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Special Investigative Project

Validation of a nutrition screening tool: testing the reliability and validity

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I would like to thank my supervisor and the other professors who gave of their time to assist me. Most especially I would like to give thanks to my sister who helped and served as the second investigator in the project.

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Abstract

Aim: The aim of the study was to investigate whether A Nutrition Screening Tool (NST) developed by Trinidad and Tobago Association of Nutritionist and Dieticians is reliable and valid.

Objectives: In order to evaluate the validity of the NST, the sensitivity, specificity, predictive values and Spearman's Rank Correlation Coefficient were calculated via statistical methods. The reliability of the NST was calculated using Cohen's Kappa Statistics.

Method: This Cross –Sectional investigation used Convenience Sampling in order to conduct and acquire data. The validity tests comprised of ten people. The NST scores and a criterion were compared and statistically analysed in order to determine validity. The reliability method included two investigators and 75 participants who were each administered the NST by both investigators. Scores were compared and statistically evaluated.

Results: Sensitivity, specificity, both positive and negative predictive values and Spearman's Rank Correlation Coefficient are as follow 0.4, 0.6, 0.5, 0.5 and -0.18 therefore it can be stated that the tool is not valid. Cohen's Kappa statistics of the Overall NST Score was 0.38. Thus the tool is reliable.

Conclusion: The NST is reliable however the validity cannot be concluded concretely due to the small sample size.

Keywords: Reliability, Validity , Nutrition Screening Tool

Chapter 1

1.1 Introduction

Populations within a defined geographic location are exposed to the risks of diseases; communicable and non-communicable. Factors increase the opportunity of acquiring diseases as such some diseases are preventable once efficient and effective measures are engaged. Efficiency and effectiveness of the measures employed are essential components in containing and reverting signs and symptoms and the spread of diseases. In order to attain information on the affected populace tools are often utilized. Tools are used to combat and assess the extent of the maladies and illnesses. However tools must measure accurately what the intended purpose of the health professional aims to investigate hence tools must be valid. Tools must possess symmetry among various health professionals meaning the tools must have the capacity to reproduce identical data when used by different health professionals; reliability. Trained health related personnel for instance dieticians and nutritionists developed methods to assess persons at risk of particular nutritional- related diseases. An illustration of such technique usually encompasses the use of a Nutritional Screening Tool.

Nutritional Screening Tools are tools used to reconnoitre whether an individual is at nutritional risk or malnourished. In other words a Nutritional Screening Tool ascertains known characteristics complementary to dietary or nutritional problems. It is important to note that, nutrition screening is done prior to the Nutrition Care Process. Nutritional Screening Tools are characterised by the following traits; ease of completion, cost-effectiveness, simplicity and the ability to detect individuals who require further

assessment. Environs or setting in which the data is attained, the purpose and goal of the screening tool, the stage in the lifecycle, the delineation of the risks and presence of data are factors which affect the type of information received after performing the screening.

1.2 Background

People who inhabit these islands whose shores are bounded by the sea, Trinidad and Tobago, may go about the activities of daily living without apprehending the significance nutritional health play in their lives. Ignorance can lead to morbidity and mortality caused by avertable nutrition related diseased state. Therefore, a Nutritional Screening Tool was developed by a health professional. The initiative taken by the developer posed a step forward into future enhancement of the health system within Trinidad and Tobago. Such a proactive approach tailors a tool designed for citizen of this country. This Nutritional Screening Tool serves as prototype of a National Health Card similar to that of the Immunization Card. Implementation of this system encompasses three out of the six strategies formulated by the Ministers Responsible for Health of the Caribbean and outlined in the Caribbean Charter for Health Promotion. The strategies that seek to ensure the planning, understanding and implementation adheres to principles of equality with regards to health comprise of 1. Formulation Healthy public policy, 2. Reorienting health services 3. Developing/ increasing personal health skills.

In this study this existing Nutritional Screening Tool would be placed under experimental conditions in order to test the reliability and validity within a community of adults, more specifically, the University of the West Indies student dormitory. The tool is one page in length and encompasses two main sections, anthropometric and dietary history. A ticking system is provided. Understandable and simple terms are used along with minor calculations incorporated. This tool exhibits the following characteristics; ease of completion, cost-effectiveness and simplicity. However, the ability to pin-point individuals

who need to progress to the assessment stage and the reproducibility among various health professionals need to be examined. Thus these two main criteria would be tested.

1.3 Problem Statement

According to the Ministry of Health report for the period 2004 to 2005, non-communicable diseases remain a major concern therefore aggressive lifestyle campaigning seeks to reduce questionable and unhealthy practices by individuals. As a result the development of a Nutritional Screening Tool would one of the tools applied. This tool forms part of the screening initiative conducted by of the Health Promotion Division, Ministry of Health to record pertinent health and nutrition data from community living individuals to determine and monitor their level of risk for nutrition related chronic diseases. However, the validity and reliability of the nutrition screening tool has not been validated.

Generally screening tools are used to give a representation of a community or individual health status hence a poor screening tool results in false reflection of data. This may lead to the wrong diagnosis, wasted time and effect during assessment phase in the nutrition care process and unwanted emotional stress by those deemed at nutritional risk when the opposite is true and false impression of being in good health to those who maybe at risk in acquiring a disease(s) . The reliability and validity of the existing screening tool must be tested so that problems defined previously mentioned can be avoided.

1.4 Research Question

Is the Nutritional Screening Tool testing what is required to be tested; valid and is it reproducible among different personnel; reliable?

1.5 Scope of Project

The project determines whether the Nutritional Screening Tool is valid and reliable by utilising various statistical analyses. The population used as the entirety of the sample size were students from the University of the West Indies. The time frame given to attain the practical aspects of this project spanned a two-week interval. Theoretical and report write-up time period was approximately thirteen weeks.

1.6 Aim

To assess the validity and reliability of an existing Nutritional Screening Tool.

1.7 Objectives

Validity

- Assess the sensitivity which measures the ability of the tool to detect people at nutritional risk thus producing a statistical value
- Assess the specificity which measures the ability of the tool not to give a positive result when people are not at nutritional risk thus producing a statistical value
- Evaluate the predictor values using mathematical means.
- Determine the concurrent validity using Spearman's Rank statistics.

Reliability

- Evaluate the inter-observer error using Cohen's Kappa Test of Agreement to produce kappa statistics
    - Categorical data includes Weight Status, Eating Habits, Fried or Greasy Foods, Water Consumption and Physical Activity and Overall Scores.

1.8 Sources of Data

The Nutritional Screening was obtained from the Trinidad and Tobago Association of Nutritionists and Dieticians.

Chapter 2

2.1 Literature Review

According to E.A. Isering et al "early identification of malnutrition and appropriate nutrition intervention may lead to beneficial outcomes. Early recognition is considered to be one of the most important ways of preventing malnutrition but relies on the use of appropriate tools to determine malnutrition risk". Prevention is better than cure is one of the most well-known sayings and has been adopted by many organisations and the National Health Services (NHS) of the United Kingdom holds this belief. One of the NHS core principles is to prevent as well as treat ill health by recognising factors such as deprivation, housing, education and nutrition along with the assistance of other public services to intervene before ill- health occurs.

In order to accomplish the task of recognising those at risk more specifically nutritional risk, screening tools are imperative. "The purpose of the screening tool is to identify patients who are malnourished...or at risk of becoming malnourished" as stated by S.T. Burden et al. The European Society for Clinical Nutrition and Metabolism (ESPEN) Guidelines averred that 'the purpose of nutritional screening is to predict the probability of a better or worse outcome due to nutritional factors and whether nutritional treatment is likely to influence this.' Nutritional risk can be defined as the presence of characteristics or risk factors that are associated with or can lead to impaired nutritional status (Simpson et al 2008). Illustrations of risk factors pertaining to nutrition are under- and overweight which can stem from poverty and (relative) affluence, type of food storage and cooking facilities and physical activity levels (Simpson et al 2008). The identification of related nutritional risk

factors is the first stage in the treatment process. ESPEN Guidelines explores the outcome from effective treatment. The guidelines assess treatment in terms of (i) the improvement or prevention of mental and physical deterioration, (ii) reduction in the number or severity of complications of illness and its treatment, (iii) quickened recovery from illnesses and abridged convalescence and (iv) diminished consumption of resources for instance medication. Nutritional Screening should be instigated at an early stage of hospitalization, if screening is to have an impact on the nutritional status of patients and the wider public. This should be widespread and an integral part of the standard admission procedure (Mackintosh and Hankey 2000).

Nutrition Screening Tools provide health professionals and care-takers with a system for documenting, evaluating and monitoring nutritional status, raising cognisance of risk factors and promoting strategic nutritional therapy and the production of nutrition strategies. It is of belief by Simpson et al that Nutrition Screening Tools are designed to codicil the professional and clinical judgement of the health appraiser. In response to the explicit need for a tool the Nutrition Screening Initiative formed by sum 30 organisations, in 1991, gave birth to a checklist entitled “DETERMINE Your Nutritional Health”.

The reliability and validity of a nutrition screening tool are vital attributes. A measure that is reliable is one which can produce consistent results therefore measurements must be independent of inter-observer error. Validity assesses how precise the tool is at identifying those at risk.

Reliability can be categorized into inter-rater or inter-observer reliability and intra-rater (observer) reliability. Inter-rater Reliability determines the extent to which two or

more raters obtain the similar result when using the same instrument to measure a concept whereas Intra-rater Reliability involves the same assessment being administered by the same rater on two or more occasions. Mackintosh and Hankey categorically assessed the inter-observer reliability of the tool. The experiment entailed six main premises which were then statistically analysed using Cohen's Kappa Test of Agreement. Mackintosh and Hankey's approach will be mirrored in this investigation.

The validity of this tool is victim to the absence of a "gold standard" to determine nutritional status (S.T. Burden et al 2001). The deficiency of a gold standard, with regards to screening tools, means validation is subjective rather than an objective process (Simpson et al 2008). Since no "gold standard" is obtainable, the criterion can be an outcome or measure that is pertinent to the construct, reliable and objective.

Three different types of validity exist. Criterion validity concept would be employed in this study. Criterion Validity examines the extent to which a measure provides results that are consistent with a gold standard. Concurrent validity and Predictive Validity are sub-categories of Criterion Validity. Predictive Validity examines a measure's ability to predict some subsequent event. Concurrent validity is the extent to which the test results agree with other measures of the same or similar traits and behaviour (Fawcett, 2008). Therefore concurrent validity tests such as the Spearman's Rank would be used to assess the validity of the NST. According to Fawcett, Melzack used Spearman's Rank test to evaluate the concurrent validity, on the other hand Mirmiran et al utilise specificity, sensitivity and predictive value calculations to attain validity where groups of high and moderate risk were merged so that a 'risk' and 'no risk' groups were formed. This study will emulate both

Melzack and Mirmiran et al methodologies since the number of willingly participants are limited.

In recognition of the absent standard, F. Bryan et al utilised the expert opinions of three dieticians which were compared to trained nursing staff who made use of a NST. Parallel to Bryan et al's experiment, Simpson et al encompassed the aid of dieticians to provide expert advice on the nutritional status of the participants. However tangent to Bryan et al, Simpson and the team formulated a standardized test to be executed by the dieticians on the subjects of the experiment. Therefore the expert opinion of the dietician entailed specific objective and subjective data. McDonald incorporated the Subjective Global Assessment (SGA) as the criterion validity. With consideration to the scope of the project and the allotted timeframe aspects a SGA would not be a feasible approach. Burden et al strategic decision to assess the nutritional status via commonly highlighted markers will be adopted. Three physical measures and an oral intake would suffice the criterion.

Despite Burden et al's approach to the validity test, the reliability procedure entails testing between various medical professionals; nurses and dieticians, spanning across a possible 72 hours of execution, therefore Burden et al method would be abandoned however the theory would be applied. With reference to the work done by Bryan et al, reproducibility findings were accomplished using nurses only and testing for inter-observer error. This methodology is malleable and consistent with the theoretical framework of Burden et al and Mackintosh and Hankey.

Mirmiran et al described the results of a number of NST and concluded that screening tools have the ability to be both reliable and valid or in other cases reliable but

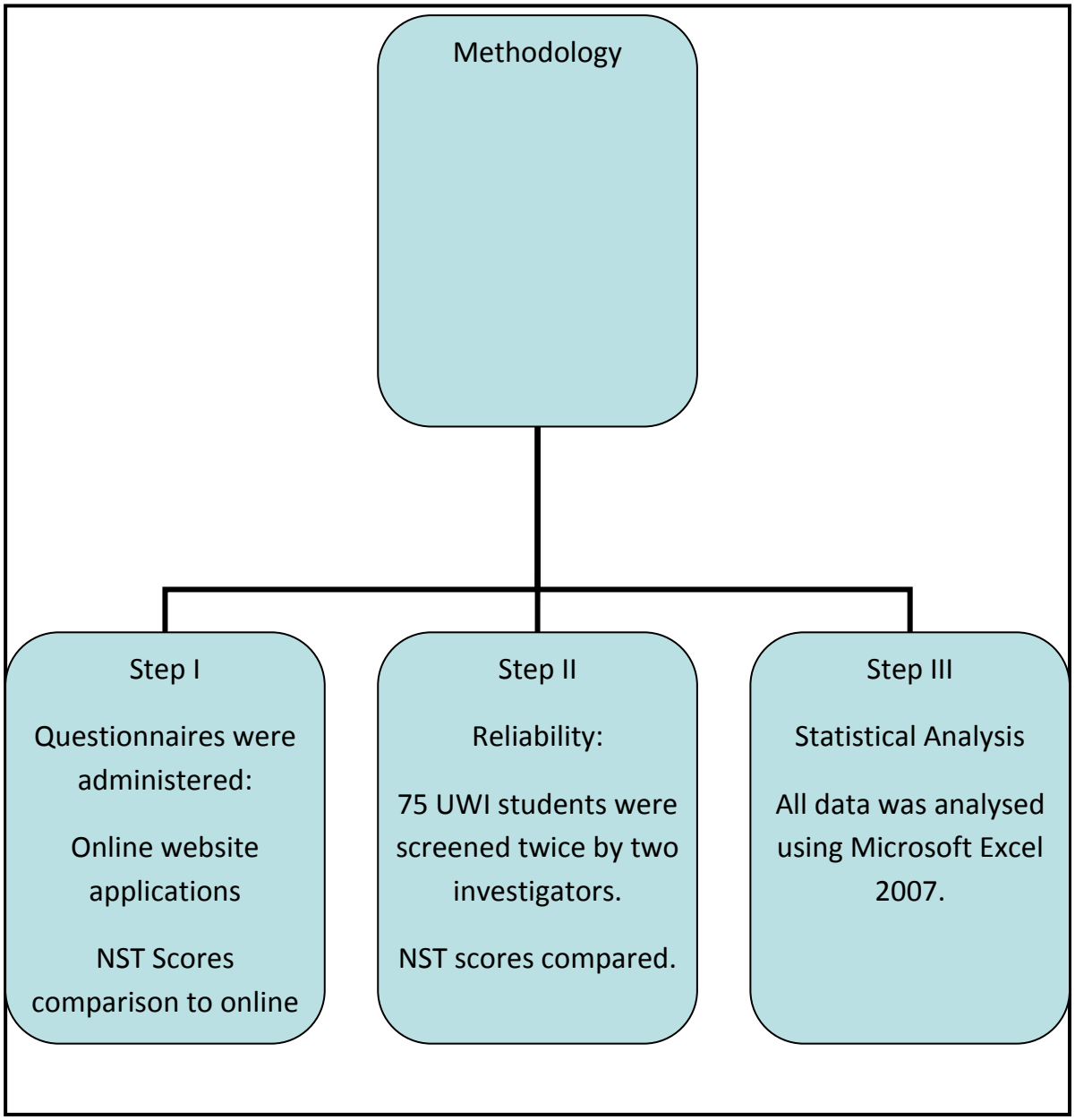
not valid and vice versa. Therefore the purpose of this study is to test whether the NST is reliable and valid.

Chapter 3

3.1 Methodology

This Cross –Sectional Study made use of the Convenience Sampling in order to conduct and acquire results.The inclusion criteria was that participants must be an adult since the NST targets adults. Any not making the inclusion criteria was excluded from the study.

Figure 3.1 Methodology Chart showing a brief breakdown of Steps taken to find reliability and validity of the NST



3.2 Materials

A Seca statiometer was used to assess height. Omron HBF-400 Body Fat Monitor and Scale was utilised to check body weight. Myo Measuring tape measured the waist circumference of the subjects. Microsoft Excel 2007 and Statistics Analze-it add-on performed the statistical evaluations needed.

3.3 Procedure

The study was divided into three phases:

1. Online Questionnaires based on food consumption were administered for seven days.(**Refer to Appendix I)**

The online survey website named Survey Monkey (survey creation site) and Facebook (social networking site where the Survey Monkey Questionnaire link was posted daily) were utilised. The questionnaires consisted of ten (10) questions; two of which were open-ended. Firstly, the Survey Monkey and Facebook interface were used since all of the individuals have a Facebook account thus reducing burden of finding subject daily (questionnaire could have been accessed via computers and mobile phones) and paper waste. Secondly, this was done for a seven-day week in order to obtain consumption patterns of participants. After completing the seven days of questionnaires, the NST was executed on participants who successfully completed all seven days. The sample was 50 persons however ended with only 10 people.

2. Nutritional Screening Tool execution.

On two separate days, NST was done at two different locations; Sir Arthur Lewis Hall on the first day and at the Student Activity Centre (SAC) on the second, by two different investigators. Each were supplied with seventy-five (75) Nutritional Screening tools and materials previously stated. The investigators set up the instruments in the common areas of hall and SAC.

3. Data Analysis

All the data was collected and analyzed using computer software. The sensitivity, the specificity, and the predictor values along with the inter-observer error were inserted and calculated using Microsoft Excel 2007 and the Trial Add-On 'Analyze-it'.

Chapter 4

4.1 Results

Table 4.1 represents Validity results for 'Risk' & 'No Risk' Groups

	Risk	No Risk	Total
Risk	2	2	4
No Risk	3	3	6
Total	5	5	10
Specificity	0.6		
Sensitivity	0.4		
Positive Value	0.5		
Negative Value	0.5		

Table 4.2 represents results of NST and 'Gold' standard

Identification Number	NST Scores	Adjusted NST Score	'Gold' Standard Scores
4000	18	15	13
265	20	19	18
15758	16	13	14
1482	21	18	21
5175	17	14	19
10841	25	21	13
639	17	14	13
4945	18	16	18
58	24	20	14
13156	13	13	19

Key

0-6 No Nutritional Risk 7-16 Low Nutritional Risk 17-26 Moderate Nutritional Risk 27-40 High Nutritional Risk

Table 4.3 represents NST Scores and Parameters for Investigators A and B and the related Cohen's Kappa Values

	Nutrition Screening Tool Scores						
Parameter	0	1	2	3	4	Outliers*	Cohen's Kappa
Weight Status	47	4	14	8	1	2	0.98
Fried or Greasy Foods	24	17	21	4	4	10	0.8
Water	12	10	15	19	17	4	0.9
Physical Activity	10	10	13	13	27	8	0.84

***Outliers represent participants who were scored differently by investigators A and B**

Table 4.4 represents Eating Habits NST Scores for Investigators A and B and the related Cohen's Kappa Values

Eating Habit Scores			
	Number of Each Score		
Scores	**A**	**B**	**Outliers***
0	2	1	1
1	1	1	0
2	1	3	2
3	3	3	0
4	7	5	2
5	5	5	0
6	5	5	0
7	3	6	3
8	8	6	2
9	3	3	0
10	5	6	1
11	9	7	2
12	2	4	2
13	3	2	1
14	5	4	1
15	3	3	0
16	0	1	1
17	4	5	1
18	2	2	0
19	2	0	2
20	1	0	1
21	0	2	2
22	0	0	0
23	1	0	1
24	0	1	1
Total	**75**	**75**	**26**
Cohen's Kappa			**0.63**

***Outliers represent participants who were scored differently by investigators A and B**

Table 4.5 represents Overall NST Scores for Investigators A and B and the related Cohen's Kappa Values

Overall NST Scores			
Scores	**A**	**B**	**Outliers***
3	**1**	**0**	**1**
4	2	1	1
5	0	0	0
6	0	2	2
7	3	3	0
8	0	0	0
9	0	0	0
10	7	8	1
11	4	3	1
12	4	9	5
13	4	1	3
14	3	4	1
15	5	5	0
16	7	3	4
17	3	4	1
18	2	1	1
19	4	5	1
20	6	6	0
21	4	2	2
22	2	1	1
23	1	3	2
24	1	1	0
25	0	3	3
26	3	2	1
27	4	1	3
28	2	2	0
29	1	2	1
30	0	1	1
31	0	1	1
32	2	0	2
33	0	1	1
Total	**75**	**75**	**40**
Cohen's Kappa			**0.44**

***Outliers represent participants who were scored differently by investigators A and B**

Table 4.6 represents Number of Subjects who scored within a specific Parameter and the related Cohen's Kappa Values

		Number of Scores	
Parameter	**Range**	**A**	**B**
No Risk	**0-10**	13	14
Low Risk	**11-20,**	42	41
Moderate Risk	**21-30**	18	18
High Risk	**31-44**	2	2
	Total	**75**	**75**
	Cohen's Kappa Statistic		**0.38**

4.2 Investigators' Observations

The reliability tests presented the opportunity for the investigators to give qualitative criticism of the NST based on personal belief and feedback from the interviewees. There were two prime concerns which reverberated among both groups; investigators and interviewees. These factors were water consumption options and physical activity selection.

Water consumption options instructed one to state how many times throughout the day water is consumed. This should have clearly read 'cups' instead of 'times'. Interviewees posed the question 'if I sip some water, can I count that as a time?' Based on the instructions, the interviewees would be accurate in their statement however fewer points would have been awarded despite the lack of water consumption.

Unanimously, both investigators considered the introduction of a panel describing the job activity level of individuals and assigning relative points. This panel would be part of either the demographic category or physical activity category. However, a clear definition in terms of physical activity (physical activity equates to job activity level and exercise or strictly exercise) should be included or put forth for investigating teams.

Chapter 5

5.1 NST Score Manipulation: Testing for Validity

The online questionnaires along with anthropometric tests served as the gold standard. During questionnaire process observations made highlighted facets of the NST which prove to be erroneous in nature; Water consumption section. Days existed where subjects did not consume any water and the NST made no provision for such an outcome. Therefore when it came to dealing with the validity tests this section was muted and adjustments were done to the Nutritional Risk Scores. The results from the online questionnaires and anthropometrics were inserted into the NST in order to generate a score which was compared to the NST scores obtained from the responses of the individuals at the end of the seven days. In other words the responses attained from the 'gold' standard were compared to the responses from the NST (**Refer to Table 4.2**).

The physical measures were height, weight and Waist circumference. These measures provided quick values which are parallel to the requirements of a NST. Validation of the anthropometric tests was not entertained since the tests are valid

5.2 Significance of the Validity Results

The sensitivity value was 0.4, therefore based on the sample studied one can expect only 40 percent to be at nutritional risk (true positive) while sixty percent (60%) of subjects from the study not to be at risk (specificity- true negative). The NST help to 'diagnosis' those at risk however the sensitivity and specificity do not give this information. Therefore it is important to know the probability that the test will give an accurate result. In order to

achieve the data the predictive values are used. The positive value 0.5 is the proportion of subjects with true positive test who will be diagnosed correctly. Similarly the negative value of 0.5 represents the number of participants with true negative tests that will be identified accurately (**Refer to Table 4.1**). Spearman's rank correlation coefficient is -0.18 thus there is a negative agreement between the NST and the 'Gold' Standard that is to say, there is little or no relationship which exist between the criterion ('Gold' Standard) and the test (NST).

5.3 Is the NST reproducible; repeatable; RELIABLE?

The Cohen's Kappa Test of Agreement was done for six parameters. The values ranged from 0.63-0.98 with weight status having the highest kappa value and eating habits possessing the lowest kappa value (**Refer to Table 4.4**). According to Mackintosh and Hankey, a kappa value greater than 0.6 denotes significant agreement between both observers. Therefore based on the results the NST parameters can be seen as reproducible; repeatable; RELIABLE. The reliability of the NST in terms of categorising subjects into no risk, low risk, moderate risk and high risk had a Kappa value of 0.38 (**Table 4.5**). The statistical software states that values less than 0.4 but greater than 0.2 have fair agreement.

5.4 Limitations

Subject compliance problems were experienced thus creating attrition; 50 participants were reduced to 10 subjects on completion of the seven days of questionnaires which tested the validity of the NST.

Chapter 6

6.1 Conclusion

The Nutrition Screening Tool developed by Trinidad and Tobago Association of Nutritionist and Dieticians is reliable according to Cohen's Kappa Statistic of 0.38. Further work is needed to conclude on the validity of the NST since the sample size was only 10 however a Spearman's Rank Correlation Coefficient of -0.18 states that there is little or no relationship between the criterion and the NST subsist.

6.2 Improving the Nutritional Screening Tool

6.2.i Absence of Demographics

The NST aims to serve the population of Trinidad and Tobago which is multi-ethnic 'melting pot' with various age ranges therefore data on such aspects must be recorded. The lack of options presented on the tool to select ethnic background, age and gender hinders the tool in acquiring basic information about the patient. Age is the key determinant with respect to the stage within the lifecycle an individual. Different ethnicities are prone to specific diseases due to genetic make-up. Likewise gender predetermines exposure and the type of diseases experienced by each sex.

6.2.ii Does the Waist Circumference Section Measure Up?

The waist circumference section has one major flaw that is, the waist measurement ranges. Males were prescribed the measurements and scores of >40 ins/ 102 cm equates to four (4) points and <40 ins/ 102 cm gives zero (0) points. Similarly females were advocated >35 ins/ 88 cm and <35 ins/ 88 cm correspond to four (4) and zero (0) respectively. This scoring key is oblivious to potential 'screeners' who possess forty (40) inch or thirty-five (35) inch waists. Without rectification of this issue such 'screeners' would remain in a void.

6.2.iii Water Consumption Frequency

Once or twice daily to Nine(9) to ten (10) times were the selections on the NST. The word 'Times' as discussed previously brought about discrepancies between the investigators when testing for the reliability of the tool. 'Times' should be replaced with 'cups' since it is more measurable and can be shown using food models. In addition, create an option for zero water consumption in order to target the individuals who fall within that bracket.

6.2.iv Body Mass Index (BMI) versus Ashwell Shape Chart

Body Mass Index (BMI) is used as a tool in assessing the status of an individual based on weight and height. This valid measure of nutritional status has certain limitations. One such limitation is the inability to distinguish between the heavily muscled and the overweight. Muscular athletes are therefore at risk of forming the misconception that their

nutritional status is grim due to the classification of the BMI. Despite, being an important issue; athletes and their perception of the BMI, the topic at hand is how the BMI impact athletes who were administered the NST. With reference to the screening tool, the nutritional scoring index indicates that a participant's score increases as BMI increases which places the participant at greater nutritional risk. Muscular athletes automatically are granted a higher score. Consequently, a subsequent section should be allotted for athletes. A proposal being the usage of the Ashwell Shape Chart or Waist-to-Height Ratio. Dr. Margaret Ashwell along with her colleagues have documented and published several articles on this concept. Succinctly, Waist-to-Height Ratio can predict mortality and morbidities in longitudinal studies with great sensitivity and easier to calculate. Developing a scoring index for athletes may improve the validity of the tool with respect to very muscular subjects.

6.2.v Physical Activity, Activity Level, Job Activity Level

Views expressed by the individuals who were screened raised a valid point- the NST does not cater for those whose jobs include a high intensity of physical prowess (construction workers) as compared to low intensity work; clerical duties. Therefore inclusion of a Job Activity Level can be an option. Alternatively an option may be to distinguish Physical Activity as Exercise. This option would ensure the reliability of the tool since different investigators may interpret the phrase 'Physical Activity' differently.

6.3 Potential Treatment of Data

All the information gathered throughout a defined location can be used to perform more comprehensive tasks. Scientists have devised spatial mapping techniques with the use of computers and other technologies to manipulate gathered information about such commutable diseases and the environment in order to keep track of the infected, the origin of the disease and predicting the spread of the disease. Nutrition- based diseases like commutable diseases can take advantage of such technologies to assist in mapping and organizing cases among the population. A map based on the BMI of a specific National Health Authority Zone can be generated and manipulated as time progress thereby tracking patients' progress. The usage of AcrGIS and AUTOCAD to create a health based map is another application that can be employed. This allows hospital management to have a blueprint of the physical infrastructure which is overlaid with results from each NST participant. This recommendation emerged since the majority of the articles accumulated during the course of the study concentrated on the hospital community.

References

1. Bryan, F., J.M. Jones and L. Russell. 1998. Reliability and validity of a nutrition screening tool to be used with clients with learning difficulties. Journal of Human Nutrition and Dietetics 11: 41-50.

2. Burden, S.T., et al. 2001. Validation of a nutrition screening tool: testing the reliability and validity. The British Dietetic Association Journal 14: 269-275.

3. Isenring, E.A., et al. 2009. The Malnutrition Screening Tool is a useful tool for identifying malnutrition risk in residential aged care. Journal Human Nutrition and Dietetics 22: 545-550.

4. Kondrup, J. 2003. ESPEN Guidelines for Nutrition Screening 2002. Clinical Nutrition 22(4): 415–421

5. Mackintosh, M.A. and C.R. Hankey. 2000. Reliability of a nutrition screening tool for use in elderly day hospitals. Blackwell Science Ltd 14: 129-136.

6. McDonald, Catherine M. 2008. Validation of a Nutrition Risk Screening Tool for Children and Adolescent With Cystic Fibrosis Ages 2- 20 Years. Journal of Pediatric Gastroenterology and Nutrition 46: 438- 446.

7. Mirmiran P, et al., Validity and reliability of a nutrition screening tool in hospitalized patients, Nutrition (2010), doi:10.1016/j.nut.2010.06.013

8. Simpson, JA Randall, et al. Nutrition Screening Tool for Every Preschooler (NutriSTEP™): validation and test–retest reliability of a parent-administered questionnaire assessing nutrition risk of preschoolers. European Journal of Clinical Nutrition 62: 770-780.

9. Available at: http://books.google.tt/books?id=s-NWZfVHcW0C&pg=PA178&dq=spearman's+rank+validity&hl=en&ei=1FqzTcmQDKGX0QH_0ZiwCQ&sa=X&oi=book_result&ct=result&resnum=2&ved=0CCkQ6AEwAQ#v=onepage&q=spearman's%20rank%20validity&f=false Accessed at April 24, 2011. Fawcett, Alison J.2007. Principles of assessment and outcome measurement for occupational therapists and physiotherapists: theory, skills and application. John Wiley and Sons.

Appendix I

Final Year Project Questionnaire

Exit this survey

1. Final Year Project HUEC 3012

All the information obtained will be confidential. The project seeks to validate a Nutritional Screening Tool.Please answer the questions truthfully and do not CHANGE your current diet. Similar questionnaires will be emailed for SEVEN consecutive days. The questionnaire consists of TEN (10) questions. If for some reason you cannot access the questionnaire due to unforeseen circumstances please make a note of the questions and write responses to the questions on those particular days

Thanking you all in advance.

Michael Pierre.

Next

*

1. Please place your UWI identification number and sex (M/F)

Please place your UWI identification number and sex (M/F)

2. Did you eat any vegetables yesterday?

Did you eat any vegetables yesterday?

3. If 'Yes', what vegetable(s) did you eat?

If 'Yes', what vegetable(s) did you eat?

4. Did you eat any fruits yesterday?

Did you eat any fruits yesterday?

5. If 'Yes', what fruit(s) did you eat?

If 'Yes', what fruit(s) did you eat?

6. Did you eat any foods with a high source of fibre yesterday(for example, peas and beans, whole grain breads or cereals, provision)?

Did you eat any foods with a high source of fibre yesterday(for example, peas and beans, whole grain breads or cereals, provision)?

7. Did you eat any fried or greasy foods yesterday?

Did you eat any fried or greasy foods yesterday?

8. Did you drink any water yesterday?

Did you drink any water yesterday?

9. Did you have breakfast, lunch and/or dinner yesterday?

Did you have breakfast, lunch and/or dinner yesterday?

10. Did you do any physical active yesterday?

Did you do any physical active yesterday?

Prev Done

AppendixII

NUTRITION SCREENING TOOL for use by adults in the community

Demographics

Age	Sex	Ethnicity		Occupation
	Male	African	Mixed	
	Female	East Indian	Caucasian	
		Chinese		

Weight Status

Height	Weight	Current Body Mass Index		Ashwell Scoring Key		Waist Circumference (WC) Male	Female	Scoring Key	
				>0.5	4	>40 ins	> 35ins		4
				0.5	2	40 ins	35 ins		2
Extremely Obese	>40 (4)	**Overweight**	25-29.9 (2)	<0.5	0	< 40 ins	<35 ins		0
Obese	30-39.9 (3)	**Underweight**	<18.5 (1)	Score	_____			WC Score	_____
Healthy weight	18.5- 24.9 (0)	**BMI Score**	_____						

Eating Habits

On a Weekly Basis how often do you have:						Scoring Key		Fried or Greasy Foods	Scoring Key	
Breakfast	Rarely	1-2 times	3-4 times	5-6 times	Daily	**Rarely**	4	Rarely	**Rarely**	**0**
Lunch	Rarely	1-2 times	3-4 times	5-6 times	Daily	**1-2 times/wk**	3	1-2 times	**1-2 times/w**	**1**
Supper/ Dinner	Rarely	1-2 times	3-4 times	5-6 times	Daily	**3-4 times/ wk**	2	3-4 times	**3-4 times/ w**	**2**
Fruits	Rarely	1-2 times	3-4 times	5-6 times	Daily	**5-6 times/ wk**	1	5-6 times	**5-6 times/ w**	**3**
Vegetables	Rarely	1-2 times	3-4 times	5-6 times	Daily	**Daily**	0	Daily	**Daily**	**4**
									Score	_____

High fibre foods; whole grain breads, cereal, peas beans provisions

Rarely 1-2 times 3-4 times 5-6 times Daily

Breakfast
Lunch
Supper/ Dinner
Fruits
Vegetables
High fibre
Score _____

Water

1-2 cups		**1-2 cups**	**4**
3-4 cups	7-8 cups	**3-4 cups**	**3**
5-6 cups	9-10 cups	**5-6 cups**	**2**
		7-8 cups	**1**
		9-10 cups	**0**
		Score	_____

Physical Activity on a weekly basis

Daily 1-2 times 3-4 times 5-6 times Rarely

Scoring Key					
Daily	**0**	**3-4 times/ w**	**2**	**Rarely**	**4**
1-2 times/ w	**3**	**5-6 times/w**	**1**	**Score**	_____

Appendix III