unilateral land (jump squat with a two-foot take off and a one foot landing). This was performed for 2 repetitions with alternate legs in the frontal plane. Then with the participants facing left, the CMJ was performed for 2 repetitions with the participants landing on the right leg. Facing right, this was again performed for 2 repetitions, however, with the participants landing on the left leg. The participants then performed 2 repetitions of the bend-and-pull at a self-selected speed and a faster speed in the frontal and sagittal planes (participants facing right). The last movement task of the MCS-2 was the performance of 2 repetitions of a standard push up followed by 2 repetitions of explosive push up in the frontal and sagittal planes (participant facing right). The MCS-2 was recorded using a Digital Single Lens Reflex camera distanced at 4–5 meters away.

The raters in this study were two (2) male and one (1) female college level physical education instructors who have more than five (5) years of teaching physical education classes. All three raters have a master's degree related to exercise science. One male instructor is a certified strength and conditioning specialist in a college basketball team while the other male instructor is the head coach of a table tennis team. The female instructor is the head coach of a women's college basketball team. No formal training was administered to the raters. The raters scored in different stations and took an average of 2 hours each in scoring all eight videos. After five days, the raters scored the videos again to determine intrarater reliability.

Rating of MCS-2 was based on the MCS-2 pack prepared by Matt Kritz (2012). Load levels were assigned to a task on the basis of a task's anatomical criteria. The lowest load level is equivalent to 1 while the highest is 5. The sum of the load scores is the overall movement competency for MCS-2.

Analysis

Data were presented using mean \pm standard deviation. Typical error was represented by %CV derived from the log transformed data to establish absolute reliability. Intraclass correlation coefficient (ICC) was determined to indicate relative reliability. Smallest worthwhile change (SWC) was computed using $0.2 \times$ between-subject standard deviation. The value in SWC was used to compare with typical error to identify test usefulness. Data were log transformed and analyzed in a reliability spreadsheet developed by Hopkins (2000b).

RESULTS

Table 1 displays the intrarater reliability of MCS-2. For rater 1, MCS-2 was scored 12.9 ± 3.60 and 13.4 ± 3.40 for day 1 and day 2, respectively. Additionally, %CV was 16.0 with an ICC of 0.75 and 0.58 SWC. Rater 2 posted MCS-2 of 12.7 ± 2.40 in day 1 and 12.7 ± 2.90 during day 2. The %CV was 16.9, while ICC = 0.50 and SWC = 0.62. For rater 3, day 1 and day 2 MCS-2 were 15.9 ± 9.50 and 13.1 ± 2.70 , respectively. The %CV = 32.8, ICC = 0.42, and SWC was 1.77.

Table 1. MCS-2 Intrarater Reliability

	Day 1	Day 2	%CV	ICC	SWC
Rater 1	12.9 ± 3.60	13.4 ± 3.40	16.0	0.75	0.58
Rater 2	12.7 ± 2.40	12.7 ± 2.90	16.9	0.50	0.62
Rater 3	15.9 ± 9.50	13.1 ± 2.70	32.8	0.42	1.77

For interrater reliability, day 1 MCS-2 scores were 13.8 ± 6.10 , %CV = 18.1, ICC = 0.52, and SWC = 1.48. Day 2 posted MCS-2 of 13.1 ± 3.00 , %CV = 20.8, ICC = 0.47, and SWC = 0.60. Table 2 displays the day 1 and day 2 interrater reliability of MCS-2.

Table 2. MCS-2 Interrater Reliability

	MCS-2	%CV	ICC	SWC
Day 1	13.8 ± 6.10	18.1	0.52	1.48
Day 2	13.1 ± 3.00	20.8	0.47	0.60

DISCUSSION

The purpose of this study was to establish the interrater and intrarater reliability of MCS-2 utilizing college physical education instructors as raters. Atkinson et al. (1999) reported that a %CV of less than 10% serves as a criterion value for an acceptable level of absolute reliability. For relative reliability, ICC of .80 above is deemed acceptable (Atkinson et al., 1999). For test usefulness, Pyne (2003) suggested using SWC. A test is 'good' if TE is less than SWC. When TE is greater than SWC, the test is 'marginal'. If TE is about the same as SWC then the test is somehow useful. Results

from this study revealed that both absolute and relative intrarater reliability posted poor reliability. Also, test usefulness is deemed marginal. Similarly, interrater absolute and relative reliability was also found to be poor during day 1 and day 2. Also, interrater test usefulness was low for day 1 and day 2.

Poor intra- and interrater absolute and relative reliabilities can be attributed to a wide margin of rater errors. First, there was no formal training administered to the raters in the study. Administration of this type of training may aid in establishing movement rating standardization, thus possibly reducing errors. Also, some of the movements in MCS-2 were not familiar to the raters. An MCS-2 familiarization phase should be warranted among the raters to reduce movement familiarization discrepancy in MCS-2 movements.

In conclusion, intrarater absolute and relative reliability for all raters in MCS-2 was poor. Intrarater test usefulness was also marginal. For interrater reliability, both days exhibited poor absolute and relative reliability. Interrater test usefulness for both days was marginal.

The MCS-2 may be used to assess the movement patterns of athletes and make necessary interventions for performance enhancement. The MCS-2 may be a useful tool in identifying athletes at risk for injury. Reliability of the MCS-2 may be improved with more precise or clearer instructions of how the MCS-2 is administered and scored to minimize the measurement error.

REFERENCES

- Atkinson, G., Nevill, A., & Edwards, B. (1999). What is an acceptable amount of measurement error? The Application of Meaningful 'analytical goals' to the reliability of sports science measurements made on ratio scale. *Journal of Sports Sciences*, 17, 18.
- Hopkins, W.G. (2000a). Measures of reliability in sports medicine and science. *Sports Medicine*, 30 (1): 1–15.
- Hopkins, W. G. (2000b). Reliability from consecutive pairs of (Excel spreadsheet): A new view of statistics. Retrieved from www.sportsci.org/resource/stats/xrely.xls.
- Kritz, M. (2012). *Development, Reliability and Effectiveness of the Movement Competency Screen (MCS)* (Doctoral Dissertation). Auckland University of Technology, Auckland, New Zealand.

- Kritz, M., Cronin, J. & Hume, P. A. (2012). Movement Competency Screen Reliability. *Journal of Australian Strength and Conditioning*.
- Lagumen, N.G., Butterwick, D.J., Paskevich, D.M., Fung, T.S., & Donnon, T.L. (2008). The Intrarater intrarater reliability of nine content-validated technical skill assessment instruments (TSAI) for athletic taping skills. *Athletic Training Education Journal*, 3, 91–101.
- McGill, S.M., Andersen, J.T., & Horne, A.D. (2012). Predicting performance and injury resilience from movement quality and fitness scores in a basketball team over 2 years. *Journal of Strength and Conditioning Research*, 26(7), 1731–1739.
- Pyne, D.B. (2003). *Interpreting the Results of Fitness Testing*. Paper presented at International Science and Football Symposium. Victorian Institute of Sport, Melbourne, Victoria, Australia.
- Zernicke, R.F., & Whiting, W.C. (2000). *Biomechanics in Sport: Performance Enhancement and Injury Prevention*. Volume IX of the Encyclopedia of Sports Medicine, an IOC Medical Commission Publication, in Collaboration with the International Federation of Sports Medicine. Blackwell Science Ltd. pp. 507–509.



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Effect of Deadlift Training on Core Strength in Previously-Untrained Males

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The purpose of this study was to examine the effect of a heavy compound exercise, in this case the deadlift, on core strength as determined through the 1-RM deadlift and the Bunkie test. The deadlift is a multi-joint movement that involves picking up a barbell from the floor and standing up to the erect position. This movement includes plenty of muscle activation, mainly the lower back, upper back, quadriceps, hamstrings, and abdominals. The core is a collection of muscles in the abdominal and lower back areas although it is commonly mistaken as simply the abdominal muscles. This study investigated the effect of deadlift training on core strength through a pretest–posttest comparison of significant differences specifically in the 1-RM deadlift and the Bunkie test for core strength. Twenty-one (21) previously-untrained male college students participated in a 5-week deadlift strength program using progressive overload with no direct core training involved. Two t-tests for dependent means were used for comparison of the pretest and posttest scores, and significant differences were evaluated for effect size using Cohen's d. All results were tested for significance at $\alpha = 0.05$. The 5-week deadlift program resulted in significant increases in both the 1-RM deadlift, derived from the Brzycki formula, and Bunkie test scores most notably in the posterior stabilizing line and the medial stabilizing line. Deadlift strength training, even without direct core training, leads to significant improvements in core strength in previously-untrained male college students.

Keywords: deadlift, core, strength, repetition max

INTRODUCTION

The deadlift is a resistance training exercise in which a loaded barbell is lifted off the floor by extending the hips and knees until the body reaches a fully erect torso position (Earle and Baechle, 2008). This barbell deadlift is one of the three lifts in the sport of powerlifting (along with the squat and bench press) and is a part of many resistance training programs. The deadlift entails plenty of muscle activation mainly the gluteal muscles, hamstring, quadriceps, and lower back as well as numerous synergist muscles in the upper body. Certain exercises like the squat and lunges require the same prime movers as the deadlift. However, the emphasis of the deadlift lies on the powerful activation of the gluteal and hamstring muscles to straighten the hips as well as highly involved synergistic role of the upper body. Such is the fundamental appeal of the deadlift in terms of physical enhancement that it has, along with its variations, been the subject of many reviews (Farley, 1995; Gardner and Cole, 1999; Frounfelter, 2000; Graham, 2000; Piper and Waller, 2001; Graham, 2001; Hales, 2010; Bird and Barrington-Higgs, 2010). The practical application of the deadlift is simple and can be used in daily life like picking items off the floor or moving heavy objects like furniture. All of these movements are mimicked by the deadlift, so an individual may perform better daily life activities.

Among the lifts that are widely beneficial for an individual, the deadlift is one of the most underrated and underappreciated. The reason for its unpopularity probably stems from the deep rooted idea that it is hazardous to the lumbar tract of the spine or the vertebral column (Casillo, 2008). Although assuming that the deadlift is completely safe and harmless is false, certain precautions can be done to minimize and even prevent injuries while training (Thibaudeau, 2008). The deadlift directly targets all of the major muscle groups responsible for correct posture and, in turn, core strength. Correct deadlifting technique enables one to hold their back straight and keep a correct posture when engaging in daily activities because of its emphasis on maintaining a straight back throughout the movement. The deadlift also strengthens all the surrounding supporting muscles of the waist, backside, and hips and, of course, lower back. This exercise can be an integral part of any resistance training program because it is very simple but is profound in its capacity to increase overall strength and can contribute to more strength and size gains compared with many other exercises (Robson, 2015).

The core can be broadly defined as the torso, an area of the human body that is essential for movement capacity such that a lack of muscular development may predispose one to injury (Karageanes, 2004). It can be further described as a collection of muscles in the abdominal and lower back areas. This includes all the abdominal muscles (rectus abdominus, internal and external obliques, transverse abdominus and intercostals) as well as the muscles associated with the spine (the erector spinae group) and the hip flexors (iliacus and psoas, collectively known as the iliopsoas). Having a strong core brings about many functions, one of which is to stabilize and protect the spine by creating stiffness that limits excessive movement in any direction—most notably, extension, flexion, lateral flexion, and rotation (Bumgardner, 2015). That being said, it is assumed that a strong core equates to better overall stability and balance. Core stability is an important attribute of the body and is vital to athletes and nonathletes alike.

The core has become a household term in the fitness industry. People seem to equate the core with abdominal training which explains why various websites, commercials, advertisements, and even trainers use the phrase to attract misinformed potential clients vying to get a “ripped” abdominal area. In truth, the core exists for a reason much more than the aesthetic value that lean abdominal muscles give and, thus, needs to be understood completely. The interaction of the overloading capacity of deadlift training and its inherent benefits to core strength and stability is yet to be objectively investigated. Thus, the aim of this study was to determine if there would be a significant change in the core strength of previously-untrained individuals after a deadlift training program, specifically whether a purely deadlift strength training program may elicit changes in one’s core strength even without direct core training.

Muscular strength testing is an integral aspect of muscular fitness assessment, and this principle can be applied to the deadlift. The absolute strength of a muscle is defined as the greatest amount of weight the muscle can lift in a single time — called the One-Repetition Max (1-RM) — in this case, the 1-RM deadlift. Many strength tests are performed using free weights, so proper form and control are important to maintain safety. Studies on 1-RM testing have reported it to have high validity and test-retest reliability (English et al., 2008; Bezerra et al., 2013) making it an ideal method of measuring an individual’s absolute strength.

Used to assess core strength, the Bunkie test is primarily a functional performance test consisting of five positions performed on the left and right sides of the body totaling 10 positions of evaluation. The Bunkie test was first introduced by de Witt and Venter (2009) to evaluate fascia mobility and athletic performance. The name Bunkie was derived from the Afrikaans word “bankie” which means “little bench”. The results of the test depend on the participants’ ability to hold each of the five positions. The test prescribes participants to hold each position for a specified amount of time or duration and would stop if pain or deviation from the standard form occurs. The test identifies performance in the anterior, posterior, medial, and lateral aspects of the core. Identifying weak areas is essential to determine how the core can be strengthened through training thus even rehabilitation professionals can utilize this test (Brumitt, 2011).

A study that assessed the relationship of the Bunkie test and athletic performance was done by van Pletzen and Venter (2012) on professional rugby players using the Bunkie test along with other tests for athletic performance. The results were groundbreaking as the participants who scored high in the Bunkie test (those who were able to hold the positions for the prescribed duration) exhibited positive significant relationships with the results for the other tests — agility, speed, anaerobic endurance, leg power, and upper body strength. Furthermore, the participants were familiar with all of the tests aside from the Bunkie test and therefore would not have been able to prepare for the Bunkie test in any way possible. When tested on a general, healthy population, the Bunkie test offered a high test–retest reliability for the five testing positions with intraclass correlation coefficients going as high as 0.95 (Brumitt, 2015). Furthermore, the Bunkie test may also be a useful tool for diagnosing muscular asymmetry as the tests are done unilaterally or as a means of tracking muscular function progress for patients undergoing rehabilitation (Brumitt, 2011).

MATERIALS AND METHODS

Research Design

This study is a pretest–posttest comparison of significant differences specifically in the 1-RM deadlift and the Bunkie tests. The intervention was a 5-week, twice-a-week frequency (with rest days in between sessions)

deadlift strength program using progressive overload. The more common conventional deadlift style was used in this study. The conventional deadlift uses a narrower stance (feet about 32 to 35 cm apart) with hand/grip placement outside the stance feet compared with that of the sumo style (Escamilla et al., 2000; Escamilla et al., 2002) which involves a placement of the hands outside the stance feet. Aside from the 5-week training program, separate days were provided for the (1) briefing/orientation about the deadlift, (2) pretesting of the 1-RM deadlift, (3) pretesting of the Bunkie test, (4) posttesting of the 1-RM deadlift, and (5) posttesting of the Bunkie test.

Participants of the Study

Twenty-one previously-untrained but healthy male college students with a mean age of 20.6 (± 2.6 yrs) — novices with no background in weight training — participated in the study. The diet, sleeping habits, fatigue management strategies, and pre- and postworkout nutrition of the participants were not monitored.

Instruments of the Study

Since novices are typically incapable of handling heavy free weights because of their lack of familiarity and experience, a derivative of the 1-RM was employed using predicted 1-RM testing through a conversion table. The Brzycki (1993) formula is one of the commonly used 1-RM prediction methods and is calculated using the formula “weight lifted/ (1.0278 – (0.0278 \times repetitions))”. It provides a fairly accurate estimation of the 1-RM especially in performances of less than 10 repetitions and was thus applied in the pretest and posttest of the 1-RM deadlift.

As introduced earlier, the Bunkie test is a method for assessing core strength and was applied in this study to determine the pretest and posttest core strength of the participants. The test involves five testing positions namely the (1) posterior power line (PPL), (2) anterior power line (APL), (3) posterior stabilizing line (PSL), (4) anterior stabilizing line (ASL), and (5) medial stabilizing line (MSL). Each position is to be held with the feet on a 30-cm bench and the upper extremities (palms and forearms) supporting the upper body. Once ready, the individual would raise one

leg or foot (depending on the test) a few inches off the bench. Although it is suggested that athletes are to hold the position for 20 to 40 seconds, the participants were novices and were just tested on how long they could hold the position as suggested by de Witt and Venter (2009). Aside from the individual scores that would be derived from each testing position, an overall score was also obtained by summing all five scores in the Bunkie test.

Tools for Analysis

Normality was assessed using the Shapiro-Wilk (1965) test and showed that data were normally distributed meeting the assumptions of a parametric test. Two t-tests for dependent means were used for comparison of the pretest and posttest scores. When applicable, significant differences were evaluated for effect size using Cohen's d to measure the magnitude of mean differences (by definition $d = 0.20$, small effect; $d = 0.50$, medium effect; $d = 0.80$, large effect) (Cohen, 1988). Significance was tested at $\alpha = 0.05$.

RESULTS

The principle of specificity, the foundation of all exercise programs today, states that individuals must train in a specific way to get specific results (Baechle and Earle, 2004). Thus, as expected because of training specifically for deadlifts, there was a significant increase in the 1-RM deadlift at 21% and was significant ($p = 0.000$) with a large effect size ($d = 1.13194$). This result was not surprising since the participants underwent a 5-week deadlift strengthening program with progressive overload.

Throughout the 5-week program, there was no direct core training, and the participants were not subjected to the Bunkie test at any point in the program. As implied by the specificity principle, this should not elicit any changes in core strength unless otherwise affected, directly or indirectly, by deadlift training. The researchers observed a 28.6% increase in the overall Bunkie test scores ($p = 0.0000$) with a large effect size ($d = 1.6810$). As can be observed in Figure 1 below, posttest scores in both the 1-RM deadlift and Bunkie test were considerably much higher than the pretest scores:

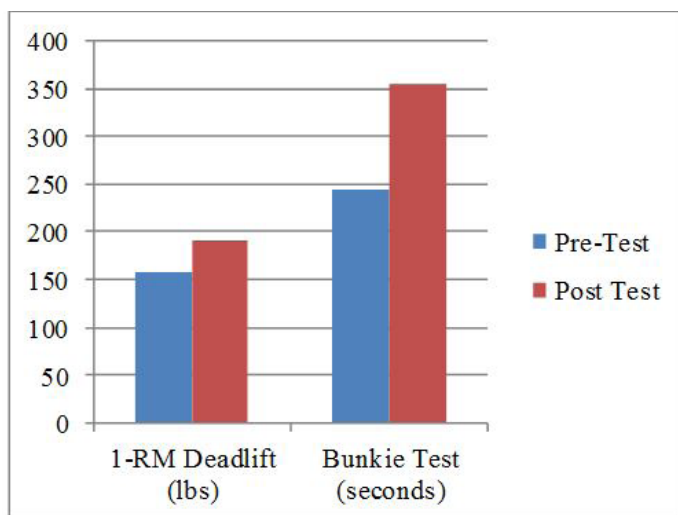


Figure 1. Pretest vs. posttest 1-RM deadlift and Bunkie test scores.

The outcome of the Bunkie test comparison is promising as it offers initial insight into the argument that many of the muscles targeted by the deadlift were similar parts of the core responsible for maintaining and ensuring proper posture for core strength. In effect, gains in core strength presumably came from the nature of the deadlift which has high muscle activation not only in the torso but also in the whole body as well. As stated earlier, movement during the deadlift does activate the abdominal muscles as well as the muscles associated with the spine and the hip flexors (Nilsson, 2003).

Further investigation into the individual Bunkie scores showed that there were significant improvements in all testing positions. The PPL had a 12.4% increase ($p = 0.0000$) with a large effect size ($d = 0.7860$). The APL increase was higher at 23.8% ($p = 0.0002$) with a large effect size ($d = 1.1678$) as well. The third position, the lateral stabilizing line LSL yielded impressive results with a 61.7% increase ($p = 0.0000$) also with a large effect size ($d = 1.3450$). Much more impressive were the results from the PSL with an 83.6% increase ($p = 0.0000$) and the MSL with an 87.8% increase ($p = 0.0000$) with both having large effect sizes ($d = 1.5927$ and $d = 1.5196$, respectively). These results are better appreciated through Figure 2 which illustrates the marked increase in performance in the test positions.

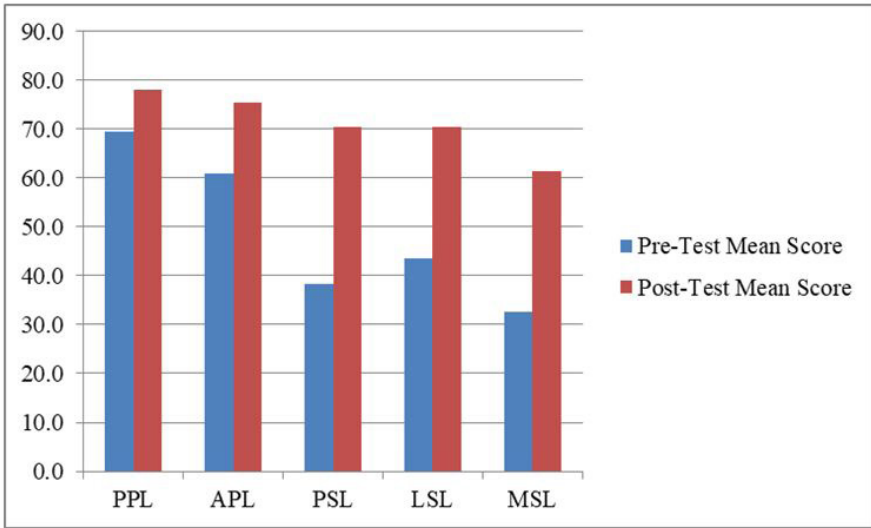


Figure 2. Pretest vs. Posttest mean scores in the individual Bunkie test positions.

CONCLUSION

The purpose of this study was to examine the effect of heavy compound exercise training, in this case the deadlift, on core strength as determined through the 1-RM deadlift and the Bunkie test. This hopefully contributes to research linking the positive effect of the deadlift on core strength through statistical evidence. The 5-week deadlift program resulted in significant increases in both the 1-RM deadlift, derived from the Brzycki formula, and Bunkie test scores most notably in the posterior stabilizing line and the medial stabilizing line. Deadlift strength training, even without direct core training, leads to significant improvements in core strength in previously-untrained, healthy males.

RECOMMENDATIONS

The sample population used in this study consisted of untrained males. Different groups may be investigated to find out whether the results would be similar especially among male and female athletes and/or trained individuals. Different training program durations may also be used to determine the effect of programs which may be shorter or longer than

the five weeks used in this study. Adjustments in training volume and/or intensity may also be investigated as well as using different exercises whether multi-joint or isolation exercises.

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REFERENCES

- Bezerra, E. S., Simão, R., Fleck, S. J., Paz, G., Maia, M., Costa, P. B., & Serrão, J. C. (2013). Electromyographic activity of lower body muscles during the deadlift and still-legged deadlift. *Journal of Exercise Physiology Online*, 16(3)
- Bird, S. & Barrington-Higgs, B. (2010). Exploring the deadlift. *Strength & conditioning journal*, 32(2): 46–51
- Brumitt, J. (2011). Successful rehabilitation of a recreational endurance runner: initial validation for the bunkie test. *Journal of bodywork and movement therapies*, 15(3): 384–390
- Brumitt, J. (2015). The Bunkie Test: Descriptive Data for a Novel Test of Core Muscular Endurance. *Rehabilitation Research and Practice*, Volume 2015, Article ID 780127. Retrieved 17 March 2016 from <http://dx.doi.org/10.1155/2015/780127>
- Brzycki, M. (1993) Strength testing—Predicting a one-rep max from reps-to-fatigue. *Journal of physical education, recreation and dance*, 68: 88–90
- Bumgardner, T. (2015). Core strength. Retrieved 30 Jan 2016 from <http://www.bodybuilding.com/fun/core-strength-your-ultimate-guide-to-core-training.html>
- Casillo, F. (2008). A scientific approach to the deadlift. Retrieved 31 Jan 2016 from <http://www.bodybuilding.com/fun/casi4.htm>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.
- de Witt, B. & Venter, R. (2009). The ‘bunkie’ test: assessing functional strength to restore function through fascia manipulation. *Journal of bodywork and movement therapies*, 13(1): 81–88

- Earle, R. and Baechle, T. (2008) Resistance training and spotting techniques. In: *Essentials of Strength Training and Conditioning*. Ed: Baechle, T., Earle, R. 3rd ed. Champaign, IL: Human Kinetics. 359
- English, K. L., Loehr, J. A., Laughlin, M. A., Lee, S. M., & Hagan, R. D. (2008). Reliability of strength testing using the advanced resistive exercise device and free weights. *NASA Technical Paper, 214728* Retrieved 28 February 2016 from http://ston.jsc.nasa.gov/collections/trs/_techrep/TP-2008-214782.pdf
- Escamilla, R.F., Francisco, A.C., Fleisig, G.S., Barrentine, S.W., Welch, C.M., Kayes, A.V. & Andrews, J.R. (2000). A three-dimensional biomechanical analysis of sumo and conventional style deadlifts. *Medicine & science in sports & exercise*, 32(7): 1265–1275
- Escamilla, R.F., Francisco, A.C., Kayes, A.V., Speer, K.P. & Moorman 3rd, C.T. (2002). An electromyographic analysis of sumo and conventional style deadlifts. *Medicine & science in sports & exercise*, 34(4): 682–688
- Farley, K. (1995). Analysis of the conventional deadlift. *Strength & conditioning journal* 17(6): 55–57
- Frounfelter, G. (2000). Teaching the Romanian deadlift. *Strength & conditioning journal*, 22(2): 55
- Gardner, P. J. & Cole, D. E. (1999). The stiff-legged deadlift. *Strength & conditioning journal*, 21(5): 7
- Graham, J. F. (2000). Exercise: Deadlift. *Strength & Conditioning Journal*, 22(5): 18
- Graham, J. F. (2001). Exercise: stiff-leg deadlift. *Strength & conditioning journal*, 23(4): 70
- Hales, M. (2010). Improving the deadlift: understanding biomechanical constraints and physiological adaptations to resistance exercise. *Strength & conditioning journal*, 32(4): 44–51
- Karageanes, S.J. (2004). *Principles of Manual Sports Medicine*. Philadelphia, PA: Lippincott Williams & Wilkins. 510–511
- Nilsson, N. (2008). Strong to the core of your being. Retrieved 30 Jan 2016 from <http://www.bodybuilding.com/fun/betteru5.htm>
- Piper, T. J. & Waller, M. A. (2001). Variations of the deadlift. *Strength & conditioning journal*, 23(3): 66–73

- Robson, D. (2015). Deadlifts: the king of mass-builders? Retrieved 30 Jan. 2016 from <http://www.bodybuilding.com/fun/drobson101.htm>
- Shapiro, S. S. & Wilk, M. B. (1965). An analysis of variance test for normality (complete samples). *Biometrika*, 52(3–4): 591–611
- Thibaudeau, C. (2008). Dissecting the deadlift. Retrieved 29 Jan 2016 from <https://www.t-nation.com/training/dissecting-the-deadlift>
- van Pletzen, D. & Venter, R. (2012). The relationship between the Bunkie test and physical performance in rugby union players. *International journal of sports science and coaching*, 7(3): 545–556



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Reliability and Usefulness of an Eye - Foot Reaction Time Test in Female University Basketball Athletes

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The purpose of this study was to determine the intra- and interset absolute and relative reliability of an eye-foot reaction time test. It also aimed to establish test usefulness. Nineteen (19) university female basketball athletes participated in the study. They performed a standardized warm-up and 2 sets of eye-foot reaction time test on both limbs with each set consisting of 3 trials randomly interspersed within 30 seconds. Intra- and interset interval was set at 15 seconds. Typical error (TE), typical error as percentage of coefficient of variation (%CV), intraclass correlation coefficient (ICC), and smallest worthwhile change (SWC) were computed. For set 1, right foot showed TE = .037, %CV = 8.90, ICC = 0.45, and SWC = .009. Left foot posted TE = .035, %CV = 8.90, ICC = 0.56, and SWC = .010. For set 2, right foot TE = .021, %CV = 8.90, ICC = 0.74, and SWC = .008. Left foot demonstrated TE = .024, %CV = 6.40, and SWC = .008. For interset values, it was seen that right foot showed TE = .010, %CV = 2.60, ICC = 0.93, and SWC = .007. Left foot showed TE = .026, %CV = 6.60, ICC = 0.60, and SWC = .008.

In conclusion, right foot and left foot intraset absolute reliabilities were “good” for set 1 and set 2. However, relative reliability was “poor” for both limbs at both sets. Similarly, test usefulness was marginal for right foot and left foot at set 1 and set 2. In contrast, interset absolute reliability was “good” for the right foot and left foot. Relative reliability was “good” for the right leg but “poor” for the left leg. Eye-foot reaction time test is somehow reliable for the right leg but marginal for the left leg.

Keywords: Eye-Foot Reaction Time, Reliability, Chronojump-Boscosystem, Open Source Technology

INTRODUCTION

In the recent decade, there has been an increasing interest in the application of open source technology for sports performance and monitoring. One such technology is the Chronojump-Boscosystem. The Chronojump-Boscosystem consists of an open source hardware and free software which is compatible with various contact mechanisms that can be used to detect time-based performances (Blas, Padullés, López del Amo, & Guerra-Balic, 2012). One test that can be applied using this technology is the simple Eye-Foot Reaction Time (EF-RT) Test. The EF-RT represents the interval time between the application of visual stimulus and foot contact of a participant. The EF-RT has been related to nervous system insensitivity in brain traumatic injury patients (Gould, Ciuffreda, Yadav, Thiagarajan, & Arthur, 2013). In another light, researchers were able to differentiate the level of athletic competency in football players from EF-RT (Montés-Micó, Buno, Candel, & Pons, 2000). An initial study by Pagaduan (2014) showed good absolute reliability for the left foot and right foot EF-RT in male and female university physical education students. Furthermore, relative reliability was poor for the right leg and good for the left leg. Both feet displayed marginal utility. The purpose of this study was to determine the intra- and inter-set absolute and relative reliability of EF-RT in female basketball athletes. This study also aimed to identify the usefulness of EF-RT Test using the Chronojump-Boscosystem.

METHOD

Participants

Nineteen female university basketball athletes during the off-season training phase participated in the study. These athletes have no known orthopedic injury that may prevent them from performing the task. Informed consent was acquired from the participants prior to further experimentation. The procedures of the study agreed with the declaration of Helsinki for Human Testing.

Procedures

This study occurred for a single session between 0600–0800 hours in the

basketball court of a university gymnasium. Upon arrival at the facility, the participants performed the Movement Competency Screen (MCS) exercises for 2 sets. The MCS consists of 5 exercises (squat, lunge and twist, push-up, bend and pull, single leg squat) executed for 2 repetitions in the frontal and sagittal planes. Frontal plane movements are completed first before proceeding to sagittal plane exercises. After MCS, the participants rested for 2 minutes. This was followed by 2 sets of EF-RT Test in the right and left limbs performed alternately. Each set consists of 3 randomized trials interspersed within 30 seconds. Additional trials were performed if any error (technical or erroneous performance by respondents) was perceived by the tester. Intra- and interset rest interval was 15 seconds. The EF-RT was measured using the Chronojump-Boscosystem. In this study, a visual stimulus (5-mm green LED light), push button, and two parallel contact platforms (30.48 cm × 30.48 cm) were connected to chronopic set at 10 ms. The chronopic is linked to the Chronojump-Boscosystem software which displays time results. The height of the LED is set at 150 cm. Contact platforms are 150 cm away from the light stimulus and are separated by 30.48 cm with 5.08 cm and 10.16 cm markings placed away from the platforms.

In the EF-RT Test, athletes were positioned at the center of the light stimulus and stood at hip width apart with hands hanging at the sides. The lead foot and trail foot were placed at 5.08 cm and 10.16 cm markings, respectively. Markings were referenced at the edge of the contact platforms. Athletes were encouraged to keep both feet on the ground. Upon seeing the green light initiated by the release of the push button by the tester, the athletes step on the platform as quickly as possible using the lead leg.

Analysis

Intrasets and intersets data were presented as mean ± standard deviation. All the trials in each set for both limbs were used for intrasets analyses. The mean of each set for both limbs was subjected to intersets analyses. Absolute reliability was determined using percentage of coefficient of variation (%CV) derived from the log transformed data. Relative reliability was identified from intraclass correlation coefficient. Test usefulness was established comparing typical error (TE) with smallest worthwhile change ($0.2 \times$ between-subject standard deviation). Analyses were performed using a reliability MS excel file developed by Hopkins (2000a).

RESULTS

Table 1 shows the intraset reliability and usefulness of left and right EF-RT. Right foot — set 1 depicted TE = .037, %CV = 8.90, ICC = 0.45, and SWC = .009. Set 1 of the left foot demonstrated TE = .035, %CV = 8.90, ICC = 0.56, and SWC = .010. In the second set of the right foot, TE was .021 with %CV = 8.90, ICC = 0.74, and SWC = .008. The second set of the left foot posted TE = .024, %CV = 6.40, ICC = 0.69, and SWC = .008.

Table 1. Intra-Set Typical Error, %CV, ICC and SWC of Right and Left EF RT

Set 1	1	2	3	TE	%CV	ICC	SWC
Right	.391 ± .038	.400 ± .060	.390 ± .036	.037	8.90	0.45	.009
Left	.415 ± .050	.394 ± .054	.388 ± .052	.035	8.90	0.56	.010
Set 2	1	2	3	TE	%CV	ICC	SWC
	.377 ± .043	.377 ± .035	.387 ± .039	.021	8.90	0.74	.008
	.384 ± .043	.384 ± .043	.377 ± .041	.024	6.40	0.69	.008

Table 2. Inter-set TE, %CV, ICC and SWC of Right and Left EF RT

	Set 1	Set 2	TE	%CV	ICC	SWC
Right	.393 ± .036	.380 ± .034	.010	2.60	0.93	.007
Left	.399 ± .041	.382 ± .037	.026	6.60	0.60	.008

For inter-set variables, EF-RT of the right foot showed TE = .010, %CV = 2.60, ICC = 0.93, and SWC = .007. On the other hand, left foot EF-RT demonstrated TE of .026, %CV = 6.60, ICC = 0.60, and SWC = .008.

DISCUSSION

The main objective of this study was to identify the intra- and inter-set reliability of right and left EF-RT Test in Chronojump-Boscosystem. Absolute reliability was interpreted as “good” if %CV is less than 10% (Atkinson, Neville, & Edwards, 1999). Relative reliability is “good” if ICC is at least 0.90 (Hopkins, 2000b). For test usefulness, TE was compared with SWC (Hopkins, 2004). A test is considered to have high usefulness if TE is less than SWC. If TE is equivalent to SWC, a test is somewhat useful. If TE is greater than SWC, a test has marginal utility. In this study, results

revealed that intraset absolute reliability was “good” for both limbs in both sets. However, intraset relative reliability posted “poor” values for right and left EF-RT in both sets. Additionally, EF-RT Test using intraset values was nonuseful. It should also be noted that an increasing trend intraset absolute and relative reliability existed from set 1 to set 2 of right and left leg.

For interset values, it was identified that right leg EF-RT presented “good” absolute and relative reliability. The SWC was almost the same as TE which means that using right EF-RT Test is somehow useful. Absolute reliability for the left leg was “good” but relative reliability was “poor”. The EF-RT Test for the left leg is marginal.

Utilizing EF-RT in Chronojump-Boscosystem may provide a low-cost alternative among practitioners. Implications for increasing EF-RT reliability include additional number of sets and intraset trials. In conclusion, intraset absolute reliability for right and left EF-RT Test was “good” while relative reliability was “poor” for set 1 and set 2. Intraset EF-RT Test usefulness was marginal for both limbs. Interset absolute reliability was “good” for right and left EF-RT Test. Relative reliability was “good” for right EF-RT Test but was “poor” for left EF-RT Test. Right EF-RT Test was useful while left EF-RT Test has marginal usefulness.

REFERENCES

- Atkinson, G., Nevill, A., & Edwards, B. (1999). What is an acceptable amount of measurement error? the application of meaningful ‘analytical goals’ to the reliability of sports science measurements made on ratio scale. *Journal of Sports Sciences*, 117, 18.
- Blas, X., Padullés, J.M., López del Amo, J.L., & Guerra-Balic M. (2012). Creation and validation of Chronojump-Boscosystem: a free tool to measure vertical jumps. *International Journal of Sports Science*, 30(8), 334–356.
- Montés-Micó, J., Buno, I., Candel, J., & Pons, A.M. (2000). Eye–hand and eye–foot visual reaction times of young soccer players. *Optometry*, 71(12), 775–780.
- Gould, A.J., Ciuffreda, K.J., Yadav, N.K., Thiagarajan, P., Arthur, B. (2013). The effect of retinal defocus on simple eye–hand and eye–foot reaction time in traumatic brain injury (TBI). *Brain Injury*, 27(13–14), 1643–1648.
- Hopkins, W. G. (2000a). Reliability from consecutive pairs of trials (Excel spreadsheet). In A new view of statistics: Sportsscience.org, Internet Society for Sport Science. www.sportsci.org/resource/stats/xrely.xls.

- Hopkins, W.G. (2000b). Measures of reliability in sports medicine and science. *Sports Medicine*, 30(1), 1–15.
- Hopkins, W.G. (2004). How to interpret changes in an athletic performance test. *Sports Science*, 8, 1–7. www.sportsci.org/jour/04/wghtests.htm
- Pagaduan, J.C. (2014), Reliability of an eye–foot reaction time test in Chronojump-Boscosystem. *Sport Scientific and Practical Aspects*, 11(2), 15–18.

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The Nutrition Program Among Preschoolers of Dumaguete City: Perception on Implementation and Impact

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This paper examines the extent of the implementation of the nutrition programs of Dumaguete City among the preschool children as perceived by the barangay captains, the barangay nutrition workers, and the mothers of the beneficiaries. The results suggest that the overall implementation of the nutrition programs of the city was “very good” after one year of implementation. However, the prevalence of malnutrition was still higher than the cutoff score. Also, some barangays despite high implementation scores had high malnutrition prevalence rates. This may be because of the fact that less significant interventions garnered higher implementation scores than those which are more significant but with low implementation ratings. The findings of this study can help local nutrition committees to improve the management of their nutrition programs in order to significantly reduce malnutrition.

Keywords: nutrition, nutrition programs, nutrition interventions, malnutrition prevalence, Dumaguete City

INTRODUCTION

One of the major objectives of the Millennium Development Goals of the United Nations (UN-MDGs) is to eradicate extreme poverty and hunger. To achieve this goal, the strategies include reducing by half in 2015 the proportion of people living on less than a dollar a day, achieving full and productive employment and decent work for all, and reducing by half

the number of people who suffer from hunger. The main target is to reduce the prevalence of underweight children less than five years of age (United Nations Development Programme [UNDP], 2011).

In the Philippines, the results of the National Nutrition Survey (NNS) in 2008 conducted by the Food and Nutrition Research Institute (FNRI) revealed that 20.7% of preschool children are undernourished and are classified as either underweight or severely underweight (FNRI, 2010). In a study on the hunger incidence in the country based on the 2008 NNS, there was a significant increase (24.6%) in the proportion of underweight 0–5-year-old children and another significant increase (27.9%) of children who were stunted. Of the 20.7%, 4.3% were considered severe. In the same study, results showed that Central Visayas recorded 16.2% and 3.2% underweight and severely underweight preschool children, respectively (Mapa et al., 2010). The FNRI further describes undernutrition among children as still a significant public health concern (FNRI, 2010).

In its Regional Summary Report on Operation Timbang done in March 2010, the National Nutrition Council—Region VII ranked the Province of Negros Oriental number one in malnutrition with an 8.37% prevalence rate. Of the 16 cities included in the survey, Dumaguete City was number eight with a 4.40% prevalence rate.

The Medium-Term Philippine Plan of Action for Nutrition (MTPPAN) is the country's response to malnutrition. It is a vital contribution to the achievement of the Millennium Development Goals by 2015. Its overall goal is to improve quality of life by transforming the population into a well-nourished, healthy, mentally able, socially active, and economically productive human resource capable of contributing to and enjoying the fruits of the nation's development (National Nutrition Council [NNC], 2009).

In economically-challenged communities however, quality of life is hindered by malnutrition. Malnutrition is “the opposite of good nutrition”. Claudio and Dirige (2002) in *Basic Nutrition for Filipinos* define malnutrition as a condition of the body resulting from a lack of one or more essential nutrients (nutritional deficiency), or it may be because of an excessive nutrient supply to the point of creating toxic or harmful effects (e.g., overnutrition and hypervitaminosis) (p. 1–7).

There are several forms of malnutrition. The most common form is known as undernutrition and is a condition which results from inadequate consumption of food over a long period of time. The individual may not

be able to maintain an adequate level of growth because his/her physical function is impaired (National Nutrition Council—University of the Philippines Los Baños [NNC-UPLB], 2011).

Malnutrition has the potential to cause severe and sometimes irreversible damage to individuals and communities in an intricate fashion (NNC, 2009). Evidence based on a study shows the clear association of infections and malnutrition in children and is seen as an important issue leading to severe and fatal outcomes. Common infections found in malnourished preschool children were gastroenteritis, acute respiratory tract infections, helminthic and protozoal infections, and sepsis (Ahmed, Ejaz, & Zehra, 2010).

Allen (2007) also observed that malnourished children tend to be born in poor households, and because of malnutrition, the likelihood of them getting higher income as adults is very slim resulting to them being parents to children who are also undernourished. And so this vicious cycle continues.

The 1987 Philippine Constitution guarantees child nutrition when it stated in Article XV Section 3 that, “The state shall defend... The right of the children to assistance, including proper care and nutrition...”

However, even before the 1973 Constitution was changed in 1987, many national level legislations and policies were enacted toward promoting good nutrition in the country. One of such laws is Presidential Decree 491 (1974) also known as the Nutrition Act of the Philippines. Presidential Decree 491 declared nutrition as a priority of the Philippine government. This law formally created the National Nutrition Council under the Office of the President and operates as the highest policy-making and coordinating body on nutrition and is mandated to formulate, monitor, coordinate, and evaluate the national nutrition program. Presidential Decree 491 paved the way to the realization of the country’s response to malnutrition known as the Philippine Plan of Action for Nutrition (PPAN) and has since been updated as the Medium-Term Philippine Plan of Action for Nutrition 2005–2010 (NNC, 2009).

Letter of Instruction 441 (LOI 441, 1976) issued by the Office of the President of the Republic instructs all departments of the government to address malnutrition. Specifically, it authorized the Department of the Interior and Local Government (DILG) to establish nutrition committees at various administrative levels from the different geopolitical regions down to the barangays.

Furthermore, PD 1569 (Strengthening the Barangay Nutrition Program) of 1978 provides, among others, the employment of at least one (1) barangay nutrition scholar/worker in every barangay and, therefore, making the provision of a BNS/W in the barangay legally mandated. This, together with the devolution to the LGUs the delivery of basic services including health and nutrition through the Local Government Code of 1991 (RA 7160), gave more capacity to the BNC to fully address malnutrition in their locality.

In an article published in the Journal of Nutritionist–Dietitians’ Association of the Philippines, former NNC Executive Director Elsa M. Bayani (2006) provided details of MTPPAN’s impact programs as follows:

- a. Home, school, and community food production — establishment of kitchen gardens in homes, schools, and communities using biointensive gardening and other regenerative agricultural technologies including urban and peri-urban gardening technologies; provision of initial seed supply and gardening implements; small animal dispersal particularly chicken for the eggs and poultry, goat for meat and milk, and fish like tilapia; and provision of potable water supply system.
- b. Micronutrient supplementation — provision of pharmaceutical preparations of iron and vitamin A in the form of capsules, tablets, or syrup to identified priority groups.
- c. Food fortification — the addition of micronutrients to a food or seasoning widely consumed by a specific population group.
- d. Nutrition information, communication, and education — include the promotion of food and nutrition messages consistent with Nutrition Guidelines for Filipinos using different media; integration of nutrition messages in the school curricula; and conduct of nutrition education classes and counseling.
- e. Food assistance — provision of food supplements to the malnourished as an emergency measure to alleviate hunger and malnutrition.
- f. Livelihood assistance — families with underweight children will be given priority credit assistance to start income-generating projects or infuse additional capital to make existing income-generating projects more viable.
- g. Reproductive health care delivery package — services especially

- focusing on adolescent females and pregnant and lactating women.
- h. Providing access to adequate and safe water supply as well as sanitation facilities and improving the knowledge of families and care givers on the importance of maintaining personal hygiene and cleanliness.
 - i. Integrated management of childhood illnesses — aims to promote health and well-being of children and reduce the negative impact of infections on nutritional status of children.

The implementing structure of MTPPAN may be viewed into two major parts: the national and subnational levels. At the national level, the NNC provides policies and standards and, although at a limited extent, technical assistance to the various stakeholders in the subnational levels. This function of the NNC is more ably done through their regional offices all over the country. At the subnational level, the implementation of the PPAN programs is the main responsibility of each local government unit. The local nutrition committees (LNCs), under the leadership of the local chief executives, are responsible for the management of these programs (Bayani, 2006). The LNC is defined by the NNC as the “...mechanism for planning, implementing, monitoring, evaluating, and coordinating the local nutrition action plan (LNAP)” (NNC-UPLB, 2011).

As a member of the Dumaguete City Nutrition Council and a partner in the delivery and implementation of the MTPPAN from 2005 to 2010, the Silliman University Nutrition and Dietetics Department conducted a study on the perception on the implementation and impact of the nutrition program among preschoolers of the city. The results of the study may lead to a review of the policies and implementation guidelines that may strengthen the Barangay Nutrition Committee (BNC) and the development of a more realistic and sound Barangay Nutrition Action Plan (BNAP) in every barangay of Dumaguete City. Specifically, this study addresses the central question on the perceptions of the barangay captains, barangay nutrition workers, and mothers about the implementation of barangay nutrition program and its impact on the nutritional status of preschool children. Furthermore, it examines the implementation of individual programs in every barangay and the city in general.

METHODS

The study covered 47 nutrition centers of the 25 barangays of Dumaguete City in Negros Oriental. The respondents were 25 barangay captains, 46 barangay nutrition workers (formerly known as barangay nutrition scholars [BNS]), and 25 mothers of preschool children who were recipients of nutrition programs. The research instruments used were interview schedules, checklists, and secondary data from the Dumaguete City Nutrition Council (DCNC). The checklist was used to gather the extent of implementation of the interventions of the BNAP. The researchers personally interviewed the respondents, conducted field observations using the checklist, and reviewed documents at the City Nutrition Office (CNO). The statistical tools used descriptive statistics and Spearman rho to test the hypothesis regarding the relationship between the perceived extent of implementation of interventions and the nutritional status of preschoolers.

To get the implementation score, the nutrition workers were given a questionnaire on extent of implementation where they rated the quality of the implementation of the strategies of the seven impact programs. They rated 0 for never implemented, 1 for poor implementation, 2 for fair implementation, 3 for good implementation, 4 for very good implementation, and 5 for excellent implementation. The overall implementation score per intervention per barangay is expressed in percentage. Consequently, the range of percentage is given appropriate description: 0% — never implemented, 1–20% — poor implementation, 21–40% — fair implementation, 41–60% — good implementation, 61–80% — very good implementation, and 81–100% — excellent implementation.

RESULTS

Perspectives of barangay captains and nutrition workers. The implementation of the proposed program includes supporting options that will intensify the delivery and management of the nutrition interventions. One of these facilitating activities is the development of human resources; in the case of Dumaguete, 84% of the barangay captains were equipped with basic knowledge in the formulation of the guidelines in nutrition program management. The percentage of the nutrition workers equipped with the said basic knowledge is higher (93.48%) compared with that of

the barangay captains. Moreover, among the barangay captains, only 52% admitted to have attended trainings on nutrition program management compared with the 97% of the nutrition workers. The participation of local leaders in the formulation of the implementation guidelines is important because this document will govern, direct, and facilitate delivery of all nutrition improvement efforts as mandated in Medium-Term Philippine Plan of Action for Nutrition. This document provides the standard operating procedures that guide the decisions and actions of implementers (Bayani, 2006).

The study also revealed that, among the barangays, 56% have partnerships with the private sectors to care for the malnourished children in their respective areas. The potential of partnership of the government with the private sector to care for the malnourished children has to be explored more. However, partnerships with NGOs as a strategy to effect the implementation of the nutrition programs of the barangays in Dumaguete City remain unexplored. Partnerships with other entities are oftentimes needed because the government may not have enough resources to achieve fuller implementation of its nutrition programs. Partnerships with nongovernment organizations (NGOs) could be of help particularly in reaching out to communities identified to have the strongest need of interventions. For example, in a study by Linnemayr et al. (2011), partner NGOs were asked to provide a list of villages in which they had the means and intentions to intervene in. It was believed that these NGOs chose to intervene in the village with the highest net benefit of intervention because they were concerned about impacts. The results of the said study show that the NGOs were able to deliver health inputs and to improve the nutrition knowledge and best practices of target communities.

The assessment of the barangay captains, nutrition workers, and mothers regarding the implementation of their respective BNAPs is summarized in Table 1. Among the barangay captains, 72% said that the implementation of their respective BNAP was “good”, while 67% of the nutrition workers and 92% of the mothers, respectively, said the same as well. On the other hand, 15% of the barangay captains, 33% of the nutrition workers, and 4% of the mothers consider that, although the BNAP implementation was “good”, it still needed some improvement. One barangay captain perceived the implementation of the BNAP in his barangay as “not good” while one mother did not respond to the question.

Table 1. Assessment of the Implementation of the Barangay Nutrition Action Plan.

Responses	Barangay Captains (%)	Nutrition Workers (%)	Mothers (%)
Good	18 (72.00)	31 (67.00)	23 (92.00)
Good but needs improvement	6 (24.00)	25 (33.00)	1 (4.00)
Not good	1 (4.00)	—	—
No response	—	—	1 (4.00)
Total	25 (100.00)	46 (100.00)	25 (100.00)

According to 32% of the barangay captains and 26% of the nutrition workers, the number one problem encountered is the poor participation of the nutrition workers in the implementation of the BNAP. The malnutrition rate itself is pointed out by 16% of the barangay captains as one of the reasons. Another problem encountered according to 12% of the barangay captains and 17% of the nutrition workers is the limited or poor cooperation of the beneficiaries. Other reasons include the lack of budget according to 12% of the barangay captains and 4% of the nutrition workers. But it is the lack of support of the BNC in the BNAP implementation that is a serious problem according to 28% of the nutrition workers. Eight percent (8%) of the barangay captains considered lack of monitoring to be a problem in the BNAP implementation. A few BNWs (4.35%) considered the difficulty in the implementation of some specific interventions to be a problem. There were barangay captains (12%) and nutrition workers (20%) who refused to give answers.

The majority of the barangay captains (52.00%) and a good percentage of the nutrition workers (32.61%) considered the quality of support and cooperation from the BNC as a major factor that influenced the development of the BNAP. So, in barangays without the BNAP, the unsupportive or passive BNC could be a big reason for their failure to produce the BNAP. This condition is coupled with the presence or absence of monitoring of the nutritional status of children which is possibly affected by the amount of budget the barangays have for nutrition program. Another important factor that propelled the desire of the barangay is the prevalence of malnutrition among children that have to be addressed according to 28% of the barangay captains and about 7% of the nutrition workers. Some barangay captains (12%) and nutrition workers (24%) did not identify any factors that

influenced the quality of the development of their respective BNAPs.

Aside from the development of the BNAP, its implementation has also become an issue because the final measure of the quality of the plan is how it works and produces the desired results. Similarly, it is the quality or the lack of BNC support that primarily determined the success in the implementation of the plan according to 20% of the barangay captains and about 37% of the nutrition workers. The BNC support takes the form of involvement in planning, use of transportation, unity and teamwork of all barangay workers and officials, and participation in training. Meanwhile, 24% and about 20% of the barangay captains and nutrition workers, respectively, opined that the cooperation of the beneficiaries had influenced the success in the implementation of the BNAP being the primary targets of interventions. But this is maybe curtailed by the lack of budget according to 12% of the barangay captains and 13% of the nutrition workers. The lack of monitoring of the implementation of BNAP is another factor identified along with the prevalence of the malnutrition rate. Nonetheless, a few of the barangay captains said that there was minimal problem in the implementation of their BNAP while others did not give any reasons at all.

Given the situation earlier described regarding the implementation of the BNAP, the respondents were then asked for suggestions as to how this could be improved. Interestingly, a significant percentage of the nutrition workers (45.65%) suggested that their work performance should be seriously monitored and accompanied with regular meetings to discuss their accomplishments and problems. Only 8% of the barangay captains shared this same suggestion while 32% in contrast believed that improving the budget allocated for the nutrition program would help. The latter suggestion is supported by 28% of the nutrition workers. The support of the BNC manifested in their strong political will to implement the plan, the use of transportation, and the unity and cooperation of the council members were deemed necessary according to 28% of barangay captains and 22% of nutrition workers, but this has to be enhanced. Lastly, 32% of the barangay captains suggested that the provision of seminars, trainings, and technical assistance from other departments of the local government unit have to be sought to ensure the serious implementation of the BNAP.

Perspective of mothers. When asked what they have done to respond to the problem of malnutrition, 56% of the mothers said that they willfully participated in the programs implemented by the city government to address

this problem. Other mothers (36.00%) did it by themselves but within their respective families such as providing their children the right kind of food. But when somebody in the family got sick, 48% of the mothers said that they usually asked medical help from the nurses or doctors of the health center or the hospital. Others sought advice from the local health and nutrition workers on what to do to keep their families away from diseases and malnutrition. There were some mothers (36.00%) who simply relied upon their own health practices while a few mothers did not provide answers to this question (16.00%).

The mothers were also asked what their participation was in both the implementation and the subsequent improvement of the BNAP. Their answers were categorized as they have either active or passive participation. Seventy-six percent (76%) of the mothers described themselves to have actively participated in the implementation of BNAP. They were not merely receivers of the services of the BNAP but were also partners in its delivery. Several mothers indicated that their involvement included cooking and serving the food to the children as part of the food assistance component or supplementary feeding of the BNAP. Only 12% of the mothers said that they were just recipients of the services and were not actively involved in any way. Involving the community illustrates the employment of the multisectoral approach wherein activities adopted from the national level must be fitting at the community level when implemented. In this approach, sound goals and policies related to nutrition improvement must be combined with basic services, mass mobilization, people empowerment, and actions in the community level (Tontisirin, 2006). It is urgent that actions must be at the community level to effectively implement the nutrition program, but this is difficult when community participation is not well established. Furthermore, the improvement in the nutritional status of children is also affected and influenced by the provision of technical and financial support to local nutrition programs (Tandingan, 2006). Since the mothers are the care providers of the infants and young children, they can significantly contribute to the improvement of their children's nutritional status provided that they have enough knowledge and skills. For example, a study shows that high knowledge and feeding scores of the mothers positively correlated to the weight-for-age z-scores of their infants and young children (Velasco, 2007). Program planners and implementers must adopt appropriate targeting priorities for educating mothers on complementary feeding. People's

participation in program development and implementation can have positive influence on the outcome of the programs (Seipel, 1999; RTP-FNP, 1999). As pointed out by Aguilar (2006), children suffering from malnutrition cannot be passive program recipients. If they are not the main players, the actions taken to reduce malnutrition are likely to be inappropriate or unsustainable. Only when communities have a sense of ownership in the programs targeted to them will nutrition programs become sustainable (Barba, 2006).

Recognizing that there were problems or deficiencies in the implementation of the BNAP, 56% of the mothers said, when asked how they could help in the success of the plan, that they could help by improving the quality of their own participation in the delivery of its services. Noteworthy also among their answers was their willingness to help in encouraging fellow mothers to participate in mother's classes and to actively take part in the implementation of the food assistance program. In contrast, 8% wanted to remain as purely recipients while 12% did not give an answer.

Extent of implementation. Based on the average overall score (69.00), the extent of the implementation of the seven nutrition intervention programs of Dumaguete City is considered very good. The micronutrient supplementation program has the highest average score (82.58) in its implementation. This is the program where children and mother beneficiaries were able to avail of vitamin A and iron supplementations from the health center. On the other hand, the program that has the lowest average score in the implementation is food assistance. This program includes the center-based complementary feeding for wasted and stunted young children with ages 6–72 months and for pregnant women with records of delivering low birth-weight infants. Food assistance also includes school feeding and milk feeding for underweight school children of grades 1 and 2.

Finally, the question whether or not the extent of the implementation of the BNAP has impact on the nutritional status of preschool children, the Spearman test was employed to determine if the two variables were significantly correlated. It is worth noting that, although the results of the correlational analysis showed that no significant relationships existed, these were suggestive of inverse relationships. This would mean that the higher the intervention score the lower would be the nutritional status of children in particular barangays. In other words, the interventions introduced would have positive impact on preschoolers as measured in the reduction of malnutrition prevalence in barangays.

Except for intervention E (Food Assistance), interventions A (Home, School, and Community Food Production) to G (Nutrition in Essential Maternal and Child Health Services) show that there is no correlation to the nutritional status. It is interesting to note that, for variable E (Food Assistance), there is a high positive correlation. Of the seven interventions, only intervention G (Nutritional in Essential Maternal and Child Health Services intervention) showed little indication but not significantly different, in relation to the percentage of malnourished children. This shows that, if intervention G (Nutrition in Essential Maternal and Child Health Services) is improved, it can significantly address malnutrition.

Table 2. Implementation scores and correlational analysis.

Barangay	NS	Implementation Scores of Individual Programs							OIS
		A	B	C	D	E	F	G	
A	3.29	100.00	100.00	100.00	72.73	33.33	88.57	100.00	84.95
B	3.09	54.44	61.00	80.00	61.82	30.00	47.14	60.00	56.34
C	3.54	68.89	80.00	80.00	87.27	93.33	80.00	92.00	83.07
D	3.92	80.00	86.00	96.67	93.64	85.56	92.86	84.00	88.39
E	1.34	35.56	54.00	93.33	58.18	31.11	42.86	88.00	57.58
F	2.98	88.89	92.00	95.00	76.36	60.00	62.86	94.00	81.30
G	2.77	37.78	72.00	76.67	50.91	15.56	20.00	68.00	48.70
H	6.26	90.00	89.00	88.33	82.73	93.33	90.00	100.00	90.48
I	9.12	57.04	72.67	76.67	76.36	71.11	65.71	78.67	71.18
J	5.19	68.89	60.00	66.67	70.91	64.44	54.29	80.00	66.46
K	3.86	72.22	63.00	68.33	53.64	68.89	54.29	80.00	65.77
L	5.86	73.33	58.00	96.67	85.45	100.00	100.00	100.00	87.64
M	1.98	74.81	78.00	91.11	68.79	55.19	69.52	73.33	72.97
N	4.54	86.67	80.00	96.67	90.00	85.56	84.29	86.00	87.02
O	4.88	61.11	86.00	86.67	78.18	76.67	85.71	80.00	79.19
P	6.20	66.67	72.00	73.33	71.82	72.22	68.57	42.00	66.66
Q	5.52	68.89	80.00	96.67	63.64	71.11	62.86	72.00	73.59
R	3.55	90.00	88.00	98.33	94.55	93.33	98.57	70.00	90.40
S	2.41	17.78	14.00	76.67	29.09	37.78	48.57	80.00	43.41
T	4.08	40.74	57.33	82.22	53.94	60.74	66.67	77.33	62.71
U	9.06	44.44	75.00	86.67	74.55	63.33	52.86	44.00	62.98
V	3.17	20.00	36.00	50.00	45.45	17.78	25.71	52.00	35.28
W	3.06	42.96	52.00	67.78	58.79	34.81	54.29	64.00	53.52

X	4.24	66.67	71.00	70.00	62.73	68.89	67.14	68.00	67.78
Y	4.19	45.71	13.00	70.00	55.45	28.89	54.29	66.00	47.62
Average	4.32	62.14	67.60	82.58	68.68	60.52	65.50	75.97	69.00
Correlation		0.137	0.204	0.003	0.361	0.467	0.241	-0.190	0.246
		p = .515	p = .328	p = .990	p = .076	p = .019	p = .246	p = .364	p = .237

Legend:

- NS - Nutritional Status
- OIS - Overall Implementation Score
- Program A - Home, School, and Community Food Production
- Program B - Food Fortification
- Program C - Micronutrient Supplementation
- Program D - Nutrition Information, Communication, and Education
- Program E - Food Assistance
- Program F - Livelihood Assistance
- Program G - Nutrition in Essential Maternal and Child Health Services

While the overall rating of the implementation of the MTPPAN was “very good”, it would appear that this did not influence significantly the reduction of the malnutrition rate in Dumaguete City. This result was not expected. Be that as it may, it is a phenomenon that is not uncommon. In fact, Florencio (2004) observed the same findings when she reviewed the implementation of the MTPPAN programs in the country. Her observations indicated that, despite the conclusions made by the NNC that the performance of its impact programs was satisfactory to very satisfactory, the problems of undernutrition and micronutrient deficiencies in the country worsened.

Using Florencio’s (2004) argument where the standard passing grade in school which is 75% were to be used as the minimum acceptable level of performance, then only two of the seven interventions in this study (Micronutrient Supplementation and Nutrition in Essential Maternal and Child Health Services) made the passing grade.

It is also worth mentioning that Food Assistance, the most common nutrition intervention used by many LGUs and other implementing agencies because of its direct bearing on the nutritional status of preschool children, had the lowest overall implementation score. To state the obvious, lesser significant interventions have offset the more significant ones.

CONCLUSIONS

The nutritional status of the preschool children after a year of implementation

of the nutrition program interventions in 2011–2012 scored an overall average of 4.32 that could be described as LOW but still higher than the cutoff score 4.10 for Dumaguete City.

The study revealed that, although the overall extent of implementation and nutritional status of the preschool children did not yield significant results, majority of the program components were not fully implemented or it could mean that the significant interventions were overshadowed by the less significant ones. Notable also in the study's findings was the fact that some barangays scored high in the overall implementation score of the interventions yet scored also high in the prevalence of the underweight preschool children. High implementation scores should have correlated to a low prevalence score of undernourished preschoolers. This could mean that some of the less significant interventions were implemented very well which could have affected the overall implementation score. It would be interesting to focus on the effect of the significant interventions such as food assistance and micronutrient supplementation and the nutritional status of the preschool children.

RECOMMENDATIONS

In light of the findings of the study, the following are strongly recommended:

All members of the Barangay Nutrition Committee, especially the barangay captain serving as the chairperson and the BNW acting as the committee's secretariat, should be involved in the development of the Barangay Nutrition Action Plan including the formulation of the plan's implementing guidelines and more importantly, adopt a participatory approach to program planning and implementation of needs-based nutrition interventions to improve program participation. In order for the members of the BNC to fully carry out their duties and responsibilities, all members should be equipped with basic knowledge in Nutrition Program Management by intensifying attendance to trainings and seminars.

To improve the delivery of nutrition services, the BNC should develop partnerships with NGOs and the private sector, provide strong political leadership, generate more funds to improve budget allocations for

nutrition interventions, and monitor and evaluate work of BNWs.

To better improve the nutrition situation of the city, the CNC (City Nutrition Council) should harmonize its City Nutrition Action Plan with other nutrition action plans of the Barangay Nutrition Committees, the Provincial Nutrition Council of Negros Oriental, and the Regional Nutrition Council of Region VII. Majority of plan's programs require significant amounts of financial resources. To augment the financial requirements of the plan, the CNC should expand its collaboration with NGOs and the private sector in providing more funds and other technical assistance in the delivery of nutrition programs. The CNC, through the City Nutrition Office, should also organize trainings, seminars, and workshops on Nutrition Program Management and other relevant topics in nutrition and nutrition interventions among policy makers and implementers especially among the members of the BNCs of Dumaguete City to improve delivery of nutrition services.

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REFERENCES

- Aguilar, J.R. 2006. Successful Nutrition Programs: A Global Perspective. *Philippine Journal of Nutrition*, 53, 1–2.
- Ahmed, R.S., Ejaz, M.S., & Zehra, H. Clinical pattern of infections in malnourished children. *Medical Channel* 30 September 2010. Academic OneFile. Web. 28 March 2012.

Allen, D. Malnutrition in low income countries: lessons from the field. *Paediatric*

- Nursing*. May 2007: 20+. Academic OneFile. Web. 28 March 2012.
- Barba C.VC. 2006. Undernutrition and Overnutrition in the Philippines: Implications to Later Life Noncommunicable Diseases. *Philippine Journal of Nutrition*, 53, 1–2.
- Bayani, E.M. 2006. The Medium-Term Philippine Plan of Action for Nutrition MTPPAN 2005–2010: An Overview. *Journal of the Nutritionist–Dietitians’ Association of the Philippines*, 20, 1 & 2.
- Claudio, V.S. & Dirige, O.V. 2002. *Basic nutrition for Filipinos* (5th ed). Manila: Merriam and Webster Bookstore.
- Dollahite, Jamie, KenKel, Donald & Thomas, Scott C. 2008. An Economic Evaluation of the Expanded Food and Nutrition Education Program. *Journal of Nutrition Education and Behavior*. 40 (3): 134–141. [not cited in the body]
- Florencio, C.A. 2004. Nutrition in the Philippines: The Past for its Template, Red for its Color. The University of the Philippines Press. Manila.
- Florentino, R.F. 2006. Micronutrient Deficiencies and Mental and Cognitive Development. *Philippine Journal of Nutrition*. Volume 53, No. 1–2. [not cited in the body]
- Food and Nutrition Research Institute. 2010. Philippine Nutrition: Facts and Figures 2008. FNRI-DOST: Metro Manila.
- Linnemayr, Sebastian & Alderman, Harold. 2011. Almost random: Evaluating a large-scale randomized nutrition programs in the presence of crossover. *Journal of Development Economics* 96: 106–107.
- Mapa, D.S., Han, F.C., and Estrada, K.C.O. 2010. Hunger Incidence in the Philippines: Facts, Determinants and Challenges. *National Nutrition Council Technical Paper*, Retrieved 26 October 2011 from www.nnc.gov.ph
- Martianto, D., Hardinsyah, Sumedi, E. Mobilizing local nutrition initiatives for nutrition improvement in Indonesia. *4th Asian Congress of Dietetics Book of Abstracts*. April 23–26, 2006. Manila, Philippines. [not cited in the body]
- National Nutrition Council. 2009. Winning in Nutrition: A Manual on Nutrition Program Management for Local Government Units. Manila.
- National Nutrition Council and University of the Philippines Los Baños (2011). *Manual on Nutrition Program Management*. Manila.

- Presidential Decree No. 491. Nutrition Act of the Philippines. Office of the President, Malacañang, 25 June 1974.
- Presidential Decree No. 1569. Strengthening the Barangay Nutrition Program by Providing for a Barangay Nutrition Scholar in Every Barangay, Providing Funds Therefore, And For Other Purposes. Office of the President, Malacañang, 11 June 1978.
- Republic Act No. 7160. The Local Government Code of the Philippines. Signed by the President of the Philippines, 10 October 1991.
- RTP-FNP. 1999. Course Syllabus on Food and Nutrition Planning and Management. The Regional Training Programme on Food and Nutrition Planning, IHNF, College of Human Ecology, University of the Philippines, Los Baños. [not cited in the body]
- Seipel, M. Social consequences of malnutrition. *Social Work* 44.5 (1999): 416. Academic OneFile. Web. 28 March 2012.
- Tandingan, E. B., Villate, E.E., Reario, D., Barquilla, E. G., & Lopez, C.T., Changes of Nutritional Status of children 12–59 months old after micronutrient intervention in six selected areas of the Philippines. *4th Asian Congress of Dietetics Book of Abstracts*. April 23–26, 2006. Manila, Philippines.
- The 1987 Philippine Constitution. Constitutional Commission, Quezon City, 12 October 1986.
- Tonstisirin, K. Global perspectives on nutrition situation and interventions. *4th Asian Congress of Dietetics Book of Abstracts*. April 23–26, 2006. Manila, Philippines.
- United Nations Development Programme (n.d). Millennium development goals. Retrieved September 5, 2011 from www.undp.org/mdg/goal1.shtml
- Velasco, R. E. 2007. Mothers' knowledge and practices on complementary feeding: implications to infants' and 12–23 month-old young children's nutritional status. *Book of Abstracts: 33rd FNRI Seminar Series*, July 10–11, 2007.



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REVIEW SECTION

Is There Only One Way To Be Free?

Monica Macansantos

TO BE FREE BY EDILBERTO K. TIEMPO

New Day Press, Quezon City, 1972. Seventh Printing, 1993

T*o Be Free*, Edilberto K. Tiempo's classic novel about revolution, American conquest, and the Second World War, was first published in 1972 and has since enjoyed seven commercial print runs. *To Be Free* is an ambitious work that attempts to tell the entire history of revolutionary struggle in the Philippines, a feat that few Filipino novelists have tried to pull off within a single book. However, aside from being reviewed by Fr. Joseph Galdon in a 1973 *Philippine Studies* article and having a chapter anthologized in Gemino Abad's *Upon Our Own Ground: Philippine Short Stories in English*, it has largely been ignored by critics in the Philippines. The fact that this novel attempts to paint a complete picture of revolution, while being unique in its contemplation of the liberating aspect of foreign (particularly American) conquest, makes it stand out among Philippine historical novels of note. Surprisingly, this novel has not become a point of interest for scholars of postcolonial Philippine Literature despite its particularly divergent take on Philippine history.

Edilberto K. Tiempo chooses Nueva Vizcaya, a remote province in northern Luzon bounded by the Sierra Madre mountain range to the east

and the Cordillera mountains to the west, as the center of his novel, making it unique among Philippine historical novels in moving its plot away from Manila. While the characters of F. Sionil Jose's *The Rosales Saga* achieve political power and control over their destinies when they move to Manila, the brothers Lamberto and Hilarion Alcantara of *To Be Free* are actively involved in nation-building while remaining in the provincial capital of Bayombong, Nueva Vizcaya. (Although Hilarion Alcantara moves to Manila later on in the novel, he also becomes less involved in politics when he settles down in the city.) We see in *To Be Free* how history unfolds in small-town Philippines, how revolutions are fought in remote hillsides and clearings where men give up their lives while defending their right to be free, and how conquest and Westernization shake up social mores in provincial communities. These are the realities of history that risk being ignored if Filipino novelists fail to envision our national history outside events that take place within the capital.

In a country where basing oneself in Manila is considered a necessity for one's writing career, Tiempo chose a different path, settling down in the Visayan city of Dumaguete after an academic stint in the United States. Together with his wife, Edith, he founded the renowned Silliman National Writers' Workshop, turning Dumaguete into a regional powerhouse and mentoring young writers from far-flung provinces who wouldn't otherwise have had a shot at a literary career. If Tiempo took on the task of incorporating the stories of those living outside the center into the larger narrative of nationhood by writing *To Be Free*, as a teacher he championed the voices of young writers from the margins. Having lived outside Manila for much of his career could be another reason why Tiempo failed to achieve the same visibility as his peers. Perhaps, by bringing this novel back into the spotlight, we can give Tiempo's work its fair due.

To Be Free opens at the tail end of the Nineteenth century, right after the Philippines has won its independence from Spain only to find itself being sold to the United States in the Treaty of Paris of 1898. We are shown how a small contingent of American soldiers arrives in Bayombong on a hot, humid evening in 1899, taking over the town with a humane efficiency yet unseen by the town's inhabitants. The American military governor, General McIntosh, pays a visit to the Alcantara family residence to invite them to supper at his house, and members of the family who are present that day are taken aback by how courteous he is to their patriarch, *Tan*

Lucas, and how respectful he is of their local customs. He asks *Tan* Lucas to take over the governorship of the province of Nueva Vizcaya from his son, Hilarion, who has joined the armed resistance against the new invaders and refuses to recognize the new government. *Tan* Lucas is initially reluctant to accept the offer, but is eventually swayed by what appears to be a willingness on the part of the Americans to recognize the hard-won freedoms of Filipinos while placing them under American rule. In deciding to accept the American military governor's offer, *Tan* Lucas ensures the survival of his clan under the new regime, as well as their survival into the future. His sons, Hilarion and Lamberto, shoulder the same responsibility.

The question of whether history defines people, or people define history, is one of the running themes of this book. Between the two brothers, Hilarion is more actively engaged in shaping his country's destiny, especially at the beginning of the novel. While earning his law degree in Manila, he joins the *Katipunan*, the armed revolutionary movement against Spain. When the Philippines loses its hard-won but brief independence to a new colonizer, and General Aguinaldo orders his men to cooperate with the new colonial masters, Hilarion joins General Malvar in the Sierra Madre, where holdouts of the *Katipunan* engage in guerilla warfare with the American military until they finally accept defeat. Although he is left unconvinced of America's benevolent intentions in colonizing the Philippines, he volunteers to fight for the Americans in France in the First World War because he believes that it is his duty to fight for other people's freedoms. He also rejects the customs of local *Gaddang* society, refusing to marry a woman in their community and questioning the tradition of working for a woman's family as a common servant before marriage. In his later years he finds himself unwilling to participate in electoral politics under the Philippine Commonwealth because of the compromises he'd have to make to win an election. Although he is a man of the world, he feels uncomfortable within his own society. After living in Bayombong for some time, he ends up moving to Manila, starting his own private law practice and withdrawing from public life.

While Hilarion rebels against authority and spends the majority of his life outside Bayombong, Lamberto toes the line of tradition and remains in Nueva Vizcaya. It's love, more than loyalty to his home province or family, which has tied him to the land and its customs. While studying at Letran College in Manila, he falls in love with Luisa, a local beauty, while at home

during the school break, and he swears to do everything that's necessary to have her, even if this means giving up his studies and working for Luisa's family as a common servant for several years. Although he eventually succeeds in winning Luisa's hand, he loses the chance to study in Europe as was his father's wish, fails to earn his university degree, and has little opportunity to leave Bayombong after marrying Luisa. In many respects, Lamberto is the more conventional brother, following *Gaddang* tradition, raising a family, staying on in Bayombong, entering local politics and even participating in fraud to win an election. Yet Tiempo chooses Lamberto, and not Hilarion, to be the hero of his novel. After all, it is Lamberto, not Hilarion, who steadily loses his footing in the world as the traditions he believed to be constant disappear within a couple generations.

Lamberto is a man who doesn't aspire towards greatness, and whose potential heroism lies dormant until historical circumstances bring it to the fore. His actions are often contradictory and difficult to accept as one reads this book. As a young man, he accepts Luisa's constant bullying as he works as a servant in her family's house, and yet he refuses to acquiesce to Spanish colonial authority and assaults a *guardia civil* when provoked. Years later, when asked to run for governor of Nueva Vizcaya, his party mates propose to buy votes for him and hire armed goons to intimidate voters, and he weakly raises his objections before giving them his consent. The novel attempts to make Lamberto a complex and flawed character, the kind of person whose growth one would like to watch, especially when social upheavals force him out of his position of comfort to choose between good and evil. Yet I would've also liked to have a glimpse into that part of his character that informs his decisions and ultimately makes him choose good over evil when history requires him to do so. This brings me to one of the main problems I had with the book—although I did get the sense that Lamberto was a flawed but decent person, I wasn't sure if I was getting close enough to Lamberto to understand the motives behind his decisions.

The problem may lie in the novel's narrative voice, which informs us about the actions of the novel's characters without stepping into their shoes. Their lives are reported upon, but not inhabited, and thus it is difficult to chart their inner growth as they gradually begin to make wiser decisions. I would've liked to see Lamberto struggling with the idea of buying votes to win an election, and eventually creating an elaborate justification for his involvement in electoral fraud. His conscience doesn't seem to nag

him when he buys votes, or allows his party mates to hire armed men to intimidate voters. He only suffers from pangs of conscience later on, when Hilarion learns about what he has done to secure the governorship and confronts him. Lamberto is a character who isn't lacking in action, but one doesn't really know if there is an inner voice guiding the decisions he makes because we hardly get a glimpse into his inner life. Sure, as an old man we see him reflecting upon the past and the choices he has made, but in the scenes in which he makes these choices, we barely know what is going on in his mind.

There are other times in the novel when Lamberto shows his fundamental decency. When the Japanese take control over the Philippine Islands and attempt to turn him into a puppet for the Japanese, he refuses to cooperate and joins the rebel forces instead. But to fully understand why he refuses to collaborate with the enemy, I'd also like to see why he fails to live up to his principles at certain points in his life. One would want his character to have a certain interiority that grows and develops over time, that is both affected by events in history and responds to these events in a way that reflects an internal movement towards wisdom.

When Lamberto chooses to sacrifice his studies in order to become a common servant for Luisa's family, I wanted to know what aspect of his character allowed him to make such a huge sacrifice. When Luisa constantly pushes him around, makes all sorts of unreasonable demands (like making him wear a G-string in front of guests at their marriage proposal feast to embarrass him), we are told about his anger and frustration, but not once do we see him questioning the sacrifice he has made for this woman during his five years of servitude. His love for Luisa is difficult to understand—it is repeated several times in the book that Luisa was a great beauty, but beyond that, we are not made to see other qualities in Luisa that would make a man throw his future away to win her heart.

Lamberto's courtship of Luisa is shown to us through flashbacks that frequently occur in this novel, making one believe that the wooing of Luisa is a motif from which the novel draws its themes. It's implied that even Hilarion was in love with Luisa at some point, and when both brothers talk about Luisa years after she has passed away, they speak of her beauty and passion with adolescent awe. And yet I'm not sure if Luisa is the passionate woman they make her out to be; she is cruel, spiteful, and oftentimes inconsiderate. During Lamberto's period of servitude, her stepfather tells

him, "The best way, Bettu, is to understand her. She's not like us really. She has the blood of the Castila. You mix basi and domecque and the result can be explosive. All we can do, Bettu, is to have patience. You may tie her to a post later, if you want. I'd like to see you do that for a change. Or gag her. Do whatever you want. Show her and everybody you are the master. But for the moment, patience, son." Luisa's presence in the novel is mainly emblematic, and one begins to suspect that Luisa has been typecast as a fiery woman to take away her potential for growth. Whatever the author's intentions were, it is difficult to see why Lamberto's love for Luisa endures beyond his initial infatuation.

Lamberto constantly returns to the years he wooed her with his servitude, wondering whether there was any value to the suffering and humiliation he endured, and convincing himself that earning Luisa's love demanded such sacrifices. As the decades pass and the marriage customs he once thought were constant are broken within his own family, first by his daughter who elopes with her boyfriend, and then his granddaughter who has a child out of wedlock, he holds on to his memories of Luisa, believing that the traditions to which he submitted in order to win her hand in marriage made their love more precious, their bond unshakeable. Lamberto's courtship of Luisa represents a more innocent time when there was dignity in servitude, and when a man didn't question the sacrifices he made for the woman he loved. However, as a one-dimensional character, Luisa fails to endear herself to the reader, and she is an emblem without charm whose frustrations remain unexplored. She shows some potential for complexity when she finally tells Lamberto, after his period of servitude ends, that she never wanted to be a prize to be won, a piece of merchandise to be haggled over. This opens up the possibility for her complexity to find expression in their relationship, but little is shown of their marriage after they tie the knot. If we were to find value in "the old ways" to which Luisa belonged, it would perhaps help if Luisa were a more nuanced and complex character. But since she is merely an unlikeable person, it's puzzling how she inspires such deep feelings in the men who meet her.

One also begins to question the true level of involvement of these characters in the political upheavals that form the bulk of the novel's plot when they risk little in their involvement, and emerge from these events seemingly unscathed. While it is true that Lamberto is imprisoned for standing up to the Spanish *guardia civil* and Hilarion risks imprisonment

or death when he joins the guerilla resistance against the American colonial government, we aren't fully aware of the dangers that they face, especially because neither brother comes fully into harm's way. Luisa's decision to leave home in order to help the revolutionary effort against Spain also loses its sense of urgency when we aren't shown the possible hardships and dangers that she and her mother face when they move to the hills with members of the local guerilla unit. Years later, when Lamberto refuses to comply with the Japanese and moves, with his tenants, deep into rebel-controlled territory in the Sierra Madre, Lamberto is barely involved in the resistance against the Japanese, and much of his days are spent in his private hut in the Sierra Madre reminiscing about his years of servitude in Luisa's house. Hilarion, who is living in Manila during the War, is arrested by the Japanese when he refuses to fill a vacancy in the Supreme Court under their regime, and despite being imprisoned in Fort Santiago, which is known to have been a death camp for many prominent figures in Philippine politics, he miraculously survives. Although he makes references to his suffering in jail, we aren't given a full glimpse into the emotional wounds that he carries with him, and neither do we find out how he escaped death in the hands of the Japanese. One of the most absurd moments in the novel is when Lamberto tours Manila two weeks after its "liberation" by the Americans: although he observes that the city is in ruins, his daughter's family is safe, their house is untouched by American bombs, and his granddaughter Louise, named after her grandmother Luisa, teases her grandfather and flirts with an American military officer who accompanies Lamberto to Manila, entertains a bevy of suitors, and behaves as though she has never been through a war. One wonders if Lamberto's family has been affected by the war at all, since they act as though they were untouched by its horrors. It seems unbelievable to me that any family living in Manila during the Japanese occupation would've emerged unscarred; the Japanese broke into homes and massacred entire families as the Americans carpet-bombed Manila to liberate the city, and a girl like Louise would've at least had friends who were raped and murdered by fleeing Japanese soldiers, if she were lucky enough to be spared. I could no longer suspend my disbelief when Lamberto is told during his visit that Louise works for an advertising firm, for what is there to advertise if your city has been leveled to the ground?

Indeed, the main actors in this novel are handled with a delicacy that one suspects is brought about by the author's fear of hurting them.

Lamberto and Hilarion join revolutions and are thrown into jail at certain points in their lives, but a certain authorial protectiveness keeps them from being maimed or killed. On the other hand, when Lamberto's manservant, Rufino, is presumably killed by the Japanese after successfully carrying Lamberto's documents to the Alcantara family in Manila, one wonders why none of the Alcantaras suffer the same fate. While members of the upper class are portrayed as major players in the history of the nation, they are also safe from history's clutches. Ordinary men like Rufino, on the other hand, are made to bear the brunt of history's violence.

Could it be that the elite in this book are allowed to grow old because they must survive history in order to bear witness to it? It seems ironic that those who are allowed witness history in its entirety are also those who suffer the least. As readers, we are kept safe from the horrors of revolution and conquest because it is the lives of the Alcantaras that we follow, and they are kept out of harm's way, no matter how turbulent the political climate of their country becomes. At the same time, we are kept at a safe distance from the characters themselves, and one begins to wonder if this is a reflection of the author's own fear of becoming too involved in his characters and their inner lives. To inhabit a character's skin, one must risk feeling that character's pain, and I suspect that Tiempo was reluctant to put himself, or his readers, through such agony.

Despite its many flaws, *To Be Free* remains an achievement in Philippine literature, both for its ambition and for the important questions it raises about foreign conquest that few novelists in the Philippines have dared to ask. As Lamberto watches the succeeding generations of his family slowly liberate themselves from tribal customs, he asks himself if American colonialism has allowed his countrymen to enjoy a level of personal freedom they have never before experienced. This brings us to the question of whether loosening oneself from the grip of one's culture is the price one has to pay to achieve freedom. At the end of the novel, Lamberto contemplates the easiness with which he has accepted the new freedoms introduced to Filipinos through conquest: "In the most natural way he had fallen into an almost painless acquiescence to the demands of a new morality. He chuckled at the last words. New morality? What sort of animal was that? No generation could claim an authentic vision of it as it worked into conventions. The stern code of the Sierra Madre was just one of the ways it showed up."

As *To Be Free* shows, freedom comes in many guises, and it is simplistic to think that one culture's interpretation of freedom pales in comparison to that of another culture. After Louise has a child out of wedlock, she reconsiders her negative attitudes towards her grandfather's submission to the tradition of servitude in order to prove his worthiness to Luisa's family. She says to herself, "Her grandfather had rightly accused her of having the kind of emancipation that had resulted in a degrading bondage of her. Her grandfather's servitude had been an expression of a unique form of freedom: the voluntary submission of self, something she had had to learn with pain. The freedom to act or to choose meant setting limits, a self-built cage." We may choose to disagree with the social codes that make Louise consider single motherhood a "degrading bondage", but there is validity in her realization that there was a certain dignity to be earned when voluntarily sacrificing oneself to tradition. Lamberto proves his worth to the woman he loves by sacrificing his personal ambitions to become a servant in her house, and there is a certain pride to be earned when making such a self-sacrificing gesture. In a sense, it's like dying for one's country in which one achieves dignity through selflessness. "What mattered finally was preserving a bedrock decency that would be honored no matter what the time or place," Tiempo writes at the closing chapter of the novel, reminding us that to be free means choosing to live with dignity, which means refusing to be enslaved by our own selfish desires. Selflessness, in the end, is what makes us free.

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Jonathan Y. Cagas

After-School Sports Participation and Psychological Needs Fulfillment in Physical Education among Filipino High School Students

John Paul S.D. Jalandoni, Jose Maria Luis R. Bonoan,

Carmen Naomi A. Damian, Paolo Luis J. Romero

Analysis of the relationship of MCS-measured squat pattern and countermovement jump measures of collegiate football varsity athletes

Christian Wisdom M. Valleser

Injuries in Novice Male Jiu Jitsu Practitioners

Jennifer G. Inovero, Jeffrey C. Pagaduan, and Fernando P. Florendo

Inter-Rater and Intra-Rater Reliability of Videotaped Performance of the Movement Competency Screen-2 (MCS-2)

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Effect of Deadlift Training on Core Strength in Previously-Untrained Males

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Reliability and Usefulness of an Eye-Foot Reaction Time Test in Female University Basketball Athletes

**Michele A. Naranjo, Jin A. Honculada, Alvyn Klein A. Mana-ay,
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The Nutrition Program Among Preschoolers of Dumaguete City: Perception on Implementation and Impact

REVIEW SECTION

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