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Function of Directing in Performing Physical Restrain in Intensive Care Wards: A Phenomenological Study

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ABSTRACT

The restraint to limit patient's movements with psychomotor agitation is often performed in the intensive care wards. Hence, optimizing the directing function is considerably needed to implement safe restraints. However, performing restraints frequently lead to injuries to patients. This study explores nurses' experiences performing physical restrain in intensive care wards. This study applied a descriptive phenomenological design, using in-depth interviews to collect data from eight key participant dan two associate participant. The key participant were nurse practisioner and team leader of nurse, the associate participant were head of nurse in intensive care wards in Aceh Province, Indonesia. The results of this study identified four themes: Socialization of Standard Operating Procedure (SOP) Restraint, optimization of supervision, lack of documentation, and improvement of nurse capacity development. The study findings show the problems in the decision-making process that needs to be considered by nurse managers to improve patient safety. It is recommended that nurse managers improve directing function and the nurse's competency in delivering nursing services at intensive care wards, especially related to restraining procedures, as one of the efforts to improve patient safety and optimize the nursing outcomes.

Keywords: Directing, hospital, nurse, physical restraint, qualitative study

INTRODUCTION

Latin word 'nurtrire' meaning to suckle or wet nurse was the origin for the word 'nurse'. Almost around 16th century the meaning was directed towards a person caring for infirm.[1] Today nursing has been defined 'as a profession within the health care sector focused on the care of individual, families and communities so they may attain, maintain or recover optimal health and quality of life'.[2] Broad approach for caring patient, training and extending scope related to practice differentiate nursing field from other health related fields. From the first perspective to the second definition there were the centuries involved. This paper aims to clarify the philosophical transitions for nursing knowledge development and explain how our discipline is guided by philosophical paradigms.

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Philosophy is the process people undertake while trying to understand fundamental truth about their existence, the world where they live, relationships to the world. This is applicable in different academic fields as well. A Philosophy of nursing is 'a statement encompassing ontological claims about the phenomena of central interest to a discipline, epistemic claims about how those phenomena come to be known and ethical claims about what the member of discipline value'.[3] Scruton suggests that philosophy is important in nursing as it involves 'a natural extraction of our interest in truth'.[4] Thus, it helps to explore variety of approaches for nursing knowledge and practice.[5] Philosophy helps nursing fraternity for critical thinking and reflects the influence of nursing values on practice and way of being. Thus, clear insight of philosophy is vital to nursing discipline and professional practice.[6]

Nursing epistemology or nurse's way of knowing involves emergence of nursing knowledge, its structure, method, pattern of knowing of its members and claims validation criteria. It has engaged nurse scientist, clinicians, and educator for developing phenomena helping to explain and clarify relationships between health and illness behavior, wellbeing and nursing action.[2] Pamela Reed & Lisa Lawrence defined nursing knowledge as "Nursing knowledge refers to knowledge warranted as useful and significant to nurses and patients in understanding and facilitating human health processes".[7] Carper described four basic patterns of knowing in nursing; empirics that is the science of nursing and is 'empirical, factual, descriptive', second is esthetics; encompassing the art of nursing, personal knowledge, which is focused on the knowing, encountering and actualizing of the concrete, individual self and finally ethics concerned with moral knowledge of nurse.[8] Chinn & Kramer explained emancipatory knowing that includes socio-political, cultural context of nursing and health care, it calls for action for eliminating inequalities and injustice 9. Further the integrated expression of emancipatory knowing is praxis which brings about change that is intended to be benefit for all.

As pattern of knowing in nursing were conceived as a process of knowing nursing, end product of nursing epistemology was identified as clinical, conceptual and empirical knowledge.[10] This knowledge is the ontology. Ontology concerns itself with the nature of reality. In accordance with philosophical prospective in scientific realism ontology address debate among the concepts of disciplines.[11] Real means the existence of the entity or process in the universe, not depending on the content like belief, perception, and attitude of mind. Axiology is the science of how human value and make value judgements.[12]

There was high urge to demark nursing as a unique discipline. Donald-son and Crowley argued stating basis for nursing was 'tacit rather than explicit' and focused that nursing research should be in the discipline of nursing rather than conducted by nurse.[13] Schwab argued that discipline constitute substantive structure; concept, theories, principles, and ideas making knowledge base of discipline while syntax included method used in inquiry, means to evaluate values, credibility or usefulness of enquiry done in discipline.[14] Thus, as a response to this concern, unique language had been created as nursing diagnosis and taxonomies have been developed as the evolution of nursing science. The process of empirical scientific enquiry has been guided by the philosophy of Aristotle before 16th century that is premodern, naturalism era.

Empiricism has been defined as a bridge conjunction between nursing theory and their practice.[15] They have a belief that there is only one reality and that can be verified through senses. Empiricism believes reality being not dependent of its context and truth can be defined.[16] Further empirical knowledge allows nurses to describe, predict and even control phenomenon in nursing discipline by testing hypothesis, comparison of interventions.[17] They used quantitative research designs like experiments, surveys and analysis of secondary-source data.[17] Conformation of results is done

through replication that allows comparison across research setting or timeframe 18. Empirical paradigm governed both positivism and post-positivism. The core natural science was value free.

Postpositivist empirical paradigm admit that absolute truth cannot be ascertained thus contextual factors play important role in understanding relationships between variables.[16] Thus, this makes it applicable to nursing research and practice. Logical empiricism was pertinent since 1940's to 1960's which focused on understanding nature of scientific knowledge with logical principles of reasoning. And this view governed more than 2 decades. The positivism came as a model for understanding the society; French philosopher Comte saw science as a means for getting insight about society and human behavior. He coined the term 'positive' originated from Latin word 'positum' meaning posited, thus for positivism objective truth existed and goal of science was to discover it. This purpose was termed as 'naturalism' which has been used by researcher to describe study of people in their own natural environment 19. Logical positivism aimed to strengthens positivism empiricism at the era where science matter was not directly observable arguing for the need of theoretical axioms for explaining phenomenon not being able of direct verification but anchored empirically by 'correspondence rules' 20 which were amenable for observational testing. Also, they supported the positivism to argue that empirical knowledge was the only valid form of knowing.

Logical positivism influenced the knowledge development in nursing since the end of 1960's. This placed nursing as a unique discipline, distinct from basic science. Further developing nursing as a professional discipline, involved having social construct, licensing requirements, and special context for nursing in public. This emphasized nursing science to focus on role of theory in nursing. Mechanism of theory development were emphasized for the development of nursing science from 1960's through 1980's. Logical positivism was basis for theory development. Nursing theory development were visible in this period, 1961 (Orlando), 1970 (Roger), 1970, 1971 (Roy) 21,22,23. The influence of logical positivism was gone in the early 1980's.

At this point nursing was attracted by a new paradigm following Thomas Kunh (1970-1974) which changed the philosophy of science from a focus on product to focus on a process. He believed science being organized around the idea of central paradigm. Also, paradigm was supposed to serve as disciplinary matrix that include the values and aims inherent in major substantive content of discipline. And the work of scientist was to articulate the paradigm. The word 'paradigm' became popular in nursing discipline; also 'meta-paradigm' in nursing was discussed. With some limitation Kuhn's ideas did not rule longer. Laudan (1977) focused on science as problem solving activity, providing view of science which address role of both conceptual and empirical problem while conducting science and determination of progress. As there was residual of logistic positivism and emergence of postmodernism, Laudan's idea got less attention.[22]

With the influence of historicism during 1970-1980's nurses were focused on resolution of conceptual problems. Still was not consistent with historicism but had positivist orientation. Concepts as building blocks of theory were valued. Analysis, synthesis and derivation for concept, statement and theory were focused on 1990's by Catherine Norris (1982), Walker and Avant (1983,1988), John Wilsom (1969). This is influenced by the recognition of role of theory in science. A philosophical view of concept development was formed by Rodgers (1989); targeted for providing solid foundation for conceptual work as a part of development of science and discipline in nursing.[23] As predominant problems in nursing field are conceptual in nature, and importance of concept in giving identity and scope of nursing as a discipline

is crucial concept development is extremely needed. With these efforts for identifying essence of nursing, fundamental concepts were postulated as constituting core of nursing knowledge. Kim, Flaskerud and Halloran, and others identified 'nursing', 'person', 'health' and 'environment' as key concepts in nursing.[24,25] The post positivist approach utilizes different variety of data, both sensory experiences and perception of those experiences. Use of different forms of data is done to falsify hypothesis, providing support to theories. Traditional postpositivist approach undertakes using both quantitative and qualitative data in understanding phenomenon making it more flexible than positivism.

Then comes interpretive perspective which incorporates naturalistic, constructivist interpretive and humanistic paradigms. It examines phenomena through the eyes of the people who live it.[26] In this paradigm reality is complex, multifactorial and content dependent.[16] As per this paradigm, reality is composed intersubjectively through socially and experimentally developed meaning and understanding (relative ontology). Also, it assumes we cannot be separated from what we know, thus our understanding about the world is central to understanding self, others and the world (subjectivist epistemology).[27, 28] Relationship networks, believes, cultures, languages construct social reality. The main aim of interpretive paradigm is describing and interpreting the phenomenon existing in the world for gaining shared meaning with others thus believes human experience as a process of interpretation rather than sensory perception only. Interpretive paradigm has critical concerns regarding moral values.[28] Interpretation involves search for vast perspectives regarding certain event or phenomena which might provide with some possibilities regarding the truth but can't offer certainty of future event as outcome. Further interpretations are moment specific (distinguished context or situation or time), like quality of life of cancer patients immediately after diagnosis, during chemotherapy, during radiation therapy, after mastectomy, during survival. Though all of them represent cancer patient's quality of life but they differ due to their unique context and timing. Hermeneutics is a term referring to the art of interpretation. Interpretative approach uses interviewing, observation along with analysis of existing texts.[28] It includes phenomenology, grounded theory, ethnography, participatory action. The process includes formulating research question, deconstructing and critical analysis of prior conceptions, capturing the phenomena, bracketing the phenomena, construction of phenomena and finally contextualization of phenomena.[39] Research conducted in interpretive paradigm is difficult to generalize findings but is in accordance with the aim of nursing that is meeting the need of patients as it helps to uncover information about individual's experience which can be used in nursing discipline.[16] Interpretive paradigms focus on induction and theory development unlike in empirical paradigm that focus on deduction and theory testing 30. Interpretive paradigm had value laden and meaning of values of lived experiences.

In the mid to late 20th century great movement across philosophy, arts, architecture and criticism occurred making modernism depart and introduced postmodernism. Incorporating wide approaches and discipline, postmodernism was defined as attitude of skepticism, irony or rejection of ideologies of modernism. Postmodern critique included Universalist notion of objective reality, morality, truth, human nature, reason, science, language and social progress. Postmodernism is a mode of disclosure or intellectual stance which rejects the possibility of reliable knowledge denies existence of universal, stable reality further frames aesthetics and beauty as arbitrary and subjective.[31, 32] In nursing post modernism involved emphasizing narrative tradition and disclosure, critical social theories and feminism. It was based on ideas of individual truth, consistent with nursing emphasis on whole person and individual approach to care. Also, the power differences present in the society, its reflection in health care system

including its interaction with care provider were considered by post modernism.

Another paradigm is Critical theory. It is 'a general perspective that uncovers social, historical and ideological forces and structures that limits human potential and that produce injustice and inequality in society'.[33] Critical paradigm, focusing on social struggle, domination, and institution with the aim of bringing egalitarian society is important paradigm for nursing.[17] Critical theory aims at man's emancipation from slavery. The global goals changes with time and nursing knowledge development cannot be addressed only by positivism and interpretative paradigm. Rationalist, interpretivist, mediation and emancipation were the four-position suggested by Kim for explanation concerning nursing practice.[34] Critical theory applied to nursing explores the reason behind some group of people having some predisposition for some illness reduce health disparities of social origin, understand cultural differences while treating patients.

According to Butterfield bringing change in health status of patient by changing patient's belief is one of the aims of nursing, but for acknowledging the antecedent factors influencing patient's behavior and health, a wide perspective is required.[35] It incorporates the role of nurse as an advocator. As nursing moves beyond carrying only for illness and focus on minimizing harmful effect of society and contextual circumstances on individual critical paradigm is significant.[36] Critical paradigm includes participatory action research as it focuses on creating change.[34]

Feminist theory evolved through critical paradigm. Feminism evolved as a movement for arranging the world in terms of gender equality and getting rid of gender-based power differences. Being not only limited to gender it included all the minorities and marginalized group for uncovering inequalities persisting in every society. Liberal feminism, radical feminism, socialist feminism and womanism are the distinguished types of feminism.[38] Feminism was of interest for nursing fraternity as it was considering some crucial values of nursing, emphasizing the uniqueness of each individual; importance of reality of individual in terms of gender, class, social, economic, religious aspects, awareness of power differences within health care system itself.

These new philosophical emergences came along with new modes of inquiry and new methodologies in nursing. Belief of an individual, culture, social context, power differences, and multiple realities needed the development of new methods able to manifest its crucial aspects of existence through research. These philosophical differences imply that traditional scientific principles are not applicable for studying human in individual and social context pointing at the need of pluralistic approach focusing on holistic tradition of inquiry.

Post modernism accelerated the growth of qualitative methodologies for knowledge development in nursing 37. With the presence of all of these paradigms, the demand for identifying diverse but valid opinions has let pragmatism arise. Pragmatism evaluates idea utilizing 'What difference does it make?' rather than criterion 'Is it true?' 38. Nurses face diverse situations and multiple approach of problem solution are necessary 16. Thus, selection of best course of action applicable for the client is the priority. With pragmatism appraising and selecting a nursing paradigm is possible.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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ETHICAL CLEARANCE

This article does not required an ethical clearance.

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A Study on Student's Satisfaction With Online Course of First Year MBBS Students

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ABSTRACT

Objective: The present study was designed with an aim to investigate 1st-year medical students' psychological well-being during the COVID-19 pandemic, with online education format, and its influence on academic motivation.

Methods: A observational cross sectional study was conducted at Government Medical College and Hospital, Mysore, India. The participants were asked to complete a pre-tested and pre-designed questionnaire. A Google questionnaire was developed. A pilot test was given to 10 participants to test the validity of Google questionnaire. Then the Google questionnaire was mailed to the students and results were analysed.

Results: A total of 90 students answered the questionnaire. Students were generally satisfied with the course (83.3%) and with technical aspects of online lectures, the positive feedback was from 62% to maximum of 75%. But they also pointed out that the weaknesses of online learning are the lack of interaction among students and difficulty in concentrating during online lectures.

Conclusion: The inevitable transformation of medical education caused by CoVID-19 is still ongoing. E-learning provided us the needed mode to continue delivering the course in the need of the hour. However, hybrid model combining both modalities can achieve better results.

Keywords: Online education, Academic stress, covid-19, E-learning

INTRODUCTION

Medical education has gradually been changing and one significant part of this has been the introduction of online learning, which is now widespread not only in medical education but in many other fields.[1] E-learning will undoubtedly have a significant impact on the environment in which future medical students learn. Most medical students view e-learning as enjoyable and effective but, interestingly, do not see it replacing traditional didactic methods.[2]

In undergraduate medical education, online learning offers learners materials for self-instruction and collaborative learning.[3] Blended learning, defined as the combination of traditional face-to-face learning and asynchronous or synchronous e-learning, has been presented as a promising alternative approach for health education because it is characterized as synthesizing the advantages of both traditional learning and e-learning. Moreover, blended learning has shown rapid growth and is now widely used in education.[4]

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Advantage of online classes, is that they allow students more flexibility. Because they can be accessed from almost anywhere with an internet connection, they forgo the need to physically go to class. However, other impacts of the pandemic on education are less positive. Some students might have fallen behind in their learning due to the lower quality of teaching in online classes and we all remember the early days of the pandemic, when teachers and professors struggled to use Zoom in their classes and the attempts to provoke interaction in breakout rooms.[5]

This study aimed to investigate 1st-year medical students' psychological well-being during the COVID-19 pandemic, with online education format, and its influence on academic motivation.

OBJECTIVES:

1. To find out the perceptions of students regarding E-learning during lockdown period of COVID-19 pandemic.
2. To assess the influence of online education format on academic motivation in 1st year medical students.

MATERIALS AND METHODS

SOURCE OF DATA

The present study is a Cross sectional, Observational, Questionnaire-based study carried out among undergraduate MBBS students, in Mysore Medical College and Research Institute.

METHODS OF COLLECTION OF DATA

A self-administered, structured, and pre-tested questionnaire is used. The questionnaire is adopted from previously conducted similar studies and modified to fit with the current set-up.

STUDY DESIGN: Observational Cross sectional

STUDY PERIOD: 01 January 2022 to 01 March 2022

SAMPLE DESIGN: 1st year Undergraduate MBBS students.

INCLUSION CRITERIA:

Undergraduate MBBS students who are willing to participate in the study.

EXCLUSION CRITERIA

a. Students who are not willing to participate in the study.

b. Students who filled forms incompletely.

METHODOLOGY

After getting approval of the Ethics Committee of Mysore Medical College and Research Institute, Mysore and obtaining written informed consent from medical students this prospective, observational study will be conducted among undergraduate MBBS students, in Mysore Medical College and Research Institute.

A self-administered, structured, and pre-tested questionnaire adopted from previously conducted similar studies and modified to fit with the current set-up is used. A pilot study will be conducted in 10 students to validate the questionnaire and changes, if necessary, will be made accordingly.

RESULTS

A total of 90 students had participated in the study. Using the pre designed questionnaire the feedback was obtained from them.

Table 1 shows '**Overall perceptions of students about E learning'**

They answered that they were generally satisfied with the course (83.3%), the educational objectives of the course were clearly presented (88.9%), the course were organized well (72%), and the volume of learning was reasonable (65%). As to their satisfaction with technical aspects of online lectures, students answered that they were satisfied with the quality, sound, speed of the video clips. The positive feedback was from 62% to maximum of 75%.

Table I : Overall perceptions of students about E learning

	Student's perception	*Yes*	*No*
1	I am generally satisfied with the course	75 (83.3%)	15 (16.7%)
2	The educational objectives of the course were clearly presented	80 (88.9%)	10 (11.1%)
3	The course lectures were well-organized in relation to each other	72 (80%)	18 (20%)
4	I am generally satisfied with the volume of learning	65 (72.2%)	25 (27.8%)
5	I am generally satisfied with the video quality of the lecture	67 (74.4%)	23 (25.6%)
6	I am generally satisfied with the progress of the online lecture	58 (64.4%)	32 (35.6%)
7	I am generally satisfied with the sound quality of the lecture	56 (62.2%)	34 (37.8%)
8	I am generally satisfied with the speed of the lecture	60 (66.7%)	30 (33.3%)
9	Feedback via email was done properly	56 (62.2%)	34 (37.8%)
10	Advantage of taking the course at any time	60 (66.7%)	30 (33.3%)
11	Advantage of taking the course anywhere	77 (85.6%)	13 (14.4%)
12	Flexibility of time in the sequence of the lecture	63 (70%)	27 (30%)
13	Playing the lecture at any speed they want	36 (40%)	54 (60%)
14	Reviewing the recorded lecture multiple times any portion of the lecture	43 (47.8%)	47 (52.2%)
15	Lack of interaction betwe en professor and student	49 (54.4%)	41 (45.6%)
16	Lack of interaction among students	56 (62.2%)	34 (37.8%)
17	Difficulty in concentrating during online lectures	74 (82.2%)	16 (17.8%)
18	Difficulty in maintaining self-directed learning	55 (61.1%)	35 (38.9%)
19	I'm satisfied with the QnA process after class	64 (71.1%)	26 (28.9%)
20	Difficulty in grasping and understanding of the subject	47 (52.2%)	43 (47.8%)

Students pointed out the following strengths of online learning: 1) they can take the course anywhere they want (85.6%), 2) they can take the course at any time they want (66.7%), 3) Flexibility of time in the sequence of the lecture (70%), 4) Satisfaction with QnA process after class (71.1%). They pointed out that the weaknesses of online learning are the lack of interaction among students and difficulty in concentrating during online lectures and Playing the lecture at any speed they want as it's not a recorded video clips but a live online teaching. As Difficulty in maintaining self-directed learning or difficulty in grasping and understanding of the subject, students answered neutrally (61.1% and 52.2%), respectively).

DISCUSSION

In this study, we present our experience of moving our classes online and our survey of students for their feedback**.** The biggest advantage of online learning is that it is possible to learn at anytime and anywhere, using the internet. Online learning also allows for learner-oriented learning.

As Table 1 shows, Even the majority of Students were generally satisfied with the online course and seem to be adjusting very well. But still difficulty in concentration during online lectures is, also been a big disadvantage pointed out by the students in majority.

Khadijah Mukhtar, Kainat Javed et al, conducted a study to explore the advantages, limitations and recommendations for online learning and their study supports the use of online learning in medical and dental institutes, considering its various advantages. Online learning modalities encourage student-centered learning and they are easily manageable during this lockdown situation.[6]

Nopa Yusnilita, in his study found that the Online learning provide students practical and flexible way in learning, it also make them more creative and active. Online learning give them some benefit in learning.[7]

Meruyert, S., Aigul, B., Aidyn, D et al, concluded in their study that Students found online learning advantageous in terms of gaining self-confidence, responsibility, a comfortable life, adaptability and acceptance of norms. They stated that the online learning environment is disadvantageous in terms of happiness, excitement, friendship, sharing, cultural and universal values.[8]

Anjali N Shete et al, concluded in their study that Students did not prefer E- learning over classroom learning. They admit the usefulness of E -learning. But, classroom learning with rational use of E -learning is preferred by the students.[9]

CONCLUSION:

Our study shows that the Students are adjusting well to the course on the whole but still they find it little difficult in concentrating during the lectures. Actually, E-learning provided us the needed mode to continue delivering the course in the need of the hour. However, hybrid model combining both modalities can achieve better results.

LIMITATIONS:

Findings in the present study can be done for large group involving more number of students. Also, we could have included the faculty in this study, as this online teaching has not much customized for the teachers as well.

Conflict of interest: None

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Study of Comparison of Anthropometric Parameters Among The Non-Obese, Overweight and Obese Subjects

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ABSTRACT

Background: Obesity is the biggest challenge in health management and public health problem in many countries since it is a significant risk factor for cardiovascular diseases. Therefore, it is to ascertain which anthropometric measurements are better predictors of obesity.

The main objective is to evaluate and compare the anthropometric parameters in non-obese, overweight, and obese subjects.

Materials and methods: This cross-sectional study was conducted with 82 subjects (male 36 and female 46) with the age group of 25 to 60 years recruited from the outpatient department of Medicine, Thanjavur Medical College, Thanjavur, South India. All the anthropometric data were collected.

Statistical analysis and results: Statistical analyses were carried out by using SPSS. The analysis by T-test was used to compare the means between the groups for normally distributed variables. All the statistical tests were two-tailed, and a p-value <0.05 was considered significant. Anthropometric parameters Height(Ht), Weight(Wt), Body mass index(BMI), waist circumference(WC), hip circumference(HC),waist-hip ratio(WHR), and Blood pressure were significant(p-value < 0.05)among the overweight and obese subjects. Among the obese subjects, the body mass index was positively associated with weight, WC, and HC.

Conclusion: In conclusion, the anthropometric markers, BMI, WC, HC, WHR, and Blood pressure were independently associated with obesity in this study. Elevated BMI and Blood Pressure are significantly related to several cardiovascular risk factors.

Keywords: Obesity, Body mass index, Cardiovascular risk factors, Anthropometric parameters.

INTRODUCTION

According to the World Health Organization (WHO), the prevalence of obesity is increasing very fast in the world and India. The WHO survey (2012) estimated that more than 200 million men and approximately 300 million women were obese(WHO-2012). Overweight and obesity are defined by the World Health Organization as abnormal or excessive fat mass (FM) that accumulates and presents a risk to health, which is most commonly characterized by the determination of a body mass index (BMI) ≥30 kg/m^2 [8].

Obesity has become a public health problem in many countries over the past decades. The financial burden and healthcare utilization from morbidity and mortality resulting from complications of Obesity

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and Cardiovascular Disease (CVD) is also increasing at an alarming rate[10]. Obesity is a strong independent predictor of CVD, even without other risk factors[11]. However, interestingly after the onset of CVD, the relationship between higher BMI and clinical outcomes is not linear. Excess adiposity contributes to the cardiovascular and other risks associated with being overweight or obese[12]. Even obesity in childhood and adolescence is associated with an increased risk for cardiovascular diseases later in life.

Being overweight and obese increases the risk of Coronary heart disease (CHD) by altering the lipid levels such as dyslipidemia, hypertension, and type 2 DM[1,4]. Obesity is associated with leptin concentrations, higher sympathetic nervous system activity, and angiotensin-aldosterone activity, which may lead to greater salt retention and blood pressure[5]. Obesity is the most significant health problem and becoming an epidemic, which affects a person both physically, and psychologically in many parts of the world[9].

Simple anthropometric measurements are used as surrogate measurements of obesity and have more practical value in both clinical practice and large-scale epidemiological studies[6]. Body mass index (BMI), which relates weight to height, is the most widely used and simple measure of body size and is frequently used to estimate the prevalence of obesity within a population[13]. BMI is consistently associated with an increased risk of cardiovascular disease (CVD) and type 2 diabetes[2]. Yet, this measurement does not account for variation in body fat distribution and abdominal fat mass, which can differ significantly across populations and vary substantially within a narrow range of BMI. Excess intra-abdominal fat is associated with a greater risk of obesity-related morbidity than overall adiposity[3]. Thus, waist circumference(WC) and waist-hip ratio (WHR) have been viewed as alternatives to BMI, with both measures regularly used in clinical and research settings. The cut-offs for WC recommended for men and women are 102 cm and 88 cm, respectively, suggesting that those individuals with greater values have a substantially increased cardiometabolic risk, independent of their BMI and total FM. Furthermore, an additional assessment of hip circumference allows us to further stratify the risk by calculating the waist-to-hip ratio (WHR) with cut-offs for men and women of ≥0.90 and ≥0.85, respectively(WHO report, 2008).

Waist circumference is the best simple measure of intra-abdominal fat mass and total fat[14]. Several studies in adults have reported a stronger positive association between cardiovascular risk factors such as hypertension, and lipid and glucose concentrations, with abdominal adiposity (measured by waist circumference or WHR) than with overall adiposity (as measured by BMI). However, BMI has also been reported as being one of the most critical risk factors for type 2 diabetes[15]. Even though a close relationship is apparent between abdominal adiposity and the risk of CVD, the current waist circumference cut-off points suggested by the World Health Organization (WHO) are not based on associations with CVD risk factors but rather on their correlation with corresponding values of BMI[9].

The main objective is to evaluate and compare the anthropometric parameters more significantly with BMI in non-obese, overweight, and obese subjects.

MATERIAL AND METHODS

This is a cross-sectional study conducted in the department of Physiology, Thanjavur Medical College, Thanjavur. The study was conducted between April 2022 and June 2022, approved by the Institutional Ethical committee TMC no:957, dated 21-04-2022. Written informed consent was obtained from all study participants. A total of 82 subjects (male 36 and female 46) with the age group of 25 to 60 years were included in the study. All the subjects were recruited from the outpatient department of Medicine, Thanjavur Medical College, Thanjavur, Tamil Nadu, South India.

All the anthropometric data were collected on the pre-designed history proforma. For measuring weight, the subject was requested to stand still on the platform of a pre-calibrated digital weighing machine. Height was measured by stadiometer with the help of a fixed scale. The formula for calculating body mass index(BMI); is the weight (kg)/ height (m^2). Waist circumference (WC) was measured midway between the iliac crest and the lowermost margin of the ribs. Hip circumference (HC) was measured at the maximum protruding part of the buttocks at the level of the greater trochanter while keeping the feet together with the subjects and wearing minimal clothing. The waist-hip ratio was calculated with the help of the formula WC (cm.)/HC (cm.). Blood Pressure was measured by a manual mercury sphygmomanometer (Diamond) which was periodically calibrated during subject recruitment. All the recruited subjects were grouped into three categories (1) non-obese, (2) overweight, and (3) obese, as per the WHO guidelines. The WHO guidelines; are BMI <25 kg/m^2 Non-obese, BMI 25-29.9 kg/m^2 Overweight, and BMI >30 kg/m^2 obese. Other exclusion criteria include the subjects with malnutrition <18.5 kg/m^2, Known history of DM, Hypertension, CVD, History of chronic illness, and previous surgery in the past, who were excluded from the study.

Statistical analysis

The collected data were entered into the Microsoft Excel computer program and checked for inconsistency. The results were presented as Mean±SD and percentages. The chi-square test was used to compare dichotomous/categorical variables among the groups. The analysis by T-test was used to compare the means between the groups for normally distributed variables. All the statistical tests were two-tailed, and a p-value <0.05 was considered significant. All the analyses were carried out by using SPSS.

RESULTS AND DISCUSSION

A total of 82(36 males and 46 females) adult subjects aged between 25 and 60 comprised the study population and its Characteristics are presented in Table I.

Among the 82 subjects, 45 (54.88%) subjects were non-obese, 27 (32.93%) subjects were overweight, and 10 (12.19%) subjects were obese. The anthropometric measurements are described in Table II.

Table 1: Profile of subjects

Gender	*Number (n)*	*Age¥ (years)*	*BMI¥ (Kg/m2)*
Male	36	40.80 +7.29	24.76 + 2.55
Female	46	40.98 + 7.53	25.51 + 2.93
¥: Mean + SD			

Table 2: Comparison of anthropometric parameters among the overweight and obese subjects.
(t-test for equality of means between overweight and obese BMI groups)

S. No.	*Parameters*	*DF*	*Mean Difference*	*Std.Dev difference*	*95%CL*		*p-value*
					lower	*upper*	
1.	Age (Years)	35	-9.630	7.58	-6.66	4.53	0.734
2.	Gender(Female)	19	-1.071	2.01	-3.02	0.88	0.265
3.	Weight(kg)	35	-5.823	4.36	-9.10	-2.54	0.001*
4.	Height(cm)	35	5.966	5.07	2.16	9.78	0.003*
5.	Body mass index (kg/m^2)	35	-4.445	1.19	-5.33	3.35	0.001*

S. No.	Parameters	DF	Mean Difference	Std.Dev difference	95%CL		p-value
					lower	upper	
6.	Waist Circumference (cm)	35	4.700	3.99	-7.70	-1.69	0.003*
7.	Hip Circumference (cm)	35	-1.692	4.65	-5.18	1.80	0.332
8.	Waist hip ratio	35	0.030	0.04	0.063	0.002	0.070
9.	Systolic Blood Pressure (mm of Hg)	35	11.7778	9.71	-19.08	-4.47	0.002*
10.	Diastolic Blood Pressure (mm of Hg)	35	-9.4889	5.60	-13.70	-5.27	0.0001*

* - p-value <0.05 was considered Statistically significant

Table 3: Comparison of anthropometric parameters among the non-obese and overweight subjects. (t-test for equality of means between non-obese and overweight BMI groups)

S. No.	Parameters	DF	Mean Difference	Std.Dev difference	95%CL		p-value
					lower	upper	
1.	Age (Years)	70	-0.459	7.44	-4.07	3.15	0.800
2.	Gender(Female)	37	-3.226	1.20	-4.03	-2.40	**<0.001***
3.	Weight(kg)	70	-7.356	4.54	-9.56	-5.15	**0.001***
4.	Height(cm)	70	0.778	5.08	-1.69	3.24	0.531
5.	Body mass index (kg/m^2)	70	-3.051	1.26	-3.66	-2.43	**<0.001***
6.	Waist Circumference (cm)	70	1.335	5.61	-4.08	1.36	0.32
7.	Hip Circumference (cm)	70	0.037	3.97	-1.89	1.96	0.96
8.	Waist hip ratio	70	-0.014	0.04	-0.03	0.08	0.203
9.	Systolic Blood Pressure (mm of Hg)	70	-5.555	11.75	-11.26	0.14	**0.05***
10.	Diastolic Blood Pressure (mm of Hg)	70	-4.222	7.00	-7.26	-0.82	**0.015***

* - p-value <0.05 was considered Statistically significant

Table 4: Comparison of anthropometric parameters among the non-obese and obese subjects.
(t-test for equality of means between non-obese and obese BMI groups)

S. No.	Parameters	DF	Mean Difference	Std. Dev Difference	95%CL		p-value
					Lower	upper	
1.	Age (Years)	53	-1.422	7.39	-6.60	3.76	0.584
2.	Gender(Female)	30	-7.49	1.03	-8.39	-6.58	<0.001*
3.	Weight(kg)	53	-13.17	4.40	-16.26	-10.0	<0.001*

S. No.	Parameters	DF	Mean Difference	Std. Dev Difference	95% CL		p-value
					Lower	upper	
4.	Height(cm)	53	6.744	4.90	3.30	10.18	0.0002*
5.	Body mass index (kg/ m^2)	53	-7.496	1.11	-8.27	-6.71	<0.001*
6.	Waist Circumference (cm)	53	-6.05	5.76	-10.11	-1.99	0.004*
7.	Hip Circumference (cm)	53	-1.655	3.19	-3.89	0.58	0.144
8.	Waist hip ratio	53	-0.045	0.046	-0.07	-0.01	0.008*
9.	Systolic Blood Pressure (mm of Hg)	53	-17.33	11.68	-25.52	-9.13	<0.001*
10.	Diastolic Blood Pressure (mm of Hg)	53	-13.71	6.72	-18.42	-8.99	<0.001*

* - p-value <0.05 was considered Statistically significant

On comparing normal and overweight groups, Weight, BMI, Systolic Blood pressure, and Diastolic Blood pressure were significant p=0.001; ($p < 0.05$) among the overweight group compared to the normal group. While Height, Waist circumference, Hip circumference, and WHR were not significant between the two groups.

Among the normal and obese groups comparison, Height, Weight, BMI, Waist circumference, WHR, Systolic Blood pressure, and Diastolic Blood pressure were significant p=0.001; ($p < 0.05$) in the obese group compared to the normal group. In comparison, Hip circumference was insignificant between the normal and obese groups.

When the overweight and obese groups were compared, Height, Weight, BMI, Waist circumference, WHR, Systolic Blood pressure, and Diastolic Blood pressure were found to be significant p=0.001; ($p < 0.05$) among the Obese group compared to the Overweight group. In comparison, Hip circumference was insignificant between the overweight and obese groups.

This study was based on estimating anthropometric findings in 82 adult individuals and its correlation with BMI, WHR, Blood pressure findings, and WC. In a clinical and research setting, it is necessary to minimize the number of anthropometric measurements. In this study, we compared BMI with other anthropometric parameters of obesity among non-obese, overweight, and obese subjects in South India. Our result suggested that the BMI was positively correlated with WC and HC among overweight and obese subjects. This may be because the extremeness of obesity is at a higher BMI cut-off range.

Currently, a significant health issue among people is obesity. There are various anthropometric measurements for the assessment of obesity. BMI and WC are the two most widely used methods. While direct assessment of fat mass may be a better index of obesity-related health risk, it is difficult to measure this accurately in the field setting. Thus, anthropometry remains the most widely used method for clinical and epidemiological purposes. In the present study, 33% of the population is overweight,12% is obese when classified according to BMI and when classified according to WC cut-offs, 17% of males and 20% of females were obese.

On the other hand, several findings suggest that BMI is a flawed measure as it does not correctly identify individuals with excess body fat due to its inability to differentiate between fat and fat-free mass, and it does not account for the effect of age and ethnicity

on body fat distribution[9]. Furthermore, our findings indicate that BMI, WC, HC, and WHR were independent markers for obesity, suggesting that only one of these measures must be obtained for clinical and research purposes. However, WHR was positively correlated with BMI in obese subjects. Carbone et al. found that overweight and obese patients are at particularly high risk for further cardiovascular complications[10]. Blood pressure findings are most closely associated with obesity which is consistently a most potent cardiovascular risk factor[16].

Therefore it seems that using only a single marker to assess obesity is still insufficient to achieve optimal accuracy. Thus, we recommended a detailed study with larger sample size is required to validate the accuracy of the findings.

CONCLUSION

Based on these findings, we concluded that the anthropometric marker BMI, WC, HC, WHR, and BP were independently associated with obesity. In conclusion, according to the results of the present study, elevated BMI and Blood Pressure are significantly related to several cardiovascular risk factors.

LIMITATIONS

However, the study has several limitations; The main limitation of this study is its cross-sectional nature, which does not allow interpretation for causality. The study also included a small sample size with a limited ethnic distribution. Other anthropometric measurements like neck circumference, arm circumference, waist-height ratio, deltoid skin fold thickness, and triceps skin fold thickness were also not included in the study. For the validation and implementation of results, it is recommended that further study with a larger sample size and evaluation of cardiac risk factors (Eg. Lipid profile) will be conducted in the future to find an association with CVD risk factors. Appropriate strategies must be planned to prevent overweight and obesity to overcome morbidity and mortality.

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