

Abstracts of Theses Approved for the PhD/MSc at the School of Health Sciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia

BIOMECHANICS OF SINGLE LEG SQUAT IN PHYSICALLY ACTIVE FEMALES: INFLUENCE OF DYNAMIC KNEE VALGUS AND EXERCISE INTERVENTION

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Introduction: Non-contact lower limb injuries, particularly in females, are strongly linked to dynamic knee valgus (DKV). The single leg squat (SLS), which is a common functional test in identifying DKV, has the potential to assess recovery and provide an indication for knee function. Moreover, there are two different types of kinetic chains: top-down (proximal origins) and bottom-up (distal origins) in the formation of DKV. Therefore, a cross-sectional study and an interventional study were conducted in this thesis.

Objectives: The cross-sectional study compares the lower limb joint kinematics of physically active females during SLS at 45° and 60° of knee flexion between those with and without excessive DKV. Meanwhile, the interventional study examined the effects of exercise that targeted hip and ankle musculature on the mechanisms of the lower limb among physically active females in SLS test over a 4-week period.

Methods: The cross-sectional study recruited 34 physically active females who were divided into two groups (i.e. normal and excessive DKV) regarding DKV's result. Then, the participants conducted SLS tests at 45° and 60° knee flexion by recording with three-dimensional motion capture and analysis. An independent *t*-test was used to analyse the comparison of lower limbs during SLS between the groups. The interventional study examined 36 physically active females with excessive DKV, which were separated into control, hip and ankle groups. Over a period of 4 weeks, the intervention groups performed 12 sessions of exercises that targeted either the hip or ankle musculature. Similar to the cross-sectional study, the SLS test procedure was used both before and after the intervention, and the data was analysed using a two-way ANOVA test.

Results: For cross-sectional study, the normal DKV group performed substantially larger hip adduction angle (4.493.25°, $t[32] = 2.371$, $P = 0.024$) than the excessive DKV group (1.4264.23°) on dominant limb during 45° of SLS. Moreover, the dominant limb of normal DKV group demonstrated knee adduction (0.2230.07°, $t[16.048] = 10.707$, $P = 0.001$) while the excessive DKV group demonstrated knee abduction (-4.4781.81°) during 60°

SLS. Meanwhile, the findings in the interventional study showed that the HIP group had a higher dominant knee ($F[2.66] = 9.437$, $P = 0.001$) and ankle ($F[2.66] = 16.465$, $P = 0.001$) sagittal moment at 45° of SLS compared to other groups. During 60° of SLS, the HIP group also found greater hip flexion angles for both the dominant ($F[2.66] = 12.032$, $P = 0.001$) and non-dominant leg ($F[2.66] = 3.618$, $P = 0.032$). On the other variable, there were no significant differences were found.

Conclusion: Thus, the lower limb kinematics and movement control techniques were significantly different in females with excessive DKV compared to those with a normal DKV range. The outcomes highlighted the importance of DKV screening in physically active females and provided rationale for individualised exercise interventions to prevent lower limb non-contact injuries. Additionally, it was discovered that the hip-focused exercise intervention had an effect on the lower limb biomechanics during SLS across four-week. However, there are no noticeable changes in DKV across four-week exercise intervention that focused on hip and ankle musculature.

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THE ROLE OF HEALTH SELF-EFFICACY, HEALTH ASSERTIVENESS, AND RISK PERCEPTION ON THE RELATIONSHIP BETWEEN VACCINATION KNOWLEDGE AND VACCINATION INTENTION

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Introduction: Current childhood vaccination coverage has achieved herd immunity. However, a concerning trend of vaccine-preventable disease incidence and vaccine hesitancy demand the need for better health promotion interventions. Health self-efficacy, health assertiveness (assert to be informed and assert opinion) and risk perception (perceived likelihood and perceived severity) were proposed as the tailoring basis for the relationship between vaccination knowledge and vaccination intention.

Objectives: Phase I study aims to: (i) develop risk perception instrument in the context of childhood vaccination and (ii) establish validity and reliability of vaccination knowledge, health self-efficacy, health assertiveness, risk perception and vaccination intention instruments. Phase II study aims to discover: (i) level of vaccination knowledge, health self-efficacy, health assertiveness, risk perception and vaccination intention among pregnant mothers; (ii) differences in vaccination knowledge and vaccination intention according to education and income level; (iii) relationships between health self-efficacy, health assertiveness and risk perception, and (iv) the mediating effect of health self-efficacy, health assertiveness, and risk perception on the relationship between vaccination knowledge and vaccination intention.

Methods: The questionnaire was validated during Phase 1 on 108 pregnant mothers and Phase 2 objectives were addressed using 924 pregnant mothers attending primary and rural health clinic in the district of Gombak, Klang, Hulu Langat and Petaling. Respondents were sampled using multi-stage random sampling with those involved in Phase 1 was excluded from Phase 2 study. For Phase 1 study, the instruments were analysed for content validity, construct validity using exploratory and confirmatory factor analysis, and reliability using Cronbach's alpha. For Phase 2 study, data were analysed in SPSS version 27 using descriptive statistics, Welch's ANOVA, and Pearson's correlation, and in AMOS version 27 using structural equation modelling.

Results: Results of Phase 1 study reported a reduction in the number of items across measured constructs with the final list of items showing satisfactory validity and reliability. Results of Phase 2 study reveal high level of vaccination knowledge, health self-efficacy, health assertiveness, risk perception and vaccination intention. There is significant difference in vaccination knowledge and vaccination intention between education and income level ($P < 0.01$). Health self-efficacy show moderate positive relationship with health assertiveness ($P < 0.01$), whereas both constructs showed weak positive relationship with risk perception ($P < 0.01$). Only risk perception shows full mediating effect on vaccination knowledge and vaccination intention ($P < 0.05$), whereas health self-efficacy and health assertiveness are not a significant mediator. The mediation model showed satisfactory fit.

Conclusion: As health assertiveness and health self-efficacy is moderately related, mothers should be encouraged to learn about vaccination knowledge. Vaccination knowledge will impact positively on vaccination intention only if high risk perception was formed as a result of the knowledge. Therefore, the focus of health education intervention should be on formation of risk perception related to vaccination.

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COMPARISON OF LEVEL OF KNOWLEDGE AND ATTITUDE ABOUT CERVICAL CANCER AMONG URBAN AND RURAL WOMEN IN DUNGUN DISTRICT, TERENGGANU

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Introduction: Cervical cancer is the third leading cause of death among at-risk reproductive women in Malaysia.

Objective: This study is to find out the level of knowledge and attitudes about cervical cancer among urban and rural women in Dungun District, Terengganu.

Methods: The study involved women aged between 30 years old and 65 years old. The design of this comparative study was conducted to compare the level of knowledge and attitudes about cervical cancer among urban and rural women. The sampling method uses purposive sampling method based on sampling criteria and sample exclusion criteria. The data in this study is analysed using Statistical Package for Social Sciences (SPSS) version 20 software (IBM Corp, 2013).

Results: The results show that the level of knowledge of urban and rural women is good. Meanwhile, the level of attitude showed that urban and rural women responded positively to cervical cancer. Even the comparison between the level of knowledge and the level of attitude for urban and rural women also did not show a significant difference. The results of the multiple regression model (MLR) conducted also showed that there were no significant factors in predicting the level of knowledge and attitude level for urban women. While educational factors and family planning factors are significant in predicting the level of knowledge and attitude level for rural women with a value of $P < 0.05$.

Conclusion: Several factors that have been identified can influence the knowledge and attitude of women to participate routinely in the cervical cancer prevention programme at the Dungun District Health Clinic. Therefore, the health department needs to improve women's knowledge and awareness more comprehensively in urban and rural areas based on the factors that have been identified. It needs to be done through a continuous education process through awareness campaigns, health camps and health programmes with the community to ensure cervical cancer screening is done to prevent and reduce the risk of getting cervical cancer for a healthier and more secure future.

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PREVALENCE OF SARCOPENIA, EMPTY NEST, DEPRESSIVE SYMPTOMS AND ITS ASSOCIATION WITH DIET QUALITY AMONG OLDER ADULTS WITH LOW SOCIOECONOMIC STATUS IN KELANTAN

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Introduction: Aging itself increases the risk of poor diet quality among older adults due to chronic disease, psychosocial problems, physical limitations and loneliness. Older adults with low socioeconomic status are at higher risk of health problems.

Objectives: To determine the association between sarcopenia, depressive symptoms and empty nest with diet quality among older adults with low socioeconomic status (SES) in Kelantan.

Methods: A total of 293 older adults in five districts in Kelantan namely Pasir Mas, Bachok, Tumpat, Kota Bharu and Machang were recruited in the study. Study subjects who fulfilled the inclusion criteria (aged 60 years old and above, low education level, B40 group, have no health problems that will limit ability to perform physical fitness tests) were selected through convenience sampling method. Data on socio-demography, anthropometry, body composition, medical history, blood pressure, depressive symptoms, empty nest, diet history and sarcopenia were obtained through interview administered method.

Results: Most of the subjects were married (69.6%), are of Malay ethnicity (100%) and has income less than RM900 (91.5%). The prevalence of empty nest was 30.7%. Almost half of the subjects were underweight (48.8%). The prevalence of sarcopenia and severe sarcopenia were 22.2% and 18.8%, respectively. The prevalence of high risk of depressive symptoms is 28.3%. Both men and women did not meet the recommendation for daily energy intake. Healthy eating index (HEI) score revealed that 42% of the subjects had poor diet quality, 57% need improvement in their diet and only 1% had good diet quality. HEI score was significantly higher in subject with no sarcopenia as compared to those who were sarcopenic and severe sarcopenic. Binary logistic regression revealed that subjects with high cholesterol were 2.4 times more likely to exhibit poor diet quality than those with normal cholesterol level (95% CI: 1.107, 5.209; P -value = 0.027). Increasing short physical performance battery (SPPB) score was associated with a reduction in the likelihood of exhibiting poor diet quality (OR:0.780; 95% CI: 0.624, 0.974; P -value = 0.028).

Conclusion: In conclusion, the prevalence of sarcopenia, empty nest, and subjects with high risk of depressive symptoms among the study subjects were considerably high. The dietary intake among older adults is also worrying especially regarding fruits and vegetables intake. Thus, nutrition interventions especially in increasing

knowledge and skills of older adults to ensure healthy eating are essential to help older adults with low socioeconomic status to improve their nutritional status for reducing risk of sarcopenia and chronic diseases.

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DEVELOPMENT OF GRANOLA BARS MADE OF FREEZE-DRIED WINTER MELON POWDER

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Introduction: Consumption of ready-to-eat products, such as fast food and snacks, have become part of the modern lifestyle which, if left unchecked, will lead to health deterioration due to improper intake of nutrients.

Objectives: This study aims to develop nutritious granola bars made of freeze-dried winter melons that have been fortified with inulin.

Methods: The products are then subjected to proximate composition analysis, sensory evaluation, morphological characterisation using scanning electron microscope (SEM), and colour and texture profiling.

Results: The nutritional profile and physicochemical characterisation of freeze-dried winter melon powder (FDWMP) used in the product formulations were investigated, namely granola bars of winter melon (GBWM) control, GBWM + 4% inulin, GBWM + 8% inulin and GB with 4% inulin only. The lowest moisture content (3.60%) was detected in GBWM + 8% inulin, while GBWM control was significantly high ($P < 0.05$) in ash (1.96%). The highest protein content (8.51%) was recorded in GBWM + 4% inulin, whereas the highest total dietary fibre (27.56 g) was observed in GBWM + 8% inulin. The overall acceptance of sensory evaluation indicated that GBWM control was the preferred formulation of panellists, although the result was not significant.

Conclusion: In overall, the use of FDWMP in granola bars has resulted in increments of ash, protein and total dietary fibre, and is well accepted by panellists, and the use of inulin may improve product texture and appearance.

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