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A Cross-Sectional Study on Health Behaviors of Nurses in Kathmandu, Nepal

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Abstract

Introduction: Nurses have an increased risk for non-communicable diseases (NCDs) and a high prevalence of obesity, poor eating habits and insufficient physical activity. A descriptive study in title with nurses' health behaviours in Kathmandu was conducted to assess health behaviour among nurses.

Methods: A descriptive cross-sectional study design was used. 104 nurses from Kathmandu with at least a proficiency certificate level in nursing with a minimum of one year of experience in clinical or academic areas were included. Data were collected from January to February 2020.A nonprobability, convenience sampling technique was used. A semi-structured, self-administered questionnaire was used to collect data and descriptive statistics were used to describe the findings.

Results: The study showed that 51.9% of the respondents have normal body mass index (BMI) followed by 38.5% overweight, 6.7% obese and 2.9% underweight. Almost all of the respondents' blood pressure and blood sugar levels were in the normal range (99% and 91.1% respectively). Regarding health behaviour, 84.6% were non-vegetarian, 91.3% consumed vegetables daily, and 48% consumed fruits daily. All the respondents were non-smokers but 21% consume alcohol occasionally. Around 42.3% of the respondents do walking. Non-communicable disease was prevalent among 11.5% of respondents, among them hypertension was the highest (74.2%).

Conclusion: Only half of the respondents have normal Body mass index (BMI). Almost all respondents' Blood pressure and Sugar levels were normal. Very few of the respondents mentioned the regular morning or evening walk. Most of the respondents were taking vegetables daily but only half of the participants taking fruits daily. Four-fifths of the respondents have adequate sleep hours. The majority of the respondents have a family history of non-communicable diseases.

Key Words: Health Behavior, Nurses

Introduction

Nurses have an increased risk for non-communicable diseases (NCDs), along with obesity, poor eating habits and insufficient physical activity. Also, the worksite is internationally recognized as an appropriate setting for health promotion and

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disease prevention.[1] Employees including nurses are at increased risk of non-communicable diseases (NCDs) like diabetes, hypertension and coronary heart diseases (CHD).[2] The main risks of NCDs are physical inactivity, unhealthy eating, smoking and alcohol abuse.[3]

NCD risk factors such as physical inactivity and co-morbidities like obesity have been widely reported among nurses in countries like Australia, the United Kingdom, New Zealand and South Africa.[2,4,5]

Physical activity can be divided into moderate and vigorous intensity levels; brisk walking is an example of moderate activity and aerobics is an example of vigorous activity.[6] Adults are advised to exercise for at least 30 minutes a day at moderate intensity levels.[7] Thirty minutes of regular moderate-intensity activity is beneficial as it reduces the onset of chronic health conditions and premature mortality.[8] However, the study identified that despite these recommendations the majority of adults in the Western world do not meet the minimum requirements for physical activity to benefit their health.[9] Alarmingly, over 60% of adults worldwide or two-thirds of Europeans fail to achieve the recommended levels of physical activity.[10,11] In addition, it has been identified that physical inactivity is more prevalent among females and older adults.[10] Physical inactivity is of major concern to those in the healthcare arena as it is a recognized risk factor for heart disease, stroke, depression and cancer.[112] According to the World Health Organization (2002), there are 600,000 deaths in Europe or 1.9 million deaths worldwide every year resulting from physical inactivity because patient care cannot be confined to usual working hours (09hrs – 17hrs), approximately a quarter of all nurses work non-traditional hours or shifts.[13,14] Shift work can harm the employee and could lead to increased drug use, job-related stress, poor job performance, insomnia, and disrupted social and family life.[14,15] The high prevalence of health-related conditions and risk factors such as obesity, overweight, physical inactivity, and poor eating habits has been reported amongst shift and rotational night shift workers. [16]

Self-care is also a part of lifestyle behavior which helps individuals to change their way of life with a specific end goal to increase ideal health. Lifestyle contains the choices on diet selection, exercise, well-being, and the actions that one makes to accomplish those decisions. It enables a person to control his/her particular health, to make one's full health potential and to have a healthy lifestyle.[7]

Therefore, the main aim of this study was to explore the Nurses' Health behaviours in Kathmandu. These findings will then be used to provide recommendations for a worksite wellness intervention programme by professional organizations and working institutions for nurses to reduce NCDs' risk factors such as obesity, physical inactivity and poor eating and sleeping habits.

Materials and Methods

Study Design: A descriptive cross-sectional study design was adopted to find out the Nurses' Health behaviours in Kathmandu, Nepal**.**

Settings /Subjects: The populations of the study were nurses who were involved in clinical or teaching services and had completed Proficiency Certificate Level (PCL) nursing with at least one year of experience. A convenient sampling method was used. All together 104 Respondents visited the nursing association's central office from January to February 2020.

Inclusion Criteria: Nurses who have at least PCL nursing level education with at least one year of working experience who were willing to participate in the study by giving consent and met the criteria were samples of the study.

Ethical Consideration: Permission to undertake the research study was granted by the Nursing Association of Nepal. The principle of human dignity and justice was maintained. and informed consent was obtained. Respondents' privacy was protected to the fullest extent possible. Participants were not obligated to participate and had the option to withdraw at any time. A brief introduction describing aims, processes, the voluntary nature of participation, and a pledge of Confidentiality and anonymity were kept on the questionnaire's cover page.

Data Collection Tool: A semi-structured self-administered questionnaire was developed based on the objectives of the study. The instrument was

developed in the English language. The research instrument was divided into two parts: Part I: Questions related to the socio-demographic variables of respondents. Part II: Questionnaire related to nurse's health behaviours. The content validity of the tool was maintained by consulting subject experts and a literature review. Pretesting of the research instrument was done in 10% of the sample size and modification of the instrument was done after pre-testing

Data Collection Procedure: Nurses were determined using the convenience method who visited the Nursing Association of Nepal (NAN) office during data collection time. The respondents were explained about the nature and objective of the study. A semi-structured research questionnaire was used to collect data.

Data Analysis Procedure: Data was checked after collection for its completeness. Collected data were entered in Statistical Package for Social Sciences (SPSS) version 16 for analysis. The obtained data were analyzed and interpreted according to the objectives of the research using descriptive statistics and are presented in the tables to facilitate their interpretations.

Results and Discussion

Table 1 depicts the socio-demographic characteristics of the respondents. Out of 104 respondents, more than nearly half (44.2%) were between 30 to 40 years of age. Regarding marital status, nearly three-fourths (71.2%) were married, and most of all (89.4%) followed Hinduism. The majority of the respondents lived with spouses and children (62.5%).

Table 1 Socio-Demographic Characteristics of Respondents (n=104)

Characteristics	Number	Percentage
Age in Years		
20 t0 30	30	28.8
30 to 40	46	42.2
40 to 50	11	10.6
50 to 60	7	6.7
60 Above	10	9.6
Marital Status		
Married	74	71.2
Unmarried	27	26.0
Widow	3	2.9
Religion		
Hindu	93	89.4
Buddhist	6	5.8
Christian	5	4.8
Ethnicity		
Brahamin/Kshitri	61	58.7
Newar	29	27.9
Rai/Limbu	10	9.6
Others	4	3.8

Continue.....

Living with		
Spouse and Children	65	62.5
With family	27	26
Son and daughter In-law	6	5.8
Alone	6	5.8
Education(in Nursing)		
PCL	13	12.5
Bachelor	56	53.8
Master	34	32.7
PHD	1	1

Table 2 showed that among 104 respondents, three-fourths (76.9%) respondents were involved in clinical services and most of all (88.5%) were working currently. Regarding designation half of the respondents were staff nurses followed by Nursing administrators (27.9%), lecturers (10.6%) and Retired (7.7%).

Table 2 Respondents' Job-Related Characteristics (n=104)

Characteristics	Number	Percentage
Occupation		
Teaching	24	23.2
Clinical	80	76.9
Working Status		
Working	92	88.5
Not Working	12	11.6
Designation		
Staff Nurse	50	48.1
Nursing officer and administrator	29	27.9
Instructor	4	3.8
Lecturer	11	10.6
Associate Professor	1	1
Professor	1	1
Retired	8	7.7

Table 3 depicts that Half of the respondents (51.9%) Body mass index was normal followed by 38.5 overweight. while a few were underweight (2.9%) and obese (6.7%). Regarding Blood pressure and sugar, almost all respondents are in the normal range (99% and 98.1% respectively).

Table 3 Respondents' Health Status related Information (n=104)

Variables	Number	Percentage
Body Mass Index		
Under Weight (<18.5)	3	2.9
Normal (18.5 to 25)	54	51.9
Overweight (25 to 30)	40	38.5
Obesity (over 30)	7	6.7
Blood Pressure		
Within Normal Range	103	99
High Blood pressure	1	1
Blood Glucose Level		
Normal Range (Random Blood sugar)	102	98.1
High Blood sugar	2	1.9

Table 4 reveals the respondents' behaviours regarding food intake. Out of 104 respondents, most of those (84.6%) were non-vegetarian and nearly half of them (45.2%) consume meat items 2-3 times a week. Regarding the consumption of vegetables, almost all of the (91.3%) respondents consume vegetables daily while half of the respondents (48%) consume fruits daily. More than half of the respondents (55.8%) go for meals in restaurants, among them 48.2% take once a week followed by, occasionally and only 10.2% more than 5 times a week. Likewise, one-third of respondents (32.7%) take junk food among them 52.5% take it occasionally. None of the respondents have smoked cigarettes while one-fifth (21.2%) consume alcohol occasionally.

Table 4 Respondent's Health Behavior on food intake (n=104)

Variables	Number	Percentage
Dietary pattern		
Vegetarian	15	15.4
Non Vegetarian	89	84.6
Frequency of consumption meat (n=89)		
Daily	13	12.5
2-3 times a week	47	45.2
Weekly	24	23.1
Monthly	5	4.8
Frequency of Consume vegetable		
Daily	95	91.3
6-8 times a week	7	6.7
4-6 times a week	1	1
Occasionally	1	1

Continue.....

Frequency of consumed fruit		
Daily	50	48.1
6-8 times a week	3	1
4-5 times a week	39	37.5
Occasionally	12	11.5
Taking meals in hotels and restaurants	58	55.8
Frequency of taking meals in hotel/restaurant (n=58)		
Once a week	28	48.2
2-3 times a week	13	22.4
4-5 times a week	6	10.3
Occasionally	9	15.5
Taking junk food (n=70)	70	67.3
Daily	4	5.7
Weekly	6	8.5
3-4 days a week	23	32.8
Occasionally	37	52.8
Nonsmoking	104	100
Consume Alcohol	21	20.2
Frequency of alcohol consumption (n=21)		
Occasionally	21	100

Table no. 5 depicts that none of the respondents was involved in vigorous activities and less than half of the respondents (40.4%) were involved in light-moderate intensity activities, among them nearly half of the respondents (45.2%) were involved in those activities 2 to 3 days per week. Regarding morning walking, less than half of the respondents (42.3%) mentioned they used to go on morning walks, among them 40.9% go daily while one-fifth of the respondents (23.1%) mention they are doing yoga. Nearly half of the respondents (45.1%) took one hour of leisure time. Related to sleep duration at night, half of the respondents (49%) sleep seven hours followed by Eight hours (31.7%) and six hours (19.3%).

Table 5: Respondents' Physical Activity and sleep habits (n=104)

Variables	Number	Percentage
Not doing Vigorous- Intensity Activities	104	100
Light moderate-intensity activity (cleaning, gardening)	42	40.4
Frequency of light moderate-intensity activity(n=42)		
Daily	16	38.0
2 to 3 days per week	19	45.2
weekly	7	16.6

Continue.....

Go for a Morning walk or Evening walk	44	42.3
Frequency of morning walk or evening walk (=44)		
Daily	18	40.9
2 to 4 times a week	12	27.2
Weekly	2	4.5
Occasionally	12	27.2
Doing Meditation/ Yoga	24	23.1
Frequency of doing Meditation/ Yoga (n=24)		
Daily	9	37.5
3-4 times a week	2lifestyle7	8.3
Weekly	27	8.3
Occasionally	10	45.8
Take Leisure time per day (in hours) one	20	45.1
Two	16	26.0
Three		9.6
Four	7	19.2
Sleep in the daytime	7	15.4
Duration of daytime sleep(n=16)	2	
Less than 1 hour		43.7
1 to 2 hours	20	43.7
3 hours	51	12.5
Sleep duration at night	33	
Six hours		19.3
Seven Hours		49.0
Eight Hours		31.7

Table 6 presents that among 104 respondents, the majority of the respondents (67.3%) have a history of chronic non-communicable diseases in the Family and the majority of them have hypertension (74.2) followed by Diabetes mellitus (48.5%). Similarly, some of the respondents (11.5%) responded they have NCDs; among those who had the disease, more than half had hypertension (58.3%). All of the respondents were under medication who had the disease.

Table 6: Respondents' self and Family history of Non-Communicable Diseases (n=104)

Variables	Number	Percentage
Having NCDs in Family	70	67.3
If yes, Type of Disease (n=70)		
Hypertension	52	74.2
Diabetes Mellitus	34	48.5
Cardiac Problem	9	12.8
Hyperlipidemia	11	15.7
Relationship with family members having NCDs		
Father	25	35.7
Mother	19	27.1
Husband	13	18.5
Father-in-law or mother-in-law	8	11.4
siblings	5	7.1
Having NCDs in respondent	12	11.5
if, yes type of NCDs(n=12)		
Hypertension	7	58.3
Diabetes Mellitus	3	25
Cardiac Problem	2	16.6
Taking Medicine for NCDs (n= 12)	12	100

Discussion

Out of 104 respondents, most of those (84.6%) were non-vegetarian and nearly half of them consume meat item 2-3 times a week. Regarding the consumption of vegetables, almost all of the respondents (91.3%) consume vegetables daily while half of the respondents (48%) consume fruits daily. More than halbased ondents (55.8%) take meals at restaurants or hotels and among them, 48.2%had the meals once a week and only 2.9% had more than 5 times a week. Likewise, one-third of respondents (32.7%) take junk food among them 35.6% take it occasionally. None of the respondents hassmoked a cigarette while one-fifth (21.2%) consume alcohol occasionally. This study's findings contradict the findings of the study in South Carolina United States where among 193 registered nurses showed that regarding alcohol intake, 13.4% do not drink alcohol, 8.8% drink more than four times per week, with the majority of respondents report drinking a moderate amount (one to two drinks in one sitting) and of the eleven nurses who smoke cigarettes, eight admit they have never tried to stop smoking.[18]Another study on in title with the lifestyle behaviours and exercise beliefs of undergraduate student nurses in Ireland showed that higher rate of consumed alcohol and smoking, among 182 students, a total of 20% of the students smoked, 95%consumed alcohol and 19% of the females reported that they exceeded the recommended weekly safe level for alcohol consumption. [19]

Regarding physical activity, none of the respondents were involved in vigorous activities and less than half of the respondents were involved in light moderate intensity activities, among them

nearly half of the respondents were involved in those activities for 2 to 3 days per week. Regarding morning walk, less than half of the respondents mentioned they used to go in morning walk, among them 40.9% go daily while one-fifth of the respondents (23.1%) mentions they are doing yoga. About half of the respondents (45.1%) took one hour of leisure time. Related to sleep duration at night, half of the respondents slept seven hours followed by Eight hours (31.7%) and six hours (19.3%). The present study findings contradict the Study titled Predictors of Physical Activity and The Contents to Exercise in Nursing and Medical Students in the UK, showing that many nursing and medicine students did not achieve recommended levels of physical activity (nursing: 48%; medicine: 38%). Perceived benefits of exercise were health-related, with medicine students identifying additional benefits for stress -relief. The most notable barriers to exercise were: lack of time, facilities having inconvenient schedules and exercise not fitting around study or placement schedules.[20] Additionally, poor physical activity levels among nurses in KwaZulu-Natal, South Africa were reported in 2007.[21] These findings are supported by other studies in 2013 as well as in 2011 that nurses do not meet the recommended levels of physical activity required for the benefit of health (30 minutes, 5 days a week).[4,5] Other behavioural risk factors that have been identified among nurses include smoking and alcohol abuse.[22,23]

Among 104 respondents, the majority of the respondents (67.3%) have a history of noncommunicable diseases in the family and the majority of them have hypertension (74.2) followed by Diabetes mellitus (48.5%). Similarly, some of the respondents (11.5%) responded they had NCDs and among them who had; half had hypertension and those were under medication. These findings contradict the Study in South Africa showed that nearly one-fifth of South African healthcare workers, including doctors, dentists, nurses, radiographers, physiotherapists and occupational therapists have reported NCDs such as hypertension and diabetes. In addition, more than 70% are overweight or obese. Also, overweight participants experienced a higher prevalence of diseases and health problems than those with a normal body mass index. [2]

Conclusion

This research finding reveals that only half of the respondents have normal Body mass index (BMI). Almost all respondents' Blood pressure and Sugar levels were normal. Very few of the respondents mentioned the regular morning or evening walk. Most of the respondents are taking vegetables daily but only half of them taking fruits daily. Four-fifths of the respondents have adequate sleep hours. The majority of them have a family history of chronic illness.

Conflict of interest: None

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Board Games in Nursing Education: Creation of "Hop-On-Slide-Down Board Game"

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Abstract

Background: Games are considered an essential technique in higher learning institutions. They enhance learning objectives by improving critical and creative thinking, which increases the reasoning of the students. Games as a learning method provide the means through which students improve their immediate feedback because of discussing both wrong and right answers. They also get self-motivated to learning.

Aim: This paper provides a critical evaluation of 'Hop-On-Slide-Down,' quizzical board game, which is ideal to be used for nursing students by nursing fraternity. It involves sharing the development of the game, analyzing the efficacy of board games "hop-on-slide down", its rules, benefits, and finally, the limitations of the game.

Method: A simple board game was developed to play in the classroom. Idea derived from the "Snake and Ladder" game. This game is easy to use, cost effective and beneficial as an active learning strategy. Teacher preparation is minimal with a single time investment. The class students can be divided into small groups of 4 and assigned different roles. The game progresses by rolling a diceand answering the quiz card. Scores obtained based on right answers.

Conclusion: The present-day student community look forward for engaging learning sessions as against the monotonous classroom lectures. Educators specifically in healthcare are forced to brainstorm various modes to retain the attentions of students. Boardgames usually are a choice for an active learning session.

Keywords: Gaming, Nursing Education, Active Learning, Board Games, Critical Thinking.

Background

Classroom games are the principal teaching strategy for students of different ages. They promote active learning participation; motivate students to learn, and insights into the relationship between theory and practice. The current generation of students in nursing are all technology addicts looking for faster learning and have shorter attention spans thus the traditional classroom learning fails to instill interest in them[1]. However, engaging students in a nursing classroom with interactive games is an added responsibility for nursing educator.[2] Introducing gaming in nursing classroom is an innovative method proven by research to increase student participation, learning and objective attainment.[3] Not all nurse educators have the technical knowledge to create

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games online for their students or buy expensive games in that case. It is thus essential for teachers to employ their own creative ideas and create a feasible game within their own limits, which will both motivate students' participation in the classroom and enhance their understanding of concepts. An excellent example of a classroom game is a simple board game derived from the idea of the traditional snake and ladder game. The board game provides the means through which students can learn while playing.

Playing in a nursing classroom is a technique of making students with diverse learning styles get attracted to class lessons.[4] It motivates them to participate in both the game and classroom learning objectives, and teamwork as they play together. It enhances their perception of curiosity and improves critical thinking.[5] Such elements improve the learning objectives and make teachers struggle less as they engage with their students. The limited-time and pressure to cover large chunks of course contents in the nursing courses have often made the nursing classroom monotonous.[6] Nurse Educators are tasked with a heavy responsibility to face the bored expressions of students. Classroom gaming has shown positive impacts on the learning attitudes and responses of students, who seem to have lost their interests in the learning[5]. However, introducing classroom games will motivate not only students' participation but also their teachers as well.[7] Hop-on-slide-down is one of such interactive games developed for nursing students to stimulate and enhance their learning outcomes.

Aim: This paper provides details of development and usage of 'Hop-On-Slide-Down,' quizzical board game which is ideal to be used for nursing students by nursing fraternity. It involves sharing the development of the game "hop-on-slide down", its rules, benefits, and finally, the limitations of the game.

Method/Intervention

Board Game Development: The developers of hop-on-slide-down initiated to make a board game to introduce it as an active learning strategy specially to create interests in certain concepts in nursing. The idea behind the game was derived from the traditional snake and ladder game that has been used and liked by most of them irrespective of adults and children. The hop-on-slide-down game has thirty-six sub squares in it, along with pictures of ladders and slides placed appropriately to boost the spirit of those playing. A few checkpoints in the form of comments are placed randomly across the board. These checkpoints contribute to both the progress and fall of the participants. The abstract of this ideation of board game was reviewed and accepted for a poster presentation in an International Conference: Transforming Nursing Education through transformational leadership, research and innovations held between 22-23 June 2018 in BLDEA" s Shri B M Patil Institute of Nursing Sciences, Vijayapura, Karnataka. The presentation caught attention and many participants showed interest in the board game, which is why we the authors decided to make this paper as a mode of disseminating the idea to be used in the classroom teaching methodology.

Rules of the Game

The game is played in groups. Each group consists of four members, two participants; one observer who facilitates the cards for quizzes and has access to correct answers, and one individual who keeps the score and progress. The participants first roll their dice alternatively, and each gets a chance to enter the board game on answering a question correctly using quiz cards. This question is picked up from a pile of prepared quiz cards. As the game progresses with every rolling of dice, the participants move their respective coins but as they move they must fulfill the checkpoints like "*Pick a question*," "*Move forward at the right answer*," "*Answer one and then move*," "*Climb Up if you are right*." Since the game offers probable chances, the player is lucky to climb up the ladder or sometimes slide down. The model of the board game is represented through a media image as Figure 1.

Figure 1: Hop on – Slide down Board Game with Quiz Cards

Course Teachers Responsibility

Hop-on-slide-down classroom game involves proper preparation from the responsible teacher to ensure that the quizzes used in the game will be of great significance to the students' understanding of certain nursing concepts. Therefore, the teacher must plan to make the learning fruitful and interactive [8]. In doing so, he or she needs to choose a topic, which they prefer to reinforce by way of playing and the students' knowledge. They also need to prepare questions from the selected topic as quiz cards and group the students depending on their capabilities. The preparation can be done before using a name list or a "Candy Choice" game with student names on it on the day of playing by which students fall into their chosen groups. After grouping, the students can then select their roles as players, observers, and scorekeepers. In this way, they get to execute their leadership as well as decision-making skills.

The two players are active opponents rolling their dice alternatively. The observer adorns the role of having the quiz cards arranged with questions faced down, facilitates picking up, and ensures if answered right as the observer is in charge of the answer key. The scorekeeper will then keep track of each player's earned points, where every right answer scores one, and the wrong answers scores zero points. In this game, the teacher must ensure that the board is printed on thick cards available with the dice, two different colored coins, and quiz cards are prepared for each team. Each member of the group will then review the instructions of the game before beginning to play. The teacher will then finalize the guidelines by reminding the students about maintaining honesty, as they are themselves supervised by their teacher. After each session, the teacher will appreciate the winners of the game as positive reinforcement.

Benefits of Hop-On-Slide Down

Hop-on-slide-down, as one of the developed classroom games, has several benefits. First, it aids in active learning with every student in the class participating. Secondly, it promotes teamwork among students and hence paving the way for cooperative learning. The game provides the means through which students feel enthusiastic when a day is taken off from their standard routine lectures[9]. Also, promote individual responsibility during teamwork as each student is assigned a responsible role. Furthermore, the hop-on-slide-down board game would be a game for NCLEX – RN/Prometric/ any competitive review class.

Limitations of Hop-On-Slide Down

Despite the game having a great contribution to the learning objectives, it also has some limitations.

For instance, committing oneself to the tasks based on the context is ambiguous. In addition, using the board game for scoring an individual student performance may be challenging. Since each participant is assigned a different role in the group, the possibility of team testing is not sufficient. The game can be used as a strategy for learning reinforcement or testing their knowledge retention of an already attended topic. The time duration of the game can be curtailed by setting rules in class or until the first group completes the game. Lastly, teacher preparation might take some considerable amount of time hence inconveniencing other essential learning or teaching activities but once prepared can be reused multiple times in future classes for different course as it serves to be economical.

Conclusion

As one of the most effective nursing classroom games, hop-on-slide-down board game facilitates fun and cognitive stimulating learning experience for nursing students. It provides the means through which nursing students actively participate in the learning activities for knowledge gain. As a classroom game, hop-on-slide-down offer a practical path for both students and teachers to achieve their objective more interactively.

Ethical clearance: Not Applicable as it does not involve data collection.

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Original Research Article

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Level of Stress Among First Line Nurses in East Jeddah Hospital, Saudi Arabia During COVID-19 Pandemic

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Abstract

Objective: This study sought to determine the level of occupational stress and the associated factors among first line nurses in East Jeddah Hospital, Saudi Arabia, during COVID-19.

Methodology: Data was collected from a sample of 250 first line nurses working in East Jeddah hospital using survey questionnaires. The questionnaires consisted of occupational stress scale. The collected data was then analyzed using Chi-square and the descriptive statistical tools of SPSS.

Results: The analysis showed that 82.8% of the nurses had high level of stress and only 17.2% had moderate stress. The level of occupational stress is affected by various demographic factors, including nurses' age (*p=.000; r=.713*), level of education (*p=.000; r=.655*) marital status (*p=.014; r=.624*), and whether the nurses stayed alone or with others (*p=.000; r=.507*). Many work-related factors were also noted to affect the level of occupational stress, including department of work (*p=.040; r=.756*), hours of working (*p=.000; r=.542*), years of experience (*p=.002; r=.734*), access to PPEs (*p=.000; r=.594*), nature of relationship with the other coworkers (*p=.000; r=.594*) and nature of work relationship (p=.000; r=.597).

Conclusion: The high level of stress among the first line nurses varies with sociodemographic and work factors, and this calls for the healthcare systems to implement devise measures to address the propagating factors around stress among these nurses.

Key words: Occupational stress, first-line nurse, Covid -19, anxiety, Saudi Arabia

Introduction

The COVID-19 pandemic caused adverse changes in healthcare, particularly in nursing practice.[1] With the rapid spread of the virus, millions of people contracted the virus, leading to congestion in healthcare facilities.[2] Consequently, there was an extreme demand for nursing care services and ultimately posing psychological challenges to the nursing workforce.[3] Apart from the increased demands for nursing care services, the pandemic also led to the deterioration in the quality of nursing care services and since nurses are at the center of healthcare service delivery, a lot of the burden befalls them.[4]

Since the outbreak of COVID-19, the fear of contracting the disease had sparked more worries,

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anxiety, panic and many other mental health conditions among nurses since they interact with the patients closely.[5] More distress also came from social isolation whenever the healthcare workers are suspected to have contracted the virus.[6] Further to the incidence of the psychological distress, many studies have also focused on demographic factors as modulators of occupational stress among first-line healthcare workers.[7] Some researchers have also made significant steps towards explaining work-related factors that influence depression and anxiety among first-line clinical caregivers.[8]

While there have been significant milestones made towards assessing the level of occupational stress among nurses, there is an inconsistency among the health workers depending on the environment and the country of the study. Similarly, there is a variation in socio-demographic factors. Therefore, there was a need to conduct further studies to determine the current statistics for occupational stress among the frontline nurses.

Methodology

This study applied cross-sectional quantitative research design. Ethical approval was obtained from the research Ethics Committee of the Directorate of Health Affairs in Jeddah. Accordingly, ethical principles that guide nursing research practices were all observed in all the research activities, and informed consent was taken from the participants. A total of 250 participants were included in the study, including the first line nurse employees in East Jeddah Hospital. Data was collected using online survey questionnaires administered online via Google forms. The questionnaire scale for assessing the level of occupational stress was obtained from Cohen, Kamarck and Mermelstein[9], who used it to examine level of occupational stress among health workers and employee, and hence suitable for determining occupational stress among the first line nurses. The collected data was then analyzed using two statistical tools of SPSS, version 26 – Chi-square and descriptive statistics.

Results

Most of the participants were males (54%), and those aged between the 31 and 40, making 31.2% of the total. Other sociodemographic features are shown in Table 1.

Table 1. Participants' demographic factors

Variables	Frequencies (N)	Percentages (%)
Age		
20-30	75	30.0
31-40	78	31.2
41-50	66	26.4
51-60	31	12.4
Gender		
Male	135	54.0
female	115	46.0
Level of education		
Diploma/tertiary college	42	16.8
Bachelor degree	152	60.8
Master degree	56	22.4
Marital status		
Married	153	61.2
Unmarried	67	26.8
Divorced	15	6.0
Widowed	15	6.0
Staying alone or with people		
Alone	88	35.2
With others	162	64.8

Regarding the hospital factors, 45 (18%) nurses worked at the medical-surgical unit, and the least number, 33 (13.2%) worked at the outpatient clinics. Majority of the participants, 145 (58%) had between 6 and 10 years of experience, while only 2 (0.8%) had worked for less than one year in the current department. Additional hospital factors are presented in Table 2.

In terms of the relationship with co-workers, 122 (48.8%) participants had a relatively supportive relationship, 95 (38.0%) had a friendly and very supportive, and 33 (13.2%0 had an unsupportive

relationship. Working relationships were also examined, and 96 (34.4%) participants noted that they have safe working condition while 33 (13.2%) had unsafe working condition.

Table 2. Hospital related factors

Variables	Frequencies (N)	Percentages (%)
Department		
Intensive Care Unit	46	18.4
Emergency department	42	16.8
Medical - Surgical unit	45	18.0
Operation rooms unit	40	16.0
Pediatric unit	44	17.6
Out Patient clinics	33	13.2
Duration of working in the department		
Less than 1 year	2	.8
2-3 years	20	8.0
4-5 years	83	33.2
6-10 years	145	58.0
Hours of working per week		
40 - 59 hours per week	76	30.4
60 - 79 hours per week	174	69.6
Years of experience		
1-5 years	36	14.4
6-10 years	76	30.4
11-15 years	75	30.0
16-20 years	41	16.4
Over 21 years	22	8.8
Training on COVID-19		
Yes	227	90.8
No	23	9.2
Adequate access to all PPEs		
Yes	154	61.6
No	96	38.4
Relationship with co-workers		
Friendly and very supportive	95	38.0
Relatively supportive	122	48.8
Unsupportive	33	13.2
Nature of working conditions		
Safe working condition	96	38.4
Relatively safe working condition	121	48.4
Unsafe working condition	33	13.2

Level of occupational stress

The level of occupational stress was assessed, and found that majority of the respondents reported high stress levels 207 (82%) while only 43 (17.2%) admitted to have suffered moderate stress. None of the participants reported low levels of stress.

Sociodemographic factors affecting level of occupational stress

Age (p=.000; r=.713), level of education (p=.000; r=.655) marital status (p=.014; r=.624), and as to whether the nurses stayed alone or with others (p=.000; r=.507) had a positive relationship with the level of occupational stress at 95% confidence interval. However, gender of the first line nurses does not influence their level of occupational stress with a Chi- square value of 24.332 (p=.386) (Table 3).

Table 3. Chi-square test of association between sociodemographic factors and occupational stress

Variables	Nominal by Nominal (Phi)	X^2	df	P value
Age	.713	127.016	69	.000
Gender	.312	24.332	23	.386
Education level	.655	107.257	46	.000
Marital status	.624	97.236	69	.014
Staying alone or with others	.507	64.329	23	.000

Hospital factors affecting level of occupational stress

Table 4 show the association between department of work and level of occupational stress (p=.040; r=.756). Moreover, the department of work (p=.040; r=.756), hours of working (p=.000; r=.542), yeas of experience (p=.002; r=.734), access to PPEs (p=.000; r=.594), nature of relationship with the other co-workers (p=.000; r=.594) and nature of work relationship (p=.000) had a statistically significant relationship with the level of occupational stress among the first line nurses.

Table 4. Chi-square test of association between hospital factors and occupational stress

Variables	Nominal by Nominal (Phi)	X2	df	P value
Department of work	.756	142.91	23	.040
Duration of working	.556	77.186	69	.234
Hours of working per week	.542	73.529	23	.000
Years of experience	.734	134.866	92	.002
Training on COVID-19	.284	20.195	23	.630
Access to all the required personal protective equipment	.406	41.240	23	.011
Nature of relationship with co-workers	.597	89.00	46	.000
Nature of working conditions	1.667	694.548	92	.000

Discussion

This study observed that there is a high level of occupational stress among the first line nurses in East Jeddah hospital, Saudi Arabia during COVID-19 pandemic. Indeed, many research studies have already reported significantly worrying levels of occupational stress among the frontline workers.[10]Therefore, this observation is neither unique to this study not to Saudi nurses who handle Covid-19 patients like other nurses across the globe.

Interestingly, the level of occupational stress was noted to vary according to the nurses' age, marital status, and education levels. Again, similar observations were made by many other researchers who also identified that age of the nurses has a significant impact on the levels of occupational

stress.[10-12] However, while this present study established a diminished relationship between gender and the occupational stress levels among the front-line nurses, Al-Mansour and colleagues, in the study found that gender contributed to increased occupational stress among the clinical first line nurses.[8] Another interesting observation is that the married nurses are less stressed compared to the unmarried. According to Smallwood's study COVID-19 increased the level of occupational stress among the married than before.[13] The severe impact can be explained by the relatively lesser social distress that the unmarried encounter. The same study indicated that frontline nurses living with children or loved ones reported high occupational stress levels than those living alone in the COVID-19 working environment due to fear of infecting family with the virus than those staying alone.[13]

This study also noted that the frontline nurses above forty years and those who had lower education levels had an increased level of occupational stress. According to Despoina and colleagues, older frontline nurses are worried about their safety at work than nurses below thirty-five years.[14]This could be due to the age-related distress in life. Education can be explained to affect stress-handling capacity. AlAteeq and colleaguesreiterate that level of education defines the capability of frontline nurses to solve arising issues. The nurse with higher educational achievements (those with master's degrees) interprets and simplifies the complexity of situations while identifying alternative approaches.[12]

Apart from the sociodemographic factors, this study also noted that level of occupational stress varied with work factors, such as department work, relationships worth co-workers, hours of working, access to personal protective equipment and level of experience. The nature of the department and its activities can enhance stress due to safety issues and job stress.[15] Improper coordination and team working in critical departments like operation rooms promote high-stress levels among the first line nurses in the Covid-19 working environment.[16,17] Some studies reported that longer working hours diminishes rest time for the first line nurses contributing to stigmatization and intentions to leave work.[18]

Regarding hours of working; longer hours of exposure to the sufferings of patients, and noisy environment contributes to psychological and mental issues thus leading to stress.[15.19]While this research established a moderate impact of working hours on stress levels of first-line nurses, some researchers reported that hours of work has a higher ability to cause elevated stress levels among the frontline nurse during the COVID-19 pandemic.[20]Moreover, years of experience have a strong positive impact on the level of occupational stress among the first-line nurses according to this study. Nurses with more years of working in hospitals are more resilient to occupational stress than those with few years. A study by Zhan and colleagues identified that frontline nurses exposed to more COVID-19 training are more comfortable working in hospitals than the nurses with limited exposure and that work experience ensures mitigation of risks and more appropriate mechanisms of handling patients' critical conditions.[19]

This study also established that access to all the required personal protective equipment has a positive impact on the level of occupational stress among the first-line nurses. Similarly, some studies found that during the initial surge of COVID-19 despite being a resilient group, the majority of frontline healthcare providers experienced stress, anxiety, fear, and concerns regarding personal safety due to COVID-19, with many at risk for burnout.[21,22]

Overall, this study findings correlates with many previous observations concerning the impact of the nature of relationships with co-workers and the nature of working conditions on the level of occupational stress among the first-line nurses. Mo et al. asserts that poor relationships with others deteriorate the working culture and promote anxiety leading to increased occupational stress levels among the frontline nurses particularly in the; COVID-19 pandemic. First line nurses also experiences dealing with dying or dead victims, insufficient emotional preparation, and treatment uncertainty lead to elevated nurses' occupational stress levels.[18]

Conclusion and recommendations

There is a high level of occupational stress among the first line nurses in East Jeddah hospital, Saudi Arabia during COVID-19 pandemic. Even though

the previous studies also indicated that there have been cases of occupational stress among nurses, the cases in the time of COVID-19 were relatively higher. It was also noted that level of occupational stress varies according to many sociodemographic and work factors. From the observations, the healthcare policymakers should come up with practical measures to help reduce the burden of occupational stress among the first line nurses in East of Jeddah. Nurses should also be aware of the high likelihood of occupational stress, and take precautionary measures to prevent the adverse outcomes. In addition, the healthcare system needs to come up with measures to educate or enlighten the first line nurses about ways of reducing stress before a pandemic arrives as well as the need to keep shifting the first line nurses across departments since it was noted that nurses working in some hospital departments were more exposed to stressful conditions than others.

Limitations

It would have been better to include data from different hospitals in different regions within the country. Nevertheless, the collected data still gave outcomes that resemble the outcomes from the previous studies.

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Availability of Data

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request

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A Original Research Article

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Depression, Anxiety and Stress among Nursing Students in Selected Colleges of Eastern India: A Descriptive Study

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Abstract

Background: Nursing students after enrolling themselves into nursing profession experiences high level of stress and anxiety which later shows signs and symptoms of depression at early age. The present study is undertaken to study the level of stress, anxiety and depression among undergraduate nurses. The objective of the study was to assess the level of stress, anxiety and depression among nursing undergraduates.

Methods: A total of 201 sample were selected using non probability sampling technique. The three domains of mental status was assessed using depression, anxiety and stress scale-21 (DASS-21).

Findings & Conclusion: Majority of the nursing students showed 60.2% of mild anxiety followed by mild depression (57.7%) and mild stress (55.2%). The present study revealed significant presence of anxiety, stress and depression among the nursing undergraduates. These findings are alarming in nature as it may have negative impacts on the mental health of the students. Stress, anxiety and depression among nursing students will adversly affect the academic performance and the quality of care they give to their patients. Students must be made aware to employ different coping strategies, different communication skills, campus connectdness, to deal with the stress, anxiety and depression during their clinical training. Mental health screening is another important preventive strategies to avoid mental disorders.

Keywords: Anxiety, Depression, Stress, Nursing students

Introduction

Psychological distress including stress, anxiety, and depression are current global problems[1]. Lifetime prevalence of stress, anxiety, and depression among adolescents and young adults ranges from 5% to 70% globally[2]. Most undergraduate students transitioning to adulthood encounter stressful situations[3] that may be responsible for a high rate of depression and anxiety among them[4,5]. The literature reveals that the prevalence of stress, anxiety, and depression is higher in developing countries such as India, Sri Lanka, Republic of China, Saudi Arabia, and Brazil as compared with developed countries[6]. Various studies revealed nursing students' self-reported symptoms of stress, anxiety, and depression were

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significantly more severe compared with a mix of university students and the general workforce[7]. Nursing is considered a stressful profession[8]. A high prevalence of stress, anxiety, and depression among nursing students may be due to the dual demands of academic as well as clinical requirements[9]. Indian studies conducted in Delhi and Rajasthan had revealed moderate degree of stress present among 77% and 82% of nursing students respectively[10].

Research Objectives

1. To assess the level of Depression, Anxiety and Stress among the nursing students.
2. To assess the correlation between Stress, Anxiety and Depression.
3. To assess the association between stress with socio demographic variables.
4. To assess the association between anxiety with socio demographic variables.
5. To assess the association between depression with socio demographic variables.

Methods and Materials

A descriptive survey design was adopted to assess the stress anxiety and depression. Non probability convenience sampling. sampling technique was applied to select 201 nursing students. The setting chosen was Gita Ram School and College of Nursing, Berhampore, West Bengal and Nemcare School and College of Nursing, Guwahati and population was 1st yr , 2nd yr, 3rd yr and 4th yr B.Sc Nursing students. A standardized tool DASS-21 was used where the three domains of psychological information over the last week was collected on a Likert scale of 0 to 3.Once completed, each scale has a numerical score associated with each construct such that higher scores are indicative of higher levels of the construct. It has well-established psychometric properties and is reliable in measuring depression, anxiety and stress (at a Cronbach's alpha of 0.83, 0.80 and 0.82, respectively). A pre validated socio demograhic data sheet is used to collect the socio dmemographic variables. The ethical clearance was Institutional Ethics Committee, NEMCARE group of Institutions, Mirza. Written informed consent was obtained from each study subjects.

Inclusion criteria: Students who gave consent to participate in the study.

Exclusion criteria: Students who did not give consent to participate in the study, day scholars students staying at Paying Guest.

Results

Majority of the nursing students, 192(95.5%) were female, 158(78.6%) were aged between 18 – 20 years, 85(42.3%) were studying 3RD year, 181(90 %) were staying at Hostel, 145 (72.1%) were Hindus, 192(95.5%) had no academic failure, 143(71.1%) had no financial difficulty, 192(95.5%) had no relationship crisis with family, 171(85.1%) had no relationship crisis with peer, 110(54.7%) had adequate sleep, 155(77.1%) had not exercised regularly, 189(94%) had no family history of psychiatric disorder, 196(97.5%) had not undergone any psychiatric consultation before, 163(81.1%) had self perceived physical health and 181(90%) had self perceived mental health.

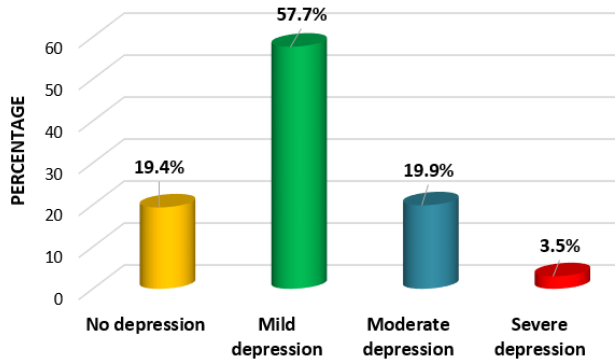

Fig-1: Distribution of level of depression among nursing students

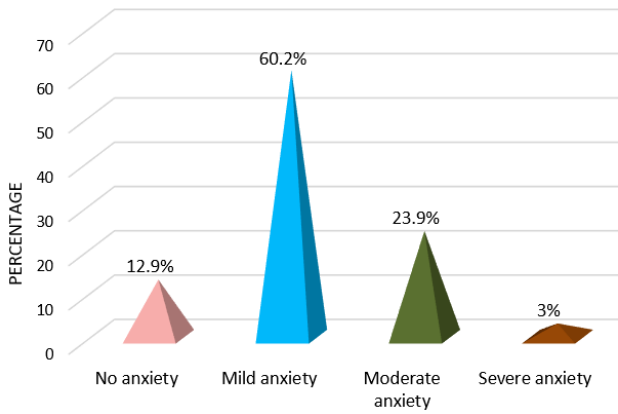

Fig-2: Distribution of level of anxiety among nursing students

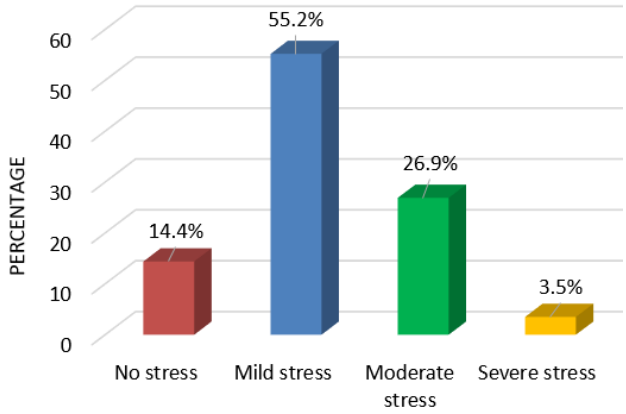

Fig-3: Distribution of level of stress among nursing students

The current study found that 60.2% of nursing students have mild anxiety (Fig 1) followed by mild depression (57.7 %) (Fig 2) and mild stress (55.2%) (Fig 3). The findings in the current study is relevant with Alahmadi systematic evaluation in Saudi Arabia that comprised 19 publications and revealed that the prevalence of anxiety among students ranged from 34.9% to 65%. In the study conducted by Baruah C et al [11] out of 214 students, 22.9% had mild depression, 24.9% had moderate depression, 6.1% had severe depression and only 1.9% had extremely severe depression. The current study findings is in contrary and higher than the findings of Wong et al [12] conducted a large scale web-based survey of 7915 first-year tertiary education students in Hong Kong using the 42-item Depression Anxiety Stress Scales. Depression, anxiety and stress levels of moderate severity or above were found at incidences of 21%, 41% and 27%, respectively. The method employed to quantify anxiety, the sample size, and the existing Sociocultural differences between the countries may all be possible causes for the observed variances.

The current study findings shows positive correlation between Stress, Anxiety and depression (table 1) which clearly infer that when stress among the nursing students increases which ultimately results in the increase in the level of anxiety and depression(Fig 4, Fig 5, Fig 6) among them. Wilson et al [13] also reported a similar findings in their study. There was a positive correlation between stress and depression in our study, which showed a positive Pearson's correlation (R) of 2.97, similar to the finding of a study done in the USA where R-value was even higher at 0.7.

Table 1- Correlation between stress, anxiety and depression among nursing students

Coorelation	'r' value	'p' value
Stress and Anxiety	0.766	0.001*
Stress and Depression	0.797	0.001*
Anxiety and Depression	0.742	0.001*

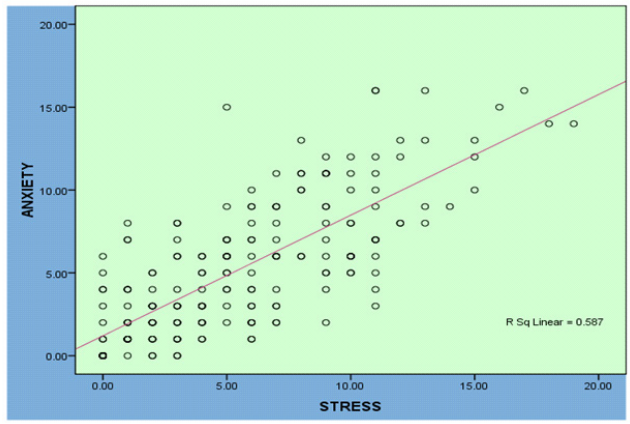

Fig-4: Coorelation between stress and anxiety

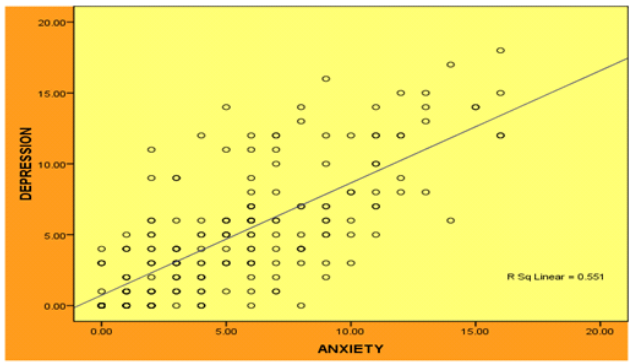

Fig-5: Coorelation between depression and anxiety

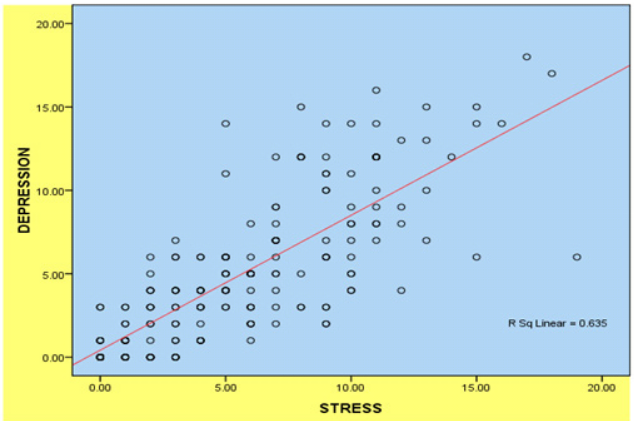

Fig-6: Coorelation between depression and stress

Depression and Correlates

In the present study depression is significantly associated with financial difficulty, relationship crisis with peer, sleep adequacy, exercises, family history of psychiatric disorder, previous psychiatric consultation, self perceived mental health. Andrews and Wilding[14] concur that financial vulnerability may exacerbate depression among university students. Cheung et al[12] conducted a study students who did not exercise at least once a week were 1.6 times more likely to experience depression than those who did. His study results indicate that respondents with sleep problems were 2 times more likely to experience depression than those without. Based on previous study's findings, depression is significantly predicted by a family history of mental illness. This is consistent with research from Germany, India, and New Zealand that found people with family members who have mental illnesses are more likely to experience depression themselves. Cheung et al[12] also reported students who perceived themselves having poor mental health were 27 times more likely to report depression than those with good self-perceived mental health. In an epidemiological studies Paykel ES[15] have reported that poor social support is associated with the onset and relapse of depression.

Anxiety and Correlates

In the present study anxiety was significantly associated with academic failure, relationship crisis with family, relationship crisis with peer, family history of psychiatric disorder, self perceived physical health, self perceived physical health, self perceived mental health. Cheung et al [12] in his study reported students seeing their physical and mental health as poor were, respectively, 3.4 times and 2.9 times more likely to experience anxiety than those with good self-perceived physical and mental health. The result outcome of study conducted by Xu, J.; Wei, Y [16] supports that the presence of family support is thought to be a key component of psychological adjustment, which may help to reduce the pathogenic effects of anxiety. The finding support with the study conducted by Md. Aris Safree Md Yasin & Dzulkifli[17] where students who are satisfied with their education have higher achievement levels than those who are not satisfied and higher achieving students had lower levels of depression, anxiety or stress. **La Greca and** Lopez [18] explored the association between peer acceptance and social anxiety. They found that low peer acceptance was significantly associated with social anxiety and accounted for between 10% and 17% in social anxiety scores.

Stress and Correlates

In the present study stress was significantly associated with religion, academic failure, financial difficulty, relationship crisis with peer, sleep adequacy, self perceived physical health, self perceived mental health. Cheung et al [12]study results indicate that respondents with sleep problems were 1.7 times more likely to experience stress than those without. He also reported students who had failed in tests/examinations in the past year were 1.7 times more likely to experience stress than those who had passed. Students in financial difficulty were 1.8 times more likely to report stress than those without money worries. Students with poor self-perceived physical and mental health were 3.3 times and 8.7 times respectively, more likely to report symptoms of stress than those students with good self-perceived physical and mental health. (Abdel-Khalek & Eid[19] Hardy et al[20], Koenig[21] found beneficial effects of religious involvement outcomes associated with stress. Also study conducted by Merrill et al[22] found that students' faith provided them with comfort and inspiration that changed their view of life, in that God is aware of their needs and will assist them accordingly .In turn, it minimizes the level of stress and promotes feelings of confidence in one's ability to handle personal problems.

Conclusion

The present study concluded that anxiety, depression, and stress are very prevalent among nursing students. Various socio-demographic traits and anxiety, depression, and stress were related. Hence, nurse educators and administrators should take the initiative to introduce and implement services such as periodic mental health screening and counseling facilities, training on proper application of coping strategies, Campus Connectedness activities which will empower the students in becoming mentally healthy nursing professionals.

Replicating a similar study with a sample from other universities that include colleges in more districts.

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Conflict of Interest: There are no conflict of interests.

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A Original Research Article

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Simulation as an Innovative Teaching Pedagogy for Baccalaureate Male Students Undertaking a Maternal Health Course in the Arab world: A Pilot Project

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Abstract

Background: The nursing profession is attracting more male students at the baccalaureate level. Nursing faculty face difficulty in finding appropriate clinical opportunities in obstetrics for male baccalaureate nursing students in the conservative Arab culture.

Methods: A simulated environment was created comprising four beds in a ward setting. A standardized patient (SP) was placed on each bed. Each SP was trained to provide a history and respond to triggers based on questions posed by male students. The scenarios were: an antenatal patient admitted for induction of labor, a primipara with edema and severe headache, a multigravida who delivered spontaneously and was preparing for discharge, and a cesarian case on the first postoperative day. In the latter two scenarios, newborns were placed in bassinettes near the SP's and the male students were also expected to take care of the baby. This innovative educational project highlighted simulation using low fidelity manikins and SPs. Male students reported simulation was an effective teaching strategy to acquire obstetric knowledge and develop critical thinking as they responded to cues given by the SP (e.g., antenatal abdominal pain). In addition, the students gained a level of proficiency in examining antenatal and postnatal women. Furthermore, they reported that debriefing following the training consolidated their learning.

Conclusion: Male students reported they would not have been able to achieve the course outcomes for the maternity clinical rotation without the introduction of simulation. This project sets the stage for introducing simulation into other clinical courses across the baccalaureate curriculum.

Key words: baccalaureate nursing education, educational pedagogy, simulation, standardized patients, Arab culture, male students

Introduction

As male students enter nursing programs, the maternal health course has emerged as an area in which they face major challenges. In addition, the conservative Arab culture makes it difficult for nursing faculty to find appropriate clinical

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opportunities in obstetrics for male baccalaureate nursing students [1], especially as cultural constraints mean they are not allowed to enter the maternity ward. This feedback has been received in course evaluations from preceding years. To overcome these cultural barriers to clinical learning, and ensure attainment of the maternal course competencies students were provided with simulated experiences so they could learn the skills that were necessary for the maternal health course. Simulation allows for a replication of real-life experiences and development of competencies, including communication and clinical decision making [2], thereby supporting student learning, and enabling them to perform nursing actions within cultural boundaries and achieve outcomes along with reflective debriefing [3]. Furthermore, this educational strategy supported student-centered learning and enabled them to learn in a setting as close to the real world as possible[4].

The use of simulation in nursing education provides opportunities for students to practice in a controlled environment. Simulation provides an excellent teaching environment that links instruction with the cognitive processes of perceiving, thinking, and processing information. Reflective thinking is part of the teaching repertoire as students recall the encounter, reflect on what took place and why. In this process, they review what they learned from the experience and reflect on what they could do if they had opportunity to repeat the same scenario[5].

The purpose of this paper is to showcase both the creation and implementation of an innovative teaching pedagogy in the maternal health course for male baccalaureate students through the use of simulation in an educational setting. In line with International Nursing Association for Clinical Simulation and Learning (INACSL) 2021, the design of the simulation encompassed clear objectives that were communicated to the students in a pre-briefing session to acquaint learners with what was expected of them in the simulation activity[6]. The information was provided by email to all the students three days prior to the activity. A list of videos was shared with the students to further consolidate their learning. This was considered a flipped classroom approach and keeping in mind the principles of adult learning the students could view the information and videos at their own pace prior to the simulation[7]. In this way, the educational outcomes aimed to increase knowledge, improve skill performance satisfaction, and enhance critical thinking and self confidence in their repertoire of skills.

Methods

The simulation experience.

The simulation experience was provided in the sixth and seventh weeks of the maternal health course (approximately halfway through the semester). By this stage, students had learned sufficient theoretical concepts as part of their didactic lectures and were prepared to encounter the concepts of the maternal course in a simulated setting, thereby bridging the theory to practice gap.

The skills laboratory was set up to resemble a four-bedded ward and male students participated in four simulated scenarios with low fidelity manikins and standardized patients (SPs). The four obstetric scenarios were developed by the course faculty and validated by another faculty member with midwifery qualifications. Scripts were developed for the SPs along with prompts and triggers, so they were prepared to enact the various roles. The four scenarios were as follows.

1. A 30-year-old antenatal woman who was admitted to the labor room for induction of labor. The student was instructed to assess the woman in the labor room.
2. A 25-year-old primipara who presented with edema and was complaining of a severe headache.
3. A 35-year-old woman who had delivered her third baby by spontaneous vaginal delivery. The student was expected to care for the mother and baby and prepare them for discharge.
4. A 28-year-old woman who had delivered her first baby by cesarian section and was at the first day postoperative. The student was expected to take care of the mother and baby.

The participating students' female classmates played the SP roles. They also acted out various roles of relatives, or doctors, nurses, and head nurses giving instructions to the male students. The SPs received extensive training to ensure they could provide a

patient history and verbalize signs and symptoms, thereby adding realism to the scenarios. The SPs wore patient gowns and identification bracelets and were given a cue card detailing their role and timed triggers (e.g., an antenatal patient who exhibited false labor). In addition, a head nurse toured the ward and asked for the fetal heart rate and vital signs of the mother or asked to see the lochia. Moulage was used to display soaked sanitary pads and lochia, and wounds that depicted episiotomy cuts and surgical incisions for the cesarian section.

Each simulation had an unfolding case scenario and students were expected to respond to the scenario in real time. For example, in the third scenario, the male student had to prepare for the discharge of the mother and baby. It was expected that the discharge teaching would include demonstrating how to give the baby bath and change the diaper and then watching a return demonstration from the mother.

Each simulation lasted about for 20-30 minutes. The faculty made notes on the students' performance. At times, it was considered important to freeze the scene [8] to allow for timely intervention by the faculty and ensure critical thinking by the student. In some cases, the faculty had to intervene to prompt students to think critically. For example, in the encounter with the woman who had edema and headache, students were expected to check her blood pressure. If the student did not show any action towards checking the blood pressure, the faculty would intervene and ask the student, "What should be your immediate action based on the history you have obtained? Which vital sign should you check and monitor right away for this patient?"

After the full run of the simulation, the student was asked to reflect on their performance in the scenarios and what learning had taken place, and if they would do something different if the scenario was to be repeated [9]. This was followed by a formal debrief, which was led by a faculty member who had received extensive training in debriefing techniques at the Centre of Medical Simulation in Boston. Debriefing is an integral part of simulation and engages the learner to link theory to action [10]. Debriefing focused on the positive aspects of the simulation and highlighted areas for improvement. In this way, the students gained a deeper understanding of the course materials and linked theory with practice. Students also developed teamwork and inter professional skills while learning to appreciate the contributions of other healthcare team members. Students were more engaged with course content and able to engage in meaningful discussions after the simulation, thereby leading to transformative learning.

Discussion

Student evaluation

The students reported that the simulation enabled them to meet the course objectives and noted that each unfolding simulation "kept them on their toes." In addition, the moulage meant that they got to see soaked sanitary pads, lochia, a surgical incision for cesarian section, and an episiotomy cut. The male students also received hands-on practice in performing psychomotor skills for both antenatal and postnatal cases on low fidelity manikins. They reported that they felt a level of proficiency in examining antenatal and postnatal patients. Furthermore, the students reported improved confidence, knowledge, and communication skills in dealing maternity cases. The simulation also taught them critical thinking and how to deal with other health professionals.

The SPs were their female classmates, and they reported they felt they needed to give non-verbal cues when the male students were off track. They also noted it was sometimes hard to keep a straight face. Additionally, SPs were able to provide the male students with feedback on their communication skills.

Faculty evaluation

The faculty appreciated this novel method of teaching maternal concepts to male students within the conservative Arab culture. In addition, they believed simulation could be extended to other courses in the curriculum.

Conclusion

This paper has showcased an innovative pedagogical approach to address contemporary issues and overcome the pragmatic constraints which are seen in the obstetrical and gynecological areas. As this was a curriculum evaluation activity, no formal ethics approval was required. However,

theDean of the College and Head of the Department and were informed about the simulation activities. Male students reported that they would not have been able to achieve the course outcomes for their maternity clinical rotation without the introduction of simulation. With the growing number of males entering the nursing profession in the United Arab Emirates, simulation in maternity courses may become a necessary part of the baccalaureate nursing curriculum. Subsequent to this educational project, the Department of Nursing has acquired a high fidelity child birth manikin Lucina who has been nicknamed "Amna" for cultural appropriateness, to support the maternal course in the baccalaureate program.

Conflict of Interest: No conflict of interest

Source of funding: No source of funding to report

Ethical clearance: Ethical clearance was not taken as this was a course related activity on the maternity curriculum in the baccalaureate program. Permission was obtained from the Dean of the College of Health Sciences and Head of Nursing Department about the teaching pedagogy which was used.

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Original Research Article

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A Cross-Sectional Survey to Assess the Risk Factors of Cardio Vascular Disease among College Students

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Abstract

Introduction: Cardiovascular diseases (CVDs) are the number one cause of deaths globally which claim an estimated 17.9 million lives each year. It is a major cause of disability and premature death throughout the world and contributes substantially to the escalating costs of health care. Modification of risk factors has been shown to reduce mortality and morbidity in people with diagnosed or undiagnosed cardiovascular diseases. Prior assessment is found to be helpful in predictions of absolute cardiovascular risks among young adults.

Objectives: To assess the risk factors of cardio vascular diseases among college students.

Methods: Descriptive survey was conducted among 207 college students at Najath College of Science and Technology, Karuvarakundu, Kerala from 10/10/2019 to 18/10/2019.Convenient sampling method was used to select the samples. Structured risk factor assessment Performa and Biophysical measurements were used as tool.

Result: The study identified 40.57% students as in moderate risk and 5.31% were in high risk for developing cardio vascular diseases. The study reported that 6.2% of students were overweight whereas 45% had elevated blood pressure. It was found that 64.25%of the students had family history of chronic illnesses like diabetes, hypertension, stroke, and obesity. The 8.21% students were smokers out of these, 17.39% were using smokeless tobacco whereas 31.88% were exposed to passive smoking and 12.56% students were drinkers. In terms of physical activity, 62.31% of the students were sedentary. The food habits of 98.56% students were non -vegetarian and 46.85% of them were consuming red meat.

Conclusion: Periodic assessment and comprehensive health awareness would be helpful to modify unhealthy habits and minimize the risk of cardiovascular problems among the college students.

Key words: Risk factors, Cardio vascular diseases, College students.

Introduction

Cardiovascular diseases (CVDs) are the number one cause of death globally, taking an estimated 17.9 million lives each year. More than 75% of deaths occur in low and middle income countries. Eighty five percent of all CVD deaths are due to heart attack

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and stroke. Low- and middle-income countries are disproportionally affected: over 80% of CVD deaths take place in low- and middle-income countries and occur almost equally in men and women. By 2030, almost 23.6 million people will die from CVDs, mainly from heart disease and stroke.[1,2]

Heart disease rate among Indians is double that of the national averages of the western world. This may be attributed to an underlying genetic predisposition to metabolic deregulation and cardiomyopathy as well as a recent shift of modifiable risk factors towards increasing consumption of red meats / saturated fats / trans-fats / junk foods and higher stress in sedentary people in India. Public health estimates indicate that India accounts for approximately 60% of the world's heart disease burden despite having less than 20% of the world's population.

Heart disease affect Indians at an earlier age,50% of all heart attacks in Indian men occur under 50 years of age and 25% of all heart attacks in Indian men occur under 40 years of age (almost 33% earlier) than other demographics, often without prior warning.[3]

Prevalence of cardiovascular risk factors increase substantially between the ages of 20 and 35. Alcohol consumption (31.7 %), excessive salt intake; elevated systolic blood pressure, raised BMI, cholesterol and blood sugar; type 2 Diabetic mellitus were found in early age.[4,5] At the same time the obesity and overweight are the risk factors responsible causing CVD among the young adults who are less active and spent >2 hours daily in front of television or computers, take daily calories above recommended dietary allowance (21.5% and 22.8% respectively), take junk food (9.3% and 14.8% respectively).[6,7] In India, CVD has become an important public health problem and one of the most important cause of mortality and morbidity which contributes substantially to the escalating costs of health care and massive economic burden.[8]

Most premature deaths can be avoided with modification of risk factors to reduce mortality and morbidity in people with diagnosed or undiagnosed CVD. Decisions about whether to initiate specific preventive action, and with what degree of intensity, should be guided by estimation of the risk of any such vascular event.[9] Reductions in the burden of modifiable CVD risk factors are estimated to contribute as much as 50% to the observed decrease in mortality from CVDs in high-income countries, reflecting a combined impact of population interventions to reduce risk factors and clinical treatment**.** The investigator felt the need to conduct a study to assess the risk factors of cardio vascular disease among college students.

Methods and Meterials

A descriptive cross sectional survey was carried among 207 undergraduate college students of Najath College of Science And Technology, Karuvarakundu, and Malappuram district of Kerala to assess the risk factors of cardiovascular diseases among college students. The objectives of the study were; 1. To collect background information of the subjects. 2. To identify the prevalence of modifiable risk factors like Weight, Blood pressure. 3. To identify the prevalence of behavioural risk factors like Tobacco-consumption, Alcohol-consumption, Physical inactivity and Unhealthy diet. Convenient sampling was used to collect the data.

A structured risk factor assessment Proforma was used to assess cardio vascular risk. It consisted 3 sections. **Section 1: Demographic characteristics** of college students. It included 10 items including age, sex, religion, type of family, stream of study, family income, educational status of father and mother, occupation of father and mother**.**

Section 2: Bio physical measurements; measurement of the samples were taken to identify Height, Weight**,** BMI**,** Blood Pressure.

- Height by using measuring tape.
- Weight by using digital weighing machine.
- BMI calculated with height and weight measurements.
- Blood pressure by using digital BP apparatus.

Section 3: **Behavioural risk assessment:** structured questionnaire was used to assess the modifiable risk factors. It consisted of 36 items related to behavioural risk factors like tobacco consumption, alcohol consumption, physical inactivity, unhealthy diet and psycho social factors

Scoring of risk factors: mild risk (**risk score** up

to 29), moderate risk (**risk score**30-48) and high risk (**risk score** 49 and above)**.** The possible score range was 12-95.

Content validity of tool:

To ensure the content validity the tool was submitted to 8 experts from the field of public health, cardiology and nursing. The experts were chosen based on their expertise, experience, qualification and interest in the problem area. The experts were requested to judge the items based on objectives, relevance and adequacy of the content organization, clarity, feasibility and appropriateness of items of the tool for the purpose of the study.

Most of the experts agreed on all items of the tool with slight modifications of some the items. The modifications were made as per the suggestions and tools were finalized.

Reliability of the tool: Reliability of the tool was established by various methods**.** For Structured risk factor assessment Proforma, KR 20 was used and it was found to be reliable with reliability coefficient 0.80. Similarly measuring tape, Weighing machine and Electronic BP apparatus were found to be reliable with reliability coefficient0.99, 0.98 and 0.99 respectively measured by the method of inter observer reliability.

Setting of the study: Najath College of Science And Technology, Karuvarakundu, Malappuram, Kerala.

The rationale for the selection of setting was: availability of subjects, feasibility of the study, familiarity of the setting, economy of time and money, convenience in terms of geographical aspects, administrative approval and expectation of cooperation for the study from various personnel.

The population comprised of under graduate college students.

Inclusion Criteria:

- College students of the selected college during the period of study.
- College students who are willing to participate.
- Availability of subjects during data collection.

Exclusion Criteria

- College students who were already diagnosed with any of cardio vascular disease.

Procedure for Data Collection

After obtaining the administrative and ethical approval from appropriate authority, the study was conducted among 207 college students from 5th October to 20th October 2018 at Najath College of Science and Technology. The researcher himself met the students in order to obtain a free and frank response; the students were explained about the nature of the study and their expected participation in the study. The subjects were assured about the confidentiality of their responses. The researcher took the measurements like height, weight, blood pressure and their responses for the survey filled by the students. The data was collected as per the validated tools. The data obtained was entered in a master sheet. The data was analysed and interpreted in terms of objective of the study using descriptive statistics like mean, percentage, frequency etc.

Results

Table: 1 Frequency distribution of sample characteristics. N=207.

Sample characteristics		Frequency	Percentage
Age in Years	18 -20 years	196	94.68%
	21-23 years	11	5.31%
	24-25 years	0	0
	above 26 years	0	0

Sex	Male	122	60%
	Female	85	40%
Religion	Hindu	22	10.62%
	Muslim	177	85.5%
	Christian	8	3.86 %
Stream of study	Science	35	17%
	Commerce	172	83.09%
	Arts	0	0
Family Income	<10,000	91	43.96%
	10,001, 20,000	73	35.26%
	20,001-30,000	32	15.45%
	30,001-above	11	5.31%
Type of Family	Nuclear family	125	60.38%
	Joint family	78	37.68%
	Single parent	4	1.93%
Educational Status of Father	Illiterate	0	0
	Primary school	35	16.90%
	High school	119	57.48%
	Higher secondary	27	13.04%
	Graduation	23	11.11%
	Post-graduation and above	3	1.44%
Educational Status of Mother	Illiterate	0	0
	Primary school	14	6.76%
	High school	136	65.70%
	Higher secondary	39	18.84%
	Graduation	15	7.24%
	Post-graduation and above	3	1.44%
Occupation of Father	Government job	10	4.83%
	Private job	74	35.74%
	Business	61	29.46%
	Agriculture	47	22.70%
	Un employed	15	7.24%
Occupation of Mother	home maker	189	91.30%
	Government job	7	3.38%
	Private job	6	2.89%
	Business	2	0.96%
	Agriculture	3	1.44%

Table-1 Shows that 94.6% of college students were in the age group of 18-20 years and 60% were male. Majority of the students (85%) were Muslim by religion. The 60% students had nuclear family whereas 37.8% students had joint family. Majority (91%) mothers were home makers.

Table- 2. Frequency distribution of BP and BMI of college students. N=207

Criteria	Statement	Total Frequency (%)	Frequency (%)	
			Male	Female
BMI	Under weight(BMI= <18)	57(27.53)	27(22.13)	30(35.29)
	Normal weight(BMI=18-24.9)	136(65.7)	83(68.03)	53(62.35)
	Overweight(BMI=25-29.9)	13(6.2)	11(5.31)	2(1.0)
	Obese(BMI=>30)	1(0.48)	1(0.48)	0(0)
Blood Pressure(mm Hg)	Normal (systolic<120, diastolic<80)	114(55.07)	59(48.36)	55(64.70)
	Elevated (systolic 120-129, diastolic <80)	46(22.22)	33(27.04)	13(15.29)
	Hypertension stage 1(systolic 130-139, diastolic 80-89)	35(16.90)	21(17.21)	14(16.47)
	Hypertension stage 2 (systolic >140, diastolic >90)	12(5.79)	9(7.37)	3(3.52)

Table-2 shows that 22.13% boys and 35.29% girls were underweight whereas only 0.48% male student was obese. Twenty seven percent boys and 15.29% girls had elevated Blood Pressure, 17.21% boys and 16.47% girls had hypertension stage 1 whereas 7.37% boys and 3.52% girls had hypertension stage 2.

Table. 3. Family history of selected chronic diseases. N=207

Statement	f (%)
Existing illness (Hypertension, DM, High Cholesterol, Kidney Disease)	2(1)
Family history of chronic illness	
Hypertension	78(37.68)
Diabetes	72(34.78)
Heart disease	45(21.73)
Stroke	6(3)

Table 3. Shows that 1% students had hypertension. The.68% students had family history of hypertension, 34.78% of diabetes mellitus type II, 21.73% heart disease and 3% students had family history of stroke.

Table 4. Tobacco & alcohol consumption and physical activity among college students. N=207

Variables		Frequency (Percentage)	
Tobacco consumption among the students		**Male**	**Female**
Type of smoker	Current smoker	15(7.24)	2(1)
	Non Smoker	107(51.6)	83(41)
Type of tobacco consumption	Non smoke Tobacco	29(14)	7(3.38)
Age of Initiation	<10 YR	1(0.48)	1(0.48)
	10-14 YR	4(2)	0(0)
	15-19	10(4.83)	1(0.48)
	>20 YR	0(0)	0(0)

Continue.....

Number of Cigarettes Per Day	0-5	7(3.38)	1(0.48)
	6-10	4(2)	1(0.48)
	11-20	3(1.44)	0(0)
	>21	1(0.48)	1(0.48)
Passive Smoking		40(19.32)	26(12.56)
Alcohol consumption among the students			
Type of drinker	Current drinker	19(9.17)	7(3.38)
	Non drinker	90(43.47)	74(35.74)
	Past drinker	13(6.28)	2(1)
Frequency Of drinking	Daily	2(1)	0(0)
	3-4 Days in a week	5(2.41)	2(1)
	1-2 Days in a week	8(3.86)	3(1.44)
	Occasional	5(2.41)	1(0.48)
Quantity per drink	10-20 ml	1(0.48)	0(0)
	20-30 ml	4(2)	3(1.44)
	30-40 ml	6(2.9)	3(1.44)
	>40 ml	7(3.38)	1(0.48)
Age of initiation	<10 Year	1(0.48)	0(0)
	10-14 Year	5(2.41)	0(0)
	15-19 Year	13(6.28)	7(3.38)
According to physical activity among the students			
Sedentary		69(33.33)	60(28.98)
Moderate intense physical activity		38(18.35	31(15)
Vigorous intense activity		29(14	5(2.41)

Table-4 shows 7.24% male and 1% female students were current smokers. The 14% male students and 3.38% female students had habit of using non-smoke tobacco. Male (5.31%) and female (0.48%) students initiated smoking during the age of 15-19 years. The 3.38% male and 0.48% female students smoke up to 5 cigarettes per day. 19.32% boys and 12.56% had been exposed to passive smoking.

Regarding drinking habits among the students 9.17% boys and 3.38% girls had habit of drinking alcohol.

Boys (3.86%) and girls (1.44%) had habit of drinking 1-2 days in week. 2.9% boys, and 1.445girls had consumption of 30-40 ml alcohol while drinking. The majority (20) had initiated drinking during the age of 15-19 years. Further 33.33% boys and 28.98% girls were sedentary. The 18.35% boys and 15% girls were under moderate intense activity category.

Table 5- Frequency distribution of college students according to dietary practices. N=207

Variables		**Frequency (Percentage)**		**Total**
		Male	**Female**	**Frequency (%)**
Choice of Food	Vegetarian	0(0)	3(1.44)	3(1.44)
	Non-vegetarian	122(58.93)	82(39.61)	204(98.56)
Red meat consumption		64(30.91)	33(16)	97(46.85)
Eat green and green leafy vegetables daily		21(10.14)	17(7.24)	38(18.35)
Eat pulses daily		7(3.38)	18(8.7)	25(12)

Continue.....

Eat one fruit daily	18(8.7)	18(8.7)	36(17.39)
Eat fast food daily	22(10.62)	9(4.34)	31(15)
Sprinkle extra salt	38(18.35)	33(16)	71(34.3)
Deep fried food consumption more than once in a week	65(31.40)	41(19.80)	106(50.24)
Cardio vascular disease risk (Max. possible score = 95)			
low risk(≤29)	56(27.05)	55(26.57)	111(54.10)
moderate risk(≤48)	56(27.05)	29(14)	85(40.57)
high risk(>49)	10(4.83)	1(0.48)	11(5.31

Table -5 shows that 98.56% students were non-vegetarian and 46.85% used to consume red meat among them.

The 18.35% students were using green and green leafy vegetable daily and 17.39% consume one fruit. The 15% students were using fast food daily and 34.3% students used extra salts in the diet. More than Half (50.24%) of the students used to consume deep fried food more than once in a week. The 27.05% boys and 14% girls were identified at moderate risk for developing cardio vascular diseases whereas 4.83% boys and only 0.485 were identified as in high risk.

Discussion

The present study found that 40.57% college students were at moderate risk and 5.31% were at high risk for developing cardio vascular disease. The risk was contributed to the risk factors and unhealthy behavior of the student as some modifiable risk factors like smoking, consumption of alcohol and sedentary life style can lead to develop CVD. The study reported that 7.24% male and 1% female students were smokers. The 3.38% male and 0.48% female students smoke up to 5 cigarettes per day. Nineteen percent boys and 12.56% had been exposed to passive smoking. The 9.17% boys and 3.38% girls had habit of drinking alcohol. Twenty seven percent boys and 15.29% girls had elevated Blood Pressure. Similar findings were reported by **Kumar SG, et al (2011)** wherein the prevalence of current smoking was found to be 22.4%. [18] Present study found Prevalence of Alcoholism among 12.56% students**.** Similarly **Khosla V, et al (2008)** found 31.1% prevalence of current use of alcohol among males.[10, 19] **Rustagi N, et al (2011)** reported that modifiable cardiovascular risk behaviors are widely prevalent among medical students and increase with years spent in the medical college.[11] Similarly **Kaur P, (2007)** indicated high prevalence of behavioral risk factors, central obesity, hypertension and diabetes in a select group of middle and high-income young urban males.[12]

Young adults are fond of fast food, non-vegetarian food and carbonated drinks. These unhealthy **dietary practices** and less physical activity are responsible for obesity, hypertension and cardiac problems. The present study found that 62.31% of the students were sedentary. Similar finding reported by **Singh H, et al (2017)** that11.37% were inactive, 73.73% were moderately active students.[13]

Present study reported that 98.56%students were non-vegetarian. The 46.85% were consuming red meat and 31% were using fast food daily. These finding are in consistent with **Saranya SV, et al (2016)** that consumption of eggs, fish, meat, and chicken was higher among male students whereas consumption of sweets and pastries was higher among the female.[14]

The study found that 6.2% students were overweight and 0.48% male was obese. Similarly, 5.38% school children were reported obeseby **Sandra Johnny, et al (2019).**[15] Obesity can develop hypertension in the people. Present study found prevalence of hypertension among 5.79% college students which in line with **Asharma, et al (2010)** that nearly 20% of the school children had elevated blood pressures.[16]

Family history of chronic illness like diabetes, hypertension and stroke, is a non-modifiable risk factor of cardio-vascular problem. The study found family history of chronic illness of 64.25% students who were suffering of CVD. **Vohra R, et al (2017)** found that CVD was present in a single family

member in 123 adolescents while 4 adolescents had more than 1 family member suffering from CVD.[17]

Conclusions

The study concluded that there should be some awareness programs regarding prevention of CVD among young adults. Promotion of supportive environment for strengthening student-based approaches and strategic delivery of health education is essential to target these risk behaviors like smoking, alcohol, sedentary life style, unhealthy dietary habits etc. Periodic screening and better control of risk factors like hypertension, hypercholesterolemia and diabetes are the key components to prevent the incidence of CVD. To prevent the premature mortality and morbidity, good management of acute and chronic events must be enforced effectively.

Limitation:

The present study was a cross sectional survey, conducted in a single setting with small sample size. This poses restriction to make a broader generalization. Standardized tool was not used in the present study because of non-availability. Therefore, self-developed tool was used.

Recommendations:

- Longitudinal studies can be conducted with a large sample size.
- A study can be conducted at hospital settings among patients diagnosed with cardio vascular disease regarding management of cardio vascular diseases.
- A similar study can be conducted in various other groups like office workers, teachers and high income groups etc.
- A comparative study may be conducted on samples drawn from urban and rural population.
- A KAP study can be conducted among college students towards prevention of cardio vascular diseases.

Conflicts of interest: The authors declare no conflict of interest.

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Original Research Article

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A Pre-Experimental Study to Evaluate the Effectiveness of Structured Teaching Programme on Knowledge Regarding Lead Poisoning among Mothers of Under-Five Children in Selected Areas at Mukerian, Punjab

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Abstract

Introduction: Lead poisoning is considered the most preventable environmental disease among young children, yet its exposure is estimated to contribute approximately 600,000 new cases of children with intellectual disabilities every year. A simple health awareness Lead poisoning can prevent permanent brain damage that will last a lifetime.

Aim of the Study: The aim of the study is to improve the knowledge on lead poisoning among mothers of under-five children through a structured teaching programme.

Material and Methods: A quantitative research approach and Pre-experimental one group pre -test-posttest research design was used. Total 50 samples of mothers of under-five children were selected by a purposive sampling technique. Data collection was done through self-structured knowledge questionnaire. The collected data were analyzed by calculating frequency, percentage, mean, standard deviation, 't test and F test.

Results: As per overall pretest knowledge score, most mothers of under-five children i.e. 90%had poor knowledge, 10% had average knowledge and none of them had good knowledge regarding lead poisoning. After structured teaching programmes most mothers i.e. 98% had good knowledge, 2% had average knowledge and none of them had poor knowledge. The difference between the mean pretest and posttest score was statistically highly significant at $p<0.001$ level.

Conclusion: Structured teaching programme was an effective tool in improving knowledge of mothers of under-five children regarding lead poisoning.

Keywords: Lead poisoning, mothers of under-five children

Introduction and Background Of The Study

The birth of a child is a significant event in any family. A child is a precious gift, which has a lot of potential within. The health of a growing child is always a matter of great concern, because a healthy child can become a healthy citizen in future.[1]

Lead poisoning is preventable but still exposure is estimated to account for 0.6% of the global burden

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of disease, with the highest burden in developing countries. Childhood lead exposure estimated 600, 000 new cases of children with intellectual disabilities every year. Overall, 99% of children affected by high exposure to lead live in low and middle income countries. It is also estimated that 143,000 deaths per year results from lead poisoning and lead paint is a major contributor to this **(WHO 2014).**[2]

Lead is the top six toxic threats globally and estimates conservatively that about 1.5-2 million people are affected in India alone. Children, when exposed to it are most vulnerable to even low levels of this toxic metal, especially when they are six years and younger.**(World's Worst Population Problem Report 2010)**[3]

Children around the world are at risk of exposure to lead from multiple sources. These sources are lead based paints and pigments, lead solder in food cans, ceramic glazes drinking water systems and lead in products such as herbal and traditional medicines. Lead may be found in the paint on toys and also used in plastic toys to stabilize the plastic molecules from heat. [2]

Socio economic status is a powerful predictor of lead exposure. Poor children are more likely to be affected with lead poisoning. The blood lead level measured in the micrograms of lead per deciliter of blood(/dl). Nearly everyone has a measurable blood lead level. The center for disease control and prevention (CDC) state that a blood lead level of 10g/dl or above is a cause for concern. However lead can impair development even at blood level <10g/dl.[4]

Lead is available, the body confuses it with more essential elements like calcium and begins using lead to make bones, muscles, brain connections etc. children below six grow rapidly, lead affects them by causing decreased intelligence (reduced IQ), attention deficit disorders, behavior issues, speech and language impairment, damage to nervous system, reduced bone and muscle growth and kidney damage.[5]

The national referral center for prevention of lead poisoning in India suggested that lead poisoning with the complaints of nausea, vomiting and sometimes constipation is confusing with other diagnoses. The mothers and caregivers must have adequate knowledge about the lead poisoning in the children because they are the primary caretakers. But parents don't have much knowledge of ways to prevent childhood lead poisoning. Information from health care providers can aid parental knowledge. [6]

Objectives of the Study

- To assess the pre -test level of knowledge regarding lead poisoning among mothers of under-five children.
- To assess the post-test level of knowledge regarding lead poisoning among mothers of under- five children.
- To compare the pre - test and post- test level of knowledge regarding lead poisoning among mothers of under- five children.
- To find out the relationship of pre- test and post- test level of knowledge regarding lead poisoning among mothers of under - five children with selected demographic variables.

Hypothesis

H_1. There is a significant difference in the level of knowledge regarding lead poisoning among mothers of under-five children after a structured teaching programme.

Material and Methods

In the present study, a quantitative approach with pre-experimental research design was adopted. By Purposive sampling technique 50 mothers of under-five children were selected. Pre test and post test were used for data collection. Analysis of data was done using descriptive and inferential statistics. A study was conducted in the month of February, 2016. Formal written permission was obtained from the Sarpanch of villages Madinpur and Ramgarh kulliyan village of Mukerian.

After discussing the purpose and objectives of the study. Analysis and interpretation of data was done according to objectives of the study by using descriptive and inferential statistics.

Ethical Consideration

- Before commencing the task of data collection, Permission was sought from the ethical research committee of SPN college of Nursing, Mukerian. After that letter seeking permission to conduct study was obtained from Sarpanch of village Madinpur, Ramgarh kulliyan of Mukerian, Punjab.
- Written informed consent was obtained from mothers of under-five children for participation in study by explaining to them the purpose of study. They were also informed that they have the right to refuse their participation in study.

Result

Table-1: Frequency and percentage distribution of mothers of under-five children according to overall post test knowledge score regarding lead poisoning.

N = 50

	Post-test		
Levels of Criteria knowledge	**Measures**	**Frequency (n)**	**Percentage (%)**
Good	>70%	49	98%
Average	36-70%	1	2%
Poor	≤35%	—	—
Total		**50**	**100%**

The data in table 1 depicts that in the post-test 98% mothers of under-five children had good knowledge, 2% had average knowledge and none of them had poor knowledge regarding lead poisoning

Associate the findings with selected socio-demographic variables.

Highest mean posttest knowledge score i.e. 22.00 was obtained by subjects in the age group of above 36 years, followed by mean posttest knowledge score i.e. 21.04 and 20.50 by mothers in the age group of 25-30 years and 19-24 years respectively. Post-test knowledge score for age was not significant at p<.067 level.

According to level of education, Highest mean posttest knowledge score i.e. 23.00 was obtained by mothers who were graduate and above followed by mean posttest knowledge score 21.13, 20.55 and 20.38 was obtained by mothers who were on the educational level of senior secondary, middle and secondary . F value for posttest knowledge score for level of education was not significant at p<0.05 highest mean posttest knowledge score i.e. 21.50 was obtained by mothers who had monthly income of above Rs.15, 001 followed by mean posttest knowledge score i.e.20.58 and 20.50 by mothers in monthly income group of Rs.5,001 -10,000 and Rs. 10.001-15,000respectively. F value for posttest knowledge score for monthly income was not significant at p<0.05 level.

According to type of family highest mean posttest knowledge score i.e. 21.00 was obtained by mothers who lived in extended family and 20.80 and 20.53 had monthly income of above Rs.15, 001 followed by mean posttest knowledge score i.e.20.58 and 20.50 obtained by mothers who lived in nuclear family and joint family. F value for posttest knowledge score for type of family was not significant at p<0.05 level.

According to the type of house, the highest mean posttest knowledge score i.e. 21.25 was obtained by mothers who were living in kacha house and 20.75 and 20.50 was obtained by mothers who were living in pucca house and mixed type of house. F value for posttest knowledge score for type of house was not significant at p<0.05 level.

According to the total number of children, the highest mean posttest knowledge score i.e.21.04 was obtained by mothers who had 2 children and 20.89, 19.94 and 20.00 was obtained by mothers who had 1 child,2 children and more than 4 children. F value for posttest knowledge score for total number of children was not significant at p<0.05 level.

According to occupational status highest mean While highest mean posttest knowledge score i.e. 20.91 was obtained by mothers whose occupational status was government employee. F value for posttest knowledge score for type of house was not significant at p<0.05 level.

According to source of information, the highest mean posttest score i.e. 20.83 who received information from social groups ,and 17.33 who didn't receive any information regarding lead poisoning from any source.F value for posttest knowledge score for source of information was significant at p < .001 level.

Hence it can be concluded that in posttest, age of mother, level of education, monthly family income, type of family, type of house, total number of children, occupational status had no impact on knowledge of mothers regarding lead poisoning except previous sources of information.

Discussion

The first objective of the present study was to assess the pre test knowledge regarding lead poisoning among mothers of under-five children.

The findings of the present study revealed that 90% of mothers of under-five children had poor knowledge, 10% had adequate knowledge and none of them had good knowledge during pretest regarding lead poisoning.

The second objective of study was to assess the post test knowledge regarding lead poisoning among mothers of under-five children.

Findings of the study revealed that 98% mothers of under-five children had good knowledge, 2% had average knowledge and none of them had poor knowledge regarding lead poisoning.

The findings of the study consistent with the results of study was conducted by **Maheshwari BU 2014 to** assess the knowledge regarding impact of lead among mothers of children in selected rural settings, Bangalore. The results revealed that 48% of mothers had inadequate knowledge, 4% had adequate knowledge and 48% had moderate knowledge. It was concluded that mothers had inadequate knowledge regarding impact of lead on children.[19]

The third objective of study was to compare the pre test and post-test level of knowledge regarding lead poisoning among mothers of under-five children

The findings of the present study revealed that the mean pretest and post test score of mothers of under-five children regarding lead poisoning was3.94 and 20.62 respectively. The difference between the mean pretest and posttest score (16.68) was statistically highly significant at $p<0.001$ level. Hence, the research hypothesis H_1 was accepted.

The findings of the study consistent with the results of study was conducted by**Vageriya V.2014**A to assess the effectiveness of structured teaching programme on knowledge about the prevention of lead poisoning among mothers of toddlers in selected rural areas at Hassan, Karnataka. 60 mothers of toddler were selected as a sample by using convenient sampling techniques. The results revealed that the overall mean percentage in pre-test is 19.66%, post test is 69%. It shows that there was a significant increase in knowledge after structured teaching programme.[30]

- **The fourth objective of study was to find out the relationship of pre- test and post- test level of knowledge regarding lead poisoning among mothers of under -five children with selected demographic variables.**

The findings of the present study revealed that in pretest and post test sources of information regarding lead poisoning was significant at the level of $p< 0.05$. Then other variables such as age, level of education, monthly income, type of family, type of house, total number of children, occupational status was non-significant at $p< 0.05$ level in both pre-test and post test.

Conclusion

Based on the findings of the present study, the investigator found that the knowledge score of mothers of under-five children was improved after a structured teaching programme. Thus structured teaching programme was an effective tool in improving knowledge of mothers of under-five children regarding lead poisoning.

Conflict if Interest: Nil

Source of Funding: Self

Summary: A structured teaching programme was prepared which contains definition of lead poisoning, sources, risk factors, clinical manifestation and prevention of lead poisoning. A self-structured knowledge questionnaire was developed for the data collection which had two sections. **Part-I:** Demographic variables **Part-II:**Self-structured knowledge questionnaire to assess the knowledge regarding lead poisoning among mothers of under – five children. Purposive sampling technique was applied for the selection of 50 samples for data

collection. The informed consent was obtained from mothers of under-five children and confidentiality of their responses was assured. Pre pre-test was applied to assess the knowledge level of mothers of under-five children regarding lead poisoning and thereafter a structured teaching programme was administered regarding lead poisoning in children among mothers of under-five children. After 7 days, a post test was applied to assess the knowledge of mothers of under-five children regarding lead poisoning. Analysis and interpretation was done in accordance with the objectives by using descriptive and inferential statistics.The results revealed that as difference between mean pre test and post test knowledge score was highly significant at $p<0.001$, So H1 Hypothesis was accepted.Thus structured teaching programme was an effective tool in improving knowledge among mothers of under-five children regarding lead poisoning.

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Original Article

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Exploring the Relationship between Knowledge and Attitudes, Adherence and Confidence on Hand Hygiene Practices Among Thai Nursing Students

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Abstract

Background: Hand hygiene plays a crucial role in infection control in healthcare settings, but there is a concerning gap in compliance rates among healthcare workers globally. Nursing students, who will form a substantial part of the future healthcare workforce, are key to effective hand hygiene practices. A significant educational gap in hand hygiene exists globally, especially in Asia, including Thailand. Research on nursing students' knowledge, attitude, adherence to, and confidence in hand hygiene is still limited, despite their frequent non-compliance with standard protocols. Therefore, this study aimed to examine the correlations and associated factors between knowledge, attitudes, adherence to, and confidence in hand hygiene practices among first-year nursing students at a Thai nursing college.

Methods: A cross-sectional study was conducted with all 116 first-year nursing students from Boromarajonani College of Nursing, Thailand. Data were collected through a self-administered questionnaire and analyzed using Pearson's correlation and multiple logistic regression analysis.

Results: The results show that only 46.6% of students demonstrated good knowledge of hand hygiene, but a higher percentage showed positive attitudes (51.7%) and adherence (55.2%). A majority (76.7%) had good confidence in their hand hygiene practices. Positive correlations were observed between knowledge and attitude, attitude and adherence, and adherence and confidence. Male students generally had better knowledge, while those with lower GPAs tended to have higher confidence in hand hygiene. The findings of this study are in line with previous studies, indicating that knowledge does not always lead to positive attitudes or adherence to hand hygiene. Also, confidence is necessary for effective hand hygiene practices.

Conclusions: This study highlights the factors related to hand hygiene practices among Thai nursing students and emphasizes the need for comprehensive, culturally sensitive educational strategies. Future research should consider various contextual factors, such as gender differences and academic performance, to enhance hand hygiene practices among nursing students.

Keywords: Hand hygiene, healthcare-associated infections, KAP, nursing students, Thailand

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Introduction

Hand hygiene is a critical element in controlling infections in healthcare environments. Nonetheless, it remains a significant issue worldwide due to alarmingly low compliance rates among healthcare workers, estimated at around 40%.[1] The importance of effective hand hygiene is underscored by its significant role in reducing healthcare-associated infections (HAIs), which not only benefits patients and healthcare workers but also alleviates financial pressures.[2-4]Nurses, who comprise the largest segment of the healthcare workforce and are considered the backbone of the system due to their extensive interactions with patients, play a vital role in preventing the transmission of HAIs. Their commitment to and compliance with hand washing protocols are essential in preventing the spread of infections.[5] Nursing students, as future healthcare professionals, are one of the crucial keys to overcoming the challenges in HAIs control. Their commitment to hand hygiene is critical in minimizing infection transmission.[6,7] The effectiveness of hand hygiene practices is significantly influenced by the confidence in performing these tasks. Nursing students with confidence in their hand hygiene abilities are more likely to follow these protocols and actively promote these practices among their colleagues and patients.[7]

However, an obvious gap exists in hand hygiene education across various healthcare disciplines globally. A systematic review revealed that the hand hygiene training provided to healthcare students, covering both theory and practice, is inadequate. While there have been improvements in some educational programs, the variability in research methodologies and the lack of comprehensive approaches pose challenges in pinpointing the most effective teaching methods.[8,9]Furthermore, it is critical to strengthen the focus on both adherence to and confidence in hand hygiene practices among nursing students. This involves enhancing individual motivation, deepening knowledge levels, fostering a commitment to infection control, and taking inspiration from the practices of peers.[10,11] As a result, hand hygiene education in nursing education may promote hand hygiene compliance and confidence, aligning with the wider public health goals of disease prevention and health promotion.[1]

Despite the failure to meet the standard protocols of hand hygiene practices among nursing students in Asia, including Thailand, there is still a research gap in understanding their knowledge, adherence, and confidence in these practices.[5] Therefore, this study focuses on examining the correlations and associated factors between knowledge, attitudes, adherence to, and confidence in hand hygiene practices among first-year nursing students at a leading Thai nursing college. The findings will be helpful in formulating effective educational strategies to enhance adherence and compliance with hand hygiene practices among the future backbone of the healthcare system.

Materials and Methods

Study Design, Setting, and Population

A cross-sectional survey was conducted at Boromarajjonani College of Nursing, Thailand, in February 2023 among all 116 first-year nursing students of Thai nationality who had access to information technology (IT) devices such as smartphones, tablets, netbooks, laptop computers, and/or desktop computer. Students were explained about the purpose of the study and signed a consent form to participate in the study. These students are a suitable representative of Thailand's nursing undergraduates due to similar course structures nationwide.

Study Instrument and Data Collection

All participants completed a self-administered questionnaire, modified from the World Health Organization's (WHO) 2009 hand hygiene guidelines[12,13] through Google Forms, which took approximately 15 to 20 minutes. The questionnaire was validated by five public health experts and tested for reliability with a Cronbach's Alpha value of 0.86 in a pilot study involving 30 first-year nursing students from a nursing college in a different province. The questionnaire included five sections on general characteristics, and assessed knowledge, attitude, adherence to, and confidence in hand hygiene practices.

The knowledge section comprised of 40 questions, each scoring 1 for a correct answer and 0 for an incorrect answer, leading to a total possible score between 0 and 40. The attitude towards hand hygiene

practices was evaluated with 16 questions, adherence to hand hygiene practices with three questions, and confidence in hand hygiene practices with one question. These sections utilized a 5-point Likert scale for responses, ranging from "1 for strongly disagree" to "5 for strongly agree," where higher scores indicated stronger agreement or confidence. The scores in knowledge, attitude, adherence to, and confidence in hand hygiene practices were categorized as either "good" or "poor" based on the mean score as the cut-off point. Scores above the mean were categorized as "good," while scores equal to or below the mean were considered "poor."

Statistical Analysis

Data analysis was conducted using the SPSS software (version 28, Chicago, IL, USA). We utilized descriptive statistics, presenting the results as frequencies and percentages. Pearson's correlation analysis was applied to determine the correlations between knowledge, attitudes, adherence to, and confidence in hand hygiene practices, with a statistical significance of a *p-value*<0.05. Additionally, multiple logistic regression was used to explore the associations between students' general characteristics and their knowledge, attitudes, adherence to, and confidence in hand hygiene practices. The association was reported with adjusted odds ratios (AOR), 95% confidence intervals (CIs), and a statistical significance of a *p-value*<0.05.

Ethical Consideration

Ethical approvals were granted from the Ethics Committees Board of Chulalongkorn University, Thailand (COA No. 064/66) and Boromarajonani College of Nursing Phra Phutthabat, Saraburi Province, Thailand (COA No. BCNPB 001/2566).

Results and Discussion

All 116 first-year students from Boromarajjonani College of Nursing Phra Phutthabat, Thailand, participated in the study, giving a 100% response rate. The demographic characteristics showed that the average age of participants was 19 years, ranging from 18 to 21 years. As shown in Table 1, over half of the students (55.2%) had a grade point average (GPA) above 2.70, and a significant majority (91.4%) were female. In addition, 76.7% of the participants had no previous experience working in healthcare, and 52.6% had never received any hand hygiene training. Markedly, over half of the students felt that their nursing college did not strictly enforce hand hygiene regulations and perceived inadequate hand hygiene service stations.

Table 1 indicates that only 46.6% of the students had good hand hygiene knowledge. However, a higher percentage showed positive attitudes (51.7%) and adherence (55.2%) towards hand hygiene practices. Significantly, a large majority (76.7%) showed good confidence in their hand hygiene practices. These results contrast with a prior study conducted in Vietnam, where a significant number of nursing students demonstrated good knowledge and a positive attitude toward hand hygiene, yet their adherence levels were found to be lacking.[14]

Table 1.General characteristics, knowledge, attitudes, adherence to, and confidence in hand hygiene practices of participants (n=116).

Variables	Frequency (n)	Percentages (%)
Age (years)		
18-19	103	88.8
20-21	13	11.2
Gender		
Male	10	8.6
Female	106	91.4
Grade point average (GPA)		
Less than or equal to 2.70	64	55.2
More than 2.70	52	44.8
Working experience in healthcare settings before enrolling in the nursing program		
No	89	76.7
Yes	27	23.3
Had experience in hand hygiene training		
No	61	52.6
Yes	55	47.4
Known about hand hygiene regulations		

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No	59	50.9
Yes	57	49.1
Adequate hand hygiene stations are provided by the nursing college		
No	66	56.9
Yes	50	43.1
Knowledge of hand hygiene practices		
Good	54	46.6
Poor	62	53.4
Mean ± SD scores	27.24 ± 2.97	
Attitude in hand hygiene practices		
Good	60	51.7
Poor	56	48.3
Mean ± SDscores	69.66 ± 5.19	
Adherence to hand hygiene practices		
Good	64	55.2
Poor	52	44.8
Mean ± SDscores	12.70 ± 1.80	
Confidence in hand hygiene practices		
Good	89	76.7
Poor	27	23.3
Mean ± SDscores	4.73 ± 0.53	

Pearson's correlation analysishig hlighted significant relationships between knowledge and attitude (r = 0.185; p <0.05), attitude and adherence (r = 0.374; p<0.01), and adherence and confidence (r = 0.223; p<0.05) as shown in Table 2. However, no significant correlations were found between knowledge and adherence, knowledge and confidence, or attitude and confidence. These results indicate that while knowledge about hand hygiene is crucial, it does not directly translate to positive attitudes or adherence to hand hygiene practices. This aligns with previous research suggesting that knowledge alone is insufficient to foster proactive hand hygiene attitudes.[15,16] The strong link between attitude and adherence highlights the need for interventions focused on attitude improvement to support hand hygiene practices. This approach is supported by studies suggesting that prioritizing attitude enhancement is key to advancing hand hygiene.[7,17-19] Furthermore, the relationship between adherence and confidence points to the importance of self-efficacy, behavioral factors, and confidence building in hand hygiene compliance.[20-22] This underscores the necessity for thorough training programs for Thai nursing students, emphasizing these aspects.

Table 2. Result of Pearson's correlation between knowledge, attitude, adherence, and confidence to hand hygiene practices of the Thai first-year nursing students (n=116)

Variables	Knowledge	Attitude	Adherence	Confidence
Knowledge	1.000			
Attitude	0.185*	1.000		
Adherence	0.166	0.374**	1.000	
Confidence	0.025	0.120	0.223*	1.000

**p< 0.05 significant correlation; **p< 0.01 significant correlation*

In addition, multiple logistic regression analysis, as shown in Table 3, indicated the gender differences in hand hygiene knowledge, with male students being more likely than female students to have good knowledge (AOR = 5.39; 95% CI = 1.06-28.65, p = 0.048), which contrast to the previous finding among healthcare workers.[23]

Another finding of our study was that students with lower GPAs tended to exhibit higher confidence in hand hygiene practices compared to their higher GPA counterparts (AOR = 3.02; 95% CI = 1.17-7.78, p = 0.022) (see Table 3). This may reflect the Dunning-Kruger effect, where less skilled individuals misjudge their abilities, emphasizing the necessity for educational interventions that effectively evaluate and improve the practical skills and knowledge of

students.[24] This discrepancy suggests that factors such as the educational environment and cultural norms might significantly impact hand hygiene knowledge. The association between lower GPA and higher hand hygiene confidence challenges the typical notion that higher academic achievement correlates with greater confidence.[25] This adds a new dimension to our understanding of hand hygiene practice, highlighting its multifaceted nature influenced by cultural norms and individual confidence levels.[26] The absence of significant correlations between factors like knowledge and adherence, or attitude and confidence indicate that other variables may also play a role in shaping hand hygiene practices. This aligns with other research suggesting that enhancing hand hygiene knowledge and attitudes could broadly benefit educational practices,[27-29] pointing to the need for more comprehensive research models to fully grasp the complexities influencing hand hygiene practice.

Table 3. Multiple logistic regression analysis of the associated factors of knowledge, attitude, adherence, and confidence in hand hygiene practices among Thai first-year nursing students (n =116).

Variables	Knowledge		Attitude		Adherence		Confidence	
	AOR (95%CI)	p-value	AOR (95%CI)	p-value	AOR (95%CI)	p-value	AOR (95%CI)	p-value
Age								
18-19	0.98 (.29-3.32)	0.979	0.94 (0.28-3.13)	0.932	2.21 (0.62-7.84)	0.216	0.79 (0.19-3.27)	0.748
20-21	Ref.		Ref.		Ref.		Ref.	
Gender								
Male	5.39 (1.06-28.65)	0.048*	0.78 (0.18-3.23)	0.733	0.75 (0.17-3.22)	0.704	0.71 (0.15-3.33)	0.673
Female	Ref.		Ref.		Ref.		Ref.	
GPA								
≤ 2.70	0.79 (0.36-1.74)	0.569	0.66 (0.30-1.45)	0.306	2.19 (0.98-4.89)	0.053	3.02 (1.17-7.78)	0.022*
>2.70	Ref.		Ref.		Ref.		Ref.	
Working experience in healthcare before a nursing program.								
No	0.71 (0.36-1.74)	0.478	0.50 (0.18-1.26)	0.143	0.60 (0.23-1.57)	0.307	1.31 (0.53-3.27)	0.991
Yes	Ref.		Ref.		Ref.		Ref.	
Had experience with hand hygiene training								
No	0.85 (0.39-1.84)	0.680	1.22 (0.57-2.61)	0.599	1.88 (0.85-4.11)	0.114	0.65 (0.25-1.65)	0.551
Yes	Ref.		Ref.		Ref.		Ref.	
Presence of hand hygiene regulations								
No		0.162	0.82 (0.37-1.77)	0.616	0.66 (0.30-1.47)	0.316	2.10 (0.81-5.40)	0.122
Yes	Ref.		Ref.		Ref.		Ref.	
Adequate hand hygiene stations provided								
No	1.39 (0.64-3.05)	0.399	1.29 (0.60-2.78)	0.507	1.16 (0.52-2.54)	0.711	0.65 (0.25-1.65)	0.365
Yes	Ref.		Ref.		Ref.		Ref.	

**p< 0.05 significant difference*

This study is exposed to certain limitations. Since this study was conducted using a cross-sectional study, a causal relationship could not be assessed. Additionally, the increased confidence in hand

hygiene practices among Thai nursing students may be influenced by the precaution fromthe COVID-19 pandemic. Moreover, as the research was confined to a single nursing college, the findings may not accurately reflect the perspectives of all Thai nursing students.

Conclusion

In conclusion, this study adds valuable insights to the current research related to hand hygiene practices among Thai nursing students. It highlights the importance of educational approaches that are all-encompassing, targeting not just knowledge acquisition but also attitude shaping and confidence enhancement in hand hygiene practices. The findings related to gender differences and the correlation between GPA and confidence in hand hygiene practices reveal the requirement for more detailed and contextually sensitive research in this area, considering diverse cultural and environmental factors.

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Case study

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Augmented Reality and Artificial Intelligence Medical Waste Classification System and Method

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Abstract

There are four categories of medical waste that cannot be mixed as this will cause serious problems such as environmental pollution or infection. In the past, the classification of medical waste often involved a lot of human and material resources to process, with workers at risk of exposure to infectious substances. Therefore, an augmented reality (AR) and artificial intelligence (AI) medical waste classification system and method were developed. This innovative medical waste classification system and method combines AR and AI identification technology to reduce the risk of manual judgment errors by clinical staff when handling medical waste.

Keywords: medical waste, classified environmental protection signs, augmented reality, artificial intelligence identification technology

Introduction

The public health consequences of the COVID-19 pandemic highlight the risk of recycling and managing medical waste, hindering the realization of the United Nations Sustainable Development Goals (SDG)[1]. Poor medical waste management will not only cause serious public health consequences such as injuries and infections but also cause damage to the environment and indirectly affect human health[2,3]. Medical waste consists of materials such as used needles and syringes, body parts, medications, diagnostic samples, blood, synthetic substances, medical equipment, radioactive materials, and surgical masks[4]. The Resource Recycling Administration of Taiwan's Ministry of Environment estimated that there were 20.23 million metric tons of general industrial waste (92.19%) and 1.72 million metric tons (7.81%) of hazardous industrial waste in the 110 years of the Republic of China, including complex and diverse medical waste. Waste is generated in hospitals, other medical facilities, laboratories, research centers, morgues, autopsy centers, blood banks, and nursing homes, of which, 85% is classified as general non-hazardous, while around 15% may be infectious, toxic, or radioactive[2]. Moreover, medical workers involved in waste handling, treatment, and removal are at risk of exposure to physical, chemical, or microbiological hazards[5]. Indeed, if the waste is not

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managed appropriately, there may be considerable social costs and damage to human health and the environment [2, 6, 7].

Referring to the Basel Convention and the WHO definition of medical waste [8], it was found that China only regulates infectious biomedical waste in medical waste and there are other non-regulated hazardous waste, such as genotoxic waste, toxic industrial waste, and dissolved toxic industrial waste. However, the composition of medical waste is complex and it often contains genotoxic or cytotoxic (anti-cancer drugs) waste items that are problematic for medical institutions and related units [2]. Currently, medical facilities use the traditional manual classification method of multiple trash bins when processing medical waste [9].

In recent years, artificial intelligence (AI) and augmented reality (AR) technology have become more mature and stable. Furthermore, the AI neural network and expert system can be combined with AR technology to solve the aforementioned medical waste classification problem. A neural network comprises three layers: the input layer, the hidden layer, and the output layer. Learning data consists of input data and corresponding correct answers, for example, in image recognition, the image learning data must first be divided into pixel data, and then each pixel value is input into the input layer for AI to understand a neural network-like model. The input layer that receives the data multiplies the pixel value. After adding the weight, it is sent to the neurons in the hidden layer which accumulates the value received by the previous layer, multiplies the result by the weight, and transmits it to the subsequent neurons. Finally, the prediction results of image recognition can be obtained through the output of the neurons in the output layer[10].

The expert system is a branch of AI and is divided into two categories: case-based expert systems and rule-based expert systems. The case-based expert system is used to find and compare similar cases in the past as a basis, make appropriate modifications or directly access them as the answer to this query, and store this modification as a new case back to the case-based knowledge Library[11]. Augmented reality superimposes computer-generated virtual objects, scenes, and information with natural scenes: enhanced to increase and strengthen understanding and reality is a definition of real and existing things. It differs from the fully immersive effect achieved by virtual reality and the product is the fusion of virtual information and natural scenes[12]. Image recognition technology identifies objects in images and uses computer technology to simulate human senses to complete the image recognition and understanding process[13]. It is more discriminative and robust through the underlying feature extraction and feature encoding. The feature expression of the entire image is obtained through the feature set aggregation operation[14].

Medical staff must rely on their judgment and experience to classify waste and errors can lead to environmental pollution and human harm. Effective waste sorting and management has a positive economic impact through reduced waste disposal costs and job creation, as well as added benefits from a human health and environmental perspective. Therefore, this article reports the development of an AR and AI medical waste classification system and method. This innovative medical waste classification system and method combines AR and AI identification technology to avoid the severe problem of incorrect classification and processing of medical waste, improve the risk of manual judgment errors faced by staff when handling medical waste, and reduce the opportunities for environmental pollution to achieve ecological protection and sustainable environmental management.

Materials and methods

Creative description

This innovative technology is the first to be used for the disposal of medical waste. Medical staff only need to ask the system to recognize the environmental protection signs on the medical waste, then the system will dispose of the item according to its ecological protection classification category. This system is combined with the government's medical and environmental protection policies and requires manufacturers to display environmental protection signs for waste classification before products leave the factory. However, if the medical waste is damaged, twisted, and deformed after use, this may cause difficulties in identification and lead to significant

problems in the waste classification. Therefore, a deep neural network and expert system detection method were used to overcome this problem(Fig. 1).

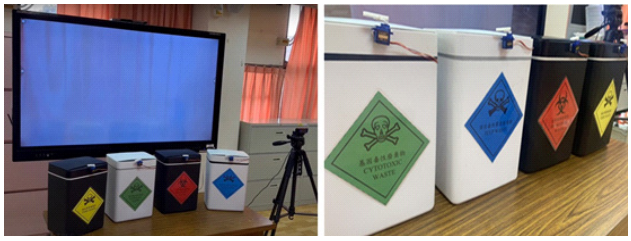

Fig. 1 AR Identification Technology Medical Waste Environmentally Friendly Classification Trash Can Sample

Introduction to system functions

When the medical waste needs to be discarded, its symbol is placed in front of the AR sensing lens (Fig. 2). After successful recognition, it will be supplemented by voice and dynamic or static icons (Fig. 3). The synchronization system will open the lid of the corresponding category and automatically close after the waste is placed inside (Fig. 4). Illustrated instructions for use are shown in Figs.5-7. System operation process video links: https://youtu.be/NKdA4W4PqBEaccessed on 23 September 2023.

Fig. 2 When the medical waste needs to be discarded, place the sign in front of the AR sensing lens

Fig. 3 After successful recognition, it will be supplemented by voice and dynamic or static icons.

Fig. 4 The synchronous system opens the lid of the correct trash and closes once the waste is placed inside.

Fig. 5 Medical staff hold the medical waste to the scanning camera to scan the classification marks on the medical waste.

Fig. 6 Scan the medical waste classification mark on the medical waste. After the identification is completed, the correct trash can lid of the classified medical waste (this diagram shows biomedical waste) will automatically open.

Fig. 7 Medical staff throw medical waste into the trash can with the lid automatically opening.

Results

System features

This system is the first to adopt the AR intelligent medical environmental protection classification system for medical waste classification and environmental protection labels. This innovative technology can be applied to various damaged, twisted, and damaged signs printed on packaging bags, bottles, medical equipment, and instruments. The deformed medical waste classification environmental protection signs allow for more accurate identification, reducing the load and pressure on medical staff in handling medical waste. In addition, it also avoids serious problems such as contamination and infection caused by inaccurate classification. The AR intelligent classification system and the electromechanical interactive interface device technology recognize the environmental protection signs for medical waste classification. It will supplement it with voice and dynamic or static icons and use the electromechanical interactive interface device to control the opening of the correct medical waste trash can, the lid of which automatically closes after the waste is placed inside. This system can also be expanded for systematic classification and disposal of various types of garbage that require environmentally friendly treatment or recycling (for example, plastics, metals, chemicals, glass, etc. that need environmentally friendly classification or recycling).

System development tools and technologies

First, combined with the government's medical environmental protection policy, manufacturers must display various levels of medical waste classification environmental protection signs before products leave the factory. The logo can be placed on the packaging bag, bottle, device, or any conspicuous location for AR scanning. When medical waste needs to be discarded, this sign is placed in front of the sensing lens and the system will display the medical waste category on the screen, supplemented by voice and dynamic or static icons, and open the correct trash can. Medical staff only need to throw waste into the opened medical waste trash can. Human judgment and selection are not required, thereby reducing the risk of environmental pollution or careless infectious problems such as needle sticks. Damaged, twisted, and deformed medical waste may cause identification difficulties, therefore a deep neural network and expert system identification technology were proposed to overcome this problem. The detection method of deep neural network and expert system in this work is described below:

a. Create a basic identification library.

b. Use image distortions and defects to increase the identification sample library, and use distorted or defective images as training samples. The training samples include normal and faulty images.

c. The deep neural network includes an input layer, a convolution layer, a pooling layer, and a connection layer. The input layer is a medical waste image, the convolution layer is for extracting features of distorted or damaged photos, and the pooling layer performs a function on the convolution layer. Take samples. Finally, the obtained features are input to the connection layer and classified using a classifier.

d. This system combines an AI identification method with an expert system for images that cannot be effectively trained and classified. It establishes a database to assist in identifying distorted and defective images, thereby achieving accurate identification.

Discussion

This innovative AR and AI medical waste classification system and metho dcan systematically classify and process various types of waste that require environmental treatment or recycling (for example, plastics, metals, chemicals, glass, and other debris that need to be environmentally classified or recyclable). If it can cooperate with implementing national environmental protection policies, hospitals and medical facilities nationwide can set up "medical waste environmentally friendly classification trash cans". This patented technology can be used to set up various types of resource recycling or waste disposal trash cansacross the country in conjunction with the new generation of environmental protection policies (public policy that all products are printed with recycling signs before leaving the factory) to improve the current domestic environmental protection. This improved processing efficiency can

be promoted to the world with Taiwan as the center, becoming an indispensable daily necessity for the future progressive society. This system can also be expanded and promoted for systematic classification and disposal of various types of garbage that require environmental treatment or recycling, such as community garbage, medical waste treatment, large garbage disposal sites, etc.

Managing increasingly complex medical waste is essential for environmental protection, as improper treatment will pollute the environment and may endanger human health [2, 3, 6, 7]. In today's society, the issue of environmental pollution is a global concern. In 2015, the United Nations announced the "2030 Sustainable Development Goals" to reduce environmental damage[15]. This new combined AR and AI medical waste classification system can achieve SDG3 Good health and well-being, reducing the risk of people contracting diseases from handling waste. Effective waste classification and processing can reduce infectious diseases and environmental pollution that threaten public health and well-being[7]. SDG6 Clean water and sanitation, through effective waste classification, can improve water quality, maintain ecological sanitation, and ensure that people have access to good water resources and the environment so that society can have a cleaner and healthier environment[16]. SDG7 Affordable clean energy, through the effective management of waste through this system, a large amount of waste can be recycled and converted into valuable energy to meet global energy demands[17, 18]. It can also reduce energy consumption and the burden on water purification, environmental protection, and medical care caused by environmental pollution and personnel infection caused by improper waste disposal.SDG9 Industry, innovation, and infrastructure, the use of AR and AI technology in this system increases the health protection of medical staff at work, reduces the occurrence of error rates, increases human resource management, and improves environmental sanitation, creating a community that helps diversity development and the improvement of the added value of medical products to promote high-quality, reliable and sustainable development, thereby achieving sustainable industry and infrastructure. SDG15, this product can judge the environmental protection classification of waste through AR, and reduce the risk of environmental pollution for ecological protection and sustainable environmental management.

Conclusion

This technology can also be promoted to all parts of the country to achieve environmental protection classification of garbage and waste. In the future, with the implementation of medical regulations, manufacturers will be required to print environmental protection signs for waste classification on products before they leave the factory. The classification environmental protection signs are recognized by the system for correct disposal, thereby ensuring the accuracy of waste classification, saving time and effort, with a zero risk of errors. This system combines AR and AI recognition technology to identify various types of waste and reduce environmental pollution. This technology can also be promoted to medical institutions, laboratories, schools, and communities worldwide, and even worldwide, to protect the ecology and sustainable environment, thereby improving people's quality of life, health, and well-being.

Patents

The name of the invention patent of the Taiwan (Republic of China): Medical waste classification system and method [Patent number: I768841].

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Data availability: All materials developed and presented in this study are available in the manuscript.

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Statement of Human Rights: We did not submit a human trial review to the Research Ethics Review Committee. As it is a regular teaching activity, we have only used the developed teaching aids as acase study.

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Construction of Question Paper

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Abstract

Evaluation is one of the most difficult areas of educational pursuits. The most common type of evaluation and assessment is through a written examination. The majority of the time, questions is drafted right before the examination without going through a quality control process, which might cause confusion or incorrect interpretation of the questions by the students. Students' self-confidence and self-esteem grow as a result of their increased understanding of the question paper's structure, and they then affirm their ability to complete the task. The design of the question paper is prepared, with consideration given to the objectives, the various forms and types of questions, and the various content areas, a projected time, Level of difficulty anticipated. In order to enhance the standard of student evaluation and assessment, this article focuses on offering instructions and a scientific technique for creating effective question papers.

Key words: Evaluation, Assessment, Question paper, Written examination

Summary

- Examination are important in our system of education as they influence the teaching learning process.
- To assess the learning outcome of students, evaluation plays a crucial role. Standards of question paper need to be followed while constructing a question paper.
- The National policy on education 1986 and its program of action 1992 recommended an improvement in the program of assessment to make it powerful tool to check quality of the teaching learning process.
- This article introduces the concept of testing and evaluation to its readers and it will help in diagnosing the competence and special aptitude of students.
- Educators should consider all the necessary steps while designing the question paper so the learning outcome of students can be assessed properly.

Introduction

The most frequently encountered form of assessment, both for formative and summative evaluation, is the written examination. No other technique can completely replace it. Question paper is the tool utilised in the written examination. Assessment is typically undertaken on two levels: summative assessment, which is the university's annual final test, and formative assessment, which is a periodic internal assessment typically conducted by the departments at the end of each term. Setting question papers is a crucial responsibility for both methods. An excellent question paper is framed in

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a clear, easily understandable language that leaves no space for ambiguity. Objectivity, practicality, and candidate friendly are also characteristics of a good question paper. A thorough and organised preparation can raise the standard of the examination questions.

Setting a Balanced a test paper

To write a fair question paper on any subject for any class, the methods listed below should be used. This article will teach you how to put up test questions and provide a sample test on the topic of nursing management for M.Sc. nursing second-year students.

1. The design of the question paper is prepared, with consideration given to the objectives, the various forms and types of questions, and the various content areas, a projected time, level of difficulty anticipated
2. A sample exam paper.
3. Writing a question on the item sheet.
4. Putting the test together.
5. Analysis by question form.
6. Making the score guide and marking system.

1. Creating a question paper's design

The format of the questions that will be used to test the objectives, course content, and design of the question paper should all be worked out in advance. The various dimensions of question paper are discussed with example below.

a) Objectives are weighted

Analysing the course objectives and selecting which ones are to be assessed in what attributes are necessary for a test to be valid. For this, points are assigned to each aim to be examined based on its significance. All of these objectives' relative importance may be determined using percentages. (Illustrated in table no. 1)

Table No.1 [original]: Weightage of objectives

Objectives	Remember	Understanding	Application	Analysis	Evaluate	Create	Total
% of Marks	5%	5%	15%	15%	30%	30%	100%
Marks allocated	2.5	2.5	7.5	7.5	15	15	50

b) Weightage of various question formats/types

It is important to consider how they will be examined after reviewing the objectives and content. A particular type of inquiry can be used to test a given purpose and content more effectively. The dependability of the test is taken care of by deciding on the several question types (Essay type, Short response type, Very Short response type, and Objectives type) to be included in the test and the total marks carried by each of them. (Illustrated in table no. 2)

Table No. 2 [original]: Weightage of various question formats/types

Form of questions	Essay type	Short answers	Total
No. of questions	02	06	08
Marks allotted	20	30	50

c) Weightage to Different Areas of information:

Examining the syllabus is required in order to give weight to various areas of information.A hypothetical example is given below for M.Sc. Nursing II Year test showing weightage to content units of Nursing Management. (Illustrated in table no. 3)

Table No.3 [original]: Weightage to different areas of information

Unit	Content	Marks Alloted
I	Introduction	2.5
II	Management	5
III	Planning	10
IV	Organization	10
V	Human resource for health	12.5
VI	Directing	10

d) Estimated Time:

Time should be mentioned for each question. Minimum 15–20 minutes should be allotted for simple type questions, 7-8 minutes for short answer questions, 1 minute for very short response questions, and objectives type questions. (Illustrated in table no. 4)

Table No. 4[original]: Estimated Time

Form of questions	Essay type	Short answers	Total
No. Of questions	02	06	08
Marks allotted	20	30	50
Time estimated	30 minutes	90 minutes	120 minutes

e) Estimated Difficulty Level

To differentiate between high achievers and low achievers, the difficulty level of the questions should be planned to accommodate all of the class members. 10% to 20% of the questions in the class can be tough if there are many strong students. The recommended percentages for easy questions are 30%, difficult questions are 10%, and average questions are 60%. (Illustrated in table no. 5)

Table No. 5[original]: Estimated Difficulty Level

Difficulty level	Percentage of marks	Marks allotted
Difficult	20%	10
Average	60%	30
Easy	20%	10
Total	100%	50

2. A sample exam paper

The blueprint is created after the test design is completed. The blueprint is a three-dimensional diagram that displays where each question should be placed in relation to the objectives and the subject matter it tests.

A blueprint also specifies the percentage weight of cognitive aspects, the degree of proficiency assessed in each knowledge domain, and the weighted average of each question's marks.

Blueprint Preparation Process

Transfer the Performa's previously chosen weighting for the various content units. List the content units under the content areas in the left-hand column and the marks under the totals column in the right-hand column.

Asterisks (*) and a dotted line, as illustrated in the example, should be used to indicate when marks in a question should be divided between two objectives.

The essay-style questions should be listed first in the plan. Put them under the goals that these questions are meant to test. The number of questions may be indicated in brackets, and the marks for the questions may be displayed in the column beneath the objectives.

Place the short answer questions next to the objectives and the content unit you want to test through them after the essay-style questions. Marks outside the bracket, number of questions inside the bracket—these conventions should be followed for both multiple-choice questions and extremely short answer questions.

Subtotals for each question under each target should be calculated. Total the amounts. The sum you came up with should match the weighted objectives and content units you had already marked on the plan.

Complete the overview of question categories, sectional structure, and option structure. (Illustrated in table no. 6)

Table 6: Blueprint – Nursing Management, Programme & Placement: M.Sc. II Yr.

Blueprint														
Class: M.Sc. Nursing I year (Internal Exam)						**Subject: Nursing Management**						**Marks: 50**		
S.No.	**Objectives**	**Remember**		**Understanding**		**Application**		**Analyze**		**Evaluate**		**Create**		**Total**
	Form of questions	ET	SA	ET	SA	ET	SA	ET	SA	ET	SA	ET	SA	
	Content													
1	Introduction	2.5(--)												2.5
2	Management												5(1)	5
3	Planning			2.5(--)		7.5(1)								10
4	Organization										5(1)		5(1)	10
5	Human resource for health							7.5(1)			5(1)			12.5
6	Directing										5(1)		5(1)	10
Sub total		2.5(--)		2.5(--)		7.5(1)		7.5(1)			15(1)		15(1)	50
Total		2.5 (5%)		2.5 (5%)		7.5 (15%)		7.5 (15%)		15 (30%)		15 (30%)		

Note: The number outside the brackets denotes total marks, whereas the number inside denotes the number of questions.

3. Writing a questions on the item sheet

The following considerations should be made while creating questions:

- It is based on the specific instructional purpose listed in the blueprint.
- It is relevant to the particular content area as specified in the blueprint.
- It complies with all the requirements for phrasing that type of inquiry and is written in the format specified by the blueprint.
- The level of difficulty is as requested.
- It is written in simple, accurate, and precise language that is easy for students to understand.
- It expresses the breadth and depth of the response.

ITEM SHEET		
CLASS:	SUBJECT:	UNIT:
OBJECTIVES:	MARKS:	SPECIFICATION:
ESTIMATED TIME:		FORMS OF QUESTIONS:
ESTIMATED DIFFICULTY LEVEL:		
QUESTION:		

The preparation of the answers at the same time as the question-writing process is another consideration, as the questions are frequently improved by the replies.

4. Putting the test together.

The questions must be developed and then put together in the form of a question paper. While putting together the question paper, the sequence of the questions must also be decided.

MODEL QUESTION PAPER

COLLEGE NAME……..

PROGRAMME & PLACEMENT: M.Sc. NURSING I YR (Internal assessment - I)

SUBJECT: NURSING MANAGEMENT

TIME: 02 HRS TOTAL MARKS: 50

LONG ESSAY [10x2=20]

Q.1 (a) Explain the term MBO?

(b) Illustrate the application of MBO in nursing process? [2.5+7.5=10]

Q.2 (a) What is the main objective of National population policy 2000?

(b) Infer the influence of Bhore committee on national health administration? [2.5+7.5=10]

Q.3 **SHORT ESSAY** [6x5=30]

(a) Appraise the significance of communication in nursing administration

(b) Formulate vision and mission for college of nursing

(c) Construct a map of 500 bedded hospital, unit and ancillary services

(d) Criticize on the best method of patient assignment in Intensive care unit

(e) How will you resolve the situation in which a team members level of performance negatively affected your work

5. Analysis by question form.

The preparation of a question-by-question analysis is preferred following the completion of the question paper and marking scheme. This study aids in comparing the test's question totals to the blueprint.

Additionally, it helps us understand the test's advantages and disadvantages better. For instance, we may learn from the analysis how many topics are covered in the syllabus, how challenging each question is, and which specifications are examined by each one.

The following areas are the focus of the analysis:

5. Preparing Question-Wise Analysis

The preparation of a question-by-question analysis is preferred following the completion of the question paper and marking scheme. This study aids in comparing the test's question totals to the blueprint.

Additionally, it helps us understand the test's advantages and disadvantages better. For instance, we may learn from the analysis how many topics are covered in the syllabus, how challenging each question is, and which specifications are examined by each one. (Illustrated in table no. 7)

Table No. 7(a) [original]: Summary of the Question Paper Blueprint

Forms of Questions	Marks	No. of Questions	Total Marks
Essay type	10	02	20
Short answers	06	05	30

Table – 7(b) [original]: Question wise analysis

Class:M.Sc. Nursing I year			Subject: Nursing Management Total marks: 50			
Q.No.	**Objectives**	**Unit**	**Form of question**	**Marks allotted**	**Estimated time**	**Estimated difficulty level**
1.a.	Understanding	III	ET	2.5	3min	Easy
1.b.	Application	III	ET	7.5	12min	Average
2.a.	Remember	I	ET	2.5	3min	Easy
2.b.	Analysis	V	ET	7.5	12min	Average
3.a.	Evaluate	VI	SA	5	15min	Average
3.b.	Create	II	SA	5	15min	Difficult
3.c.	Create	IV	SA	5	15min	Easy
3.d.	Evaluate	IV	SA	5	15min	Average
3.e.	Create	VI	SA	5	15min	Difficult
3.f.	Evaluate	V	SA	5	15min	Average

The following areas are the focus of the analysis:

- The question's question number.
- The question evaluated the objective.
- The details upon which the query is built.
- Subject covered.
- The question's format.
- Allotted marks.
- The approximate amount of time needed to respond.
- Suggested degree of difficulty.

6. Making the score guide and marking system

For objective-type questions, the scoring key should be ready, and for other questions, the marking scheme. The correct answer's alphabet and the points assigned to each question are provided in the scoring key. The required outline answer and the value points for each component of the answer are provided in the marking scheme. In order to assure consistency and uniformity in scoring by several examiners, a thorough marking scheme is required. In other words, it guarantees the accuracy of the scoring.

Conclusion

One of the most effective teaching strategies is the use of questions, and using best practises can greatly improve education. A question paper must be designed so that it can track changes in students' mastery of a particular subject. Utilising a methodical approach will enhance the question paper setting for our exams. Plan the design, create the blueprint, create a model question paper, create a making scheme, fine-tune the questions, edit the questions, review the question paper, and then send it off are the stages required.

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Original Article

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Knowledge and Attitude Regarding Cataract and its Management among Diabetic Mellitus Patients

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Abstract

Introduction: People with diabetes are more likely to experience major health issues like cataracts and diabetic retinopathy, and persistently high blood sugar levels can cause serious conditions that leads to vision loss in order to avoid this, it is crucial to evaluate the knowledge and attitude of diabetes mellitus patients. Prolonged high blood glucose absorption in the lens of the eye, which leads to changes in its shape, resulting in vision changes. Cataracts are still the biggest cause of blindness worldwide, and this is especially true in India.

Objectives 1. To assess the level of knowledge and attitude regarding cataract and its management among diabetic mellitus patients at IMS and SUM hospital 2. To find out association of level of knowledge and attitude regarding cataract and its management with selected socio-demographical variables among diabetic mellitus patients at IMS and SUM hospital.

Methodology: It was a quantitative study conducted among 383 subjects who visited endocrinology OPD, IMS & SUM hospital, Bhubaneswar, Odisha selected descriptive, quantitative study through purposive sampling technique. It was assumed that the margin of error is 5%. The data was collected by standardized socio demographic questionnaire, knowledge and attitude questionnaire.

Results: The finding shows that maximum samples between age group 51-65. This included both the male and female population of 50.7% and 49.3% respectively.. It was observed that 91.9% had a basic knowledge of cataract. 68.9% of the subjects have a positive attitude toward cataract and its management in diabetes mellitus patients. It was observed that there is no significant difference between socio demographic variables with level of knowledge. An association of attitude and socio demographic variables in the subjects put forward that there was significant difference between socio demographic variables like educational status, regular eye check-up, last eye check-up and source of information and that of attitude.

Conclusion: Although majority of the patients know that DM affects the eye, that leads to cataract. The importance of better control of DM and regular eye examination in the prevention of cataract should be emphasized.

Keywords: Diabetes mellitus, Cataract, Level of knowledge, Level of attitude, endocrinology OPD.

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Introduction

Diabetes mellitus constitutes a major threat on health and economy worldwide. Type 2 DM (T2DM) is the most prevalent type of diabetes among adults and constitutes around 90% of all cases[1]. Remarkably, 70% of these individuals live in developing countries[2]. Diabetes is a self-managed condition; therefore, knowledge, attitudes, and practices about the condition among DM patients can influence the overall treatment outcomes and complications of the disease[3]. Recent studies show that compliance with complex regimens and self-care behavior of diabetic patients worsen over the long-term with lifestyle changes. Adherence to medical instructions and glycemic control are affected by several factors such as knowledge about diabetes[4], self-efficacy [5], and medical beliefs[6]. Hence, Identification of knowledge, attitudes, and practices towards glycemic control would provide better insight for the development of preventive and treatment strategies for the patients[7]. Patients who are knowledgeable about the DM self-care, have better long-term glycemic control[8].A cataract affects more than 95 million individuals worldwide, and diabetes mellitus affects 285 million. According to the National Programme for Control of Blindness report, there are currently approximately 22 million blind eyes in India (12 million blind persons), 80.1% of whom are blind as a result of cataract[1]. 3.8 million people worldwide experience cataract-related blindness every year. Cataracts are still the biggest cause of blindness worldwide, and this is especially true in India. In this nation, 55% of all blindness is caused by cataracts. According to estimates, if cataract development could be postponed by 10 years, the number of cataract procedures might drop by 45%, significantly lowering costs and strain on the National Blindness Control Program. There are 47.2 million people living in Odisha overall, 4.2 million of whom have diabetes mellitus. About 3.2% of the people in Odisha live in Khordha.

The prevalence of obesity, urbanisation, ageing, sedentary lifestyles, and population growth all contribute to an increase in diabetes mellitus cases. In 2000, it was projected that 2.8% of people worldwide had diabetes; by 2030, that number is predicted to rise to 4.4%. According to projections, there will be 366 million persons with diabetes mellitus worldwide by 2030, up from 171 million in 2000. The greatest cause of blindness in the world, impacting over 18 million people, is still cataracts. Cataracts develop sooner in life and 2–5 times more frequently in diabetic individuals, hence the working population is significantly impacted by the visual loss.

Cataracts are one of the most prevalent causes of vision impairment in those who have diabetes mellitus, which is on the rise. DM, which has both a microangiopathic and a systemic chronic metabolic illness component, can cause diseases in a variety of tissues across the ocular structure [9,10]. One of the main factors contributing to visual impairment in diabetic people is cataract. Up to five times as probable, especially in young patients with DM, cataracts are known to develop. Diabetic cataract incidence has increased along with the prevalence of DM.

The main objective of this study is - To assess the knowledge and attitude regarding cataract and its management among diabetic mellitus patients.

Material and Method

The research design chosen for this study was quantitative descriptive research design. Study population includes all the diabetes mellitus patients in khordha district. Sample size was 383 diabetic mellitus patients, who are attending endocrinology OPD at IMS and SUM hospital, Bhubaneswar. Sampling technique was purposive sampling technique. This study conducted after obtaining institutional ethical committee, the data collected from the participant those who come under inclusive and exclusive criteria and gave the informed consent for the study. The data collected by using self –structured questionnaire which consist of 3 sections. Socio - demographic variable, Knowledge questionnaire with multiple choice questions and Attitude with rating scale tool is used, which consist of 10 questions each.

Result and Discussion

Among 383 study participants majority 55.4% of DM patients were at between age group 51-65 years and 50.7% study participants are male.

Table 1. Descriptive demographic characteristic of DM patients participated in this study, (n=383).

Sociodemographic Variables		Frequency	Percentage
AGE	20-35	2	0.5
	36-50	73	19.1
	51-65	212	55.4
	66-80	88	23.0
	81-95	8	2.1
GENDER	MALE	194	50.7
	FEMALE	189	49.3
EDUCATIONAL STATUS	PRIMARY SCHOOL	69	18.0
	SECONDARY SCHOOL	73	19.1
	UNDER GRADUATE	74	19.3
	POST GRADUATE	89	23.2
	ILLITERATE	78	20.4
DURATION OF DIABETES MELLITUS	LESS THAN 1 YEAR	40	10.4
	2 YEARS	61	15.9
	3 YEARS	80	20.9
	ABOVE 4 YEARS	202	52.7
OCCUPATION	CIVIL SERVANT	51	13.3
	STUDENTS/DEPENDENT	24	6.3
	BUSINESS	83	21.7
	OTHERS	225	58.7
FAMILY HISTORY OF CATARACT	YES	181	47.3
	NO	202	52.7
PREVIOUS HISTORY OF CATARACT	YES	127	33.2
	NO	256	66.8
DIAGNOSED WITH CATARACT	YES	148	38.6
	NO	235	61.4
AVAILABILITY OF NEARBY EYECLINIC	YES	256	66.8
	NO	127	33.2
REGULAR EYE CHECK-UP	YES	195	50.9
	NO	188	49.1
LAST VISIT FOR EYE CHECK-UP	LESS THAN 2 YEARS	180	47.0
	MORE THAN 2 YEARS	203	53.0
SOURCE OF INFORMATION ABOUT DIABETES MELLITUS	NEWSPAPER	136	35.5
	MASS MEDIA	47	12.3
	INTERNET	99	25.8
	OTHERS	101	26.4

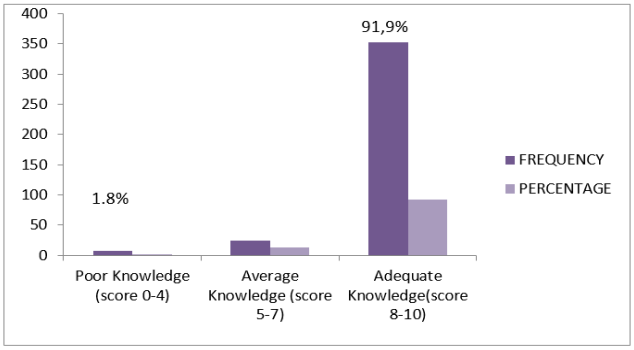

Fig 1. Summary of Knowledge score of DM patients participated in this study, (n=383).

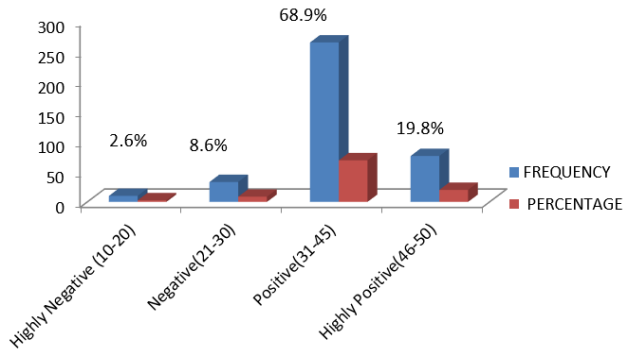

Fig 2. Summary of Attitude scores of DM patients participated in this study, (n=383).

Table 2. The relation between socio-demographic characteristics with attitude among DM patients, (n=383). P<0.05, significance determined using two tail method.

SL NO.	SOCIO-DEMOGRAPHIC DATA	CHI-SQUARE	Df	P VALUE	LEVEL OF SIGNIFICANCE
1.	REGULAR EYECHECK-UP	7.885	3	0.049*	Significant
2.	LAST EYE CHECKUP	11.154	3	0.011*	Significant
3.	SOURCE OF INFORMATION	21.137	3	0.012*	Significant

Discussion

The risk of developing cataract is influenced by the patient's knowledge of the disease[13]. Yet, knowledge and attitude regarding cataract vary greatly depending on socioeconomic condition, regular eyecheck-up, attended diabetes clinic atleast once in a year and source of information[14,15]. Cataracts are still the biggest cause of blindness worldwide, and this is especially true in India. In this nation, 55% of all blindness is caused by cataracts. Understanding these variables it is necessary to design prevention and management measure for cataract. The findings of the present study reassert the gaps in knowledge and attitude regarding cataract in the IMS SUM hospital. We found that 91.9% of our participants had good knowledge regarding cataract and its management, however, when it comes to attitude 68.9% of our sample participants had positive attitude. The level of DM knowledge in our study was higher than Saudi (48%) [16], Jordan (66%) [22]; Ethiopia (62%) [17], and Iran (61%) [18]. When it comes to attitute, the nearly half of participants, 195 (50%) had their regular eye check up and attended diabetes clinic 180 (47%) at least once in a year.

Control of obesity is important for better glycemic control and prevention of complications, such as cataract, it is evident from the present studies. Similar previous studies conducted in Malaysia, japan, Bangladesh and also with several other studies elsewhere showing obesity has been to be a major risk factor for developing diabetic complications, such as cataract[19, 20, 21]. This attitude needs to be modified more to the patients by the diabetes educators or nurse educator in clinics. The present study showed a slight significant association between the level of education and knowledge with p value 0.071 which is similar to many other studies [23].

The attitude of our participants was strongly associated with regular eye checkup (p=0.049), frequent attend to diabetic clinic (p=0.011) and source of information(p=0.012), less DM complications such as cataract. This is well reported in other studies [12].

This study will help the government to implement the diabetic complications such as cataract educational programmes. Tailoring cataract information that have benn identified in this study will be a forwarding step towards overcoming these gaps.

Limitations

This study focused only on patients in IMS SUM hospital, so it may not be generalized to all population. In this study we used convenience sampling so that the results might be unrepresentative of the general population. However, despite these limitations, the results of this study provide a basis for further planning and in-depth research need to develop a strategic plan in cataract management and education programme of patients with DM.

Conclusions

This study assessed the knowledge awareness attitude regarding cataract among DM patients in IMS SUM hospital. Our results demonstrates that regular eye checkup, frequent visit to diabetic clinic and previous source of information is highly associated with positive attitude and outcome of the disease. There is a need for encouraging DM patients for regular eye checkup and better education programme at PHC and the development of number of campaigns and awareness program on prevent and early diagnosis of cataract and complications of DM. Finally, we suggest that new measure to establish to increase the community for regular eye check up in diabetes patients in order to prevent eye complications. New measure to establish to increase the community for regular eye check up in diabetes patients in order to prevent eye complications.

Ethical clearance- Take from institutional review board committee

Source of Funding- self

Conflict of Interest- Nil

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Original Research

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Development and Validation of a Knowledge Checklist of Cognitive Therapy for Nurses(KCCTN)

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Abstract

This study aimed to develop a Knowledge Checklist of Cognitive Therapy for Nurses (KCCTN) to assess the effectiveness of cognitive-behavioral therapy-based training. Sixteen items were collected from the provisional KCCTN; four response choices were created for each item with one correct response. The reliability and validity study results showed that Cronbach's alpha was 0.63. The intra-class correlation was calculated using the data on the number of correct answers before and after the training of nursing college students, and the reliability was confirmed at r=0.65 ($p<0.01$). The uncorrelatedness of KCCTN and KBPAC helped establish discriminatory validity. Two-way analysis of variance with the dependent variable being the KCCTN score of the intervention group (nurses, N=30) and control group (nursing students, N=76) implementing cognitive-behavioral therapy, and pre-and post-intervention factors were calculated for hospital nurses. The results showed a significant interaction with a significant improvement in the intervention group.

Keywords: Nurses, Mental health, Cognitive behavioral therapy, Cognitive therapy Checklist

Introduction

Generally, nurses are reported to have a greater quantitative workload and workload variability than other professions[1], and are considered a high-risk group. In Japan, nurses' mental health measures are an urgent issue;however, according to a fact-finding survey conducted by the Japanese Nursing Association[2] on the dissemination of the "Guidelines for Night and Shift Work of Nurses," 63.3%of 3,213 responding hospitals were working on mental health measures, indicating a lack of adequate care in the nursing environment [2].

The study by Ohue et al.[3] on the effectiveness of group cognitive-behavioral therapy (CBT) offers a viable approach to address mental health issues among nurses, revealing that group CBT lowered burnout and intention to leave among nurses[4]. The social significance of this study is the reduced intention to leave the profession. Also, turnover behavior facilitates a decrease in organizational commitment and an increase in burnout among nurses who continue to work, leading to additional turnover[5]. Therefore, developing an effective program to curtail occupational stress may improve the mental health of nurses and decrease turnover.

The dissemination of information and ease of implementation of an effective program should be investigated. Accordingly, Ohue and Menta[6]

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proposeCBT coupled with a mentoring system as a new support system for nurses. Mentoring refers to individualized support offered by senior nurses (i.e., mentors) with abundant knowledge and professional experience to junior nurses (i.e., mentees) in hospitals. As described by Ohue et al.[6], training mentors in CBT prevents burnout and turnover. Thus, a measure to determine the efficacy of nurses'CBT, together with the effectiveness of the overall program, is required.

The Knowledge of Behavioral Principles Applied to Children (KBPAC) was employed in previous studies as an indicator to measure the effectiveness of training conducted in CBT[7][8]. Primarily, this checklist was based on applied behavior analysis to evaluate the knowledge of therapists involved in behavioral therapy for children with autism. The KBPAC is a 50-itemtest wherein participants select the correct answer from four choices given for each item. Koda et al.[9] prepared a Japanese version of the KBPAC, while Shiga [10] developed a simplified version with 25 items. The KBPAC has been used to examine the guidance provided to teachers [11] and parents of children with developmental disabilities[12]. Additionally, Koseki et al. [13] drafteda checklist for teachers to explore applied behavior, which has been used as an indicator of the training's effectiveness based on applied behavior analysis and behavior therapy in special needs education. These scales gauge knowledge of behavioral aspects of CBT. Alternatively, the Japanese version of the Cognitive Therapy Awareness Scale (CTAS-J)[14]is a checklist marking the cognitive aspect of CBT. Developed by Wright et al.[15], this scale assesses knowledge with regards to depression. The higher the score, the more knowledgeable the therapist about CBT for depression. Although the CTAS-J is employed as a measure of knowledge, its reliability and accuracy have not been well-established since the reliability of retesting remains unaffirmed. Furthermore, no significant differences between pre-and post-training have been reported[16]. In addition, this scale is aimed at professionals, making it difficult to evaluate nurses' cognitive therapy for mental health.

Therefore, in Study 1, items related to possible human relationships and cognition in nursing situations were collected to create a cognitive therapy checklist targeting "cognition" as an indicator of the training's effectiveness. The purpose of Study 2 was to verify the reliability and validity of this checklist.

Study 1

Purpose

The study intends to develop a cognitive therapy checklist (i.e., Knowledge Checklist of Cognitive Therapy for Nurses: KCCTN), which could serve as an indicator for the effectiveness of nurses' knowledge on CBT.

Methods

Collection of Items

To develop relevant items for a cognitive therapy checklist, having a comprehensive collection of specific data on cognitive therapy is necessary. The cognitive model, which is the basis of cognitive therapy, assumes that schemas are influenced by negative life events and cognitive distortions, resulting in automatic thoughts, maladjustment, depression, and anxiety. Thus, cognitive therapy concentrates on cognitive transformation[17]. A cognitive distortion should be clearly distinguished from automatic thoughts and schemas and is considered to be an "erroneous way of processing information, "including errors in cognition and reasoning, and distorted reality [18]. Ohno [19] designated "cognition," "automatic thoughts," and "schemas" as constructs of cognition, and "unfounded judgments," "black-and-white thinking," "partial focusing," "overestimation and underestimation," "ought-thinking," "extreme generalization," "self-association," "emotional reasoning," and "self-fulfilling prophecy" as constructs of cognitive distortion. Cognitive therapy techniques can be divided into cognitive and behavioral techniques [17]. Cognitive techniques include "cognitive restructuring" and behavioral techniques include "problem-solving" and "brainstorming." Furthermore, listening to clients' words and actions is integral for collaborative empiricism. After establishing the 16 constructs (refer to Table 1), we selected specific questions for each concept. First, based onthe KBPAC [7]and literaturedepicting cognitive characteristics of nursing professionals [3] [20], two CBT researchers specializing in nursing and parent training collected questions related to possible

human relationships and cognition in interpersonal support situations. As a collection policy, the items were formed into cards to increase their face validity as much as possible. Consequently, 20 items were collected on cards, after which we proceeded to name the cards and repeated the conceptual examination. For the 16 items selected during collection, questions regarding possible stressful situations and cognition in nursing situations were determined, presenting four choices, including one correct answer, and the subjects were asked to choose one that was closer to their beliefs.

Results and Discussion

Altogether, 16 items were chosen for the KCCTN. Study 1 aimed to create a cognitive therapy checklist that could serve as an indicator of effectiveness when conducting training for nurses based on CBT. As demonstrated in Table 1, this checklist comprehensively ascertained knowledge on "cognition" in CBT relevant to the nursing profession. Constructs as sociated with cognitive therapy were clarified during development. Besides, two experts repeatedly reviewed items assembled into cards, ensuring that they had as much surface validity as possible.

The KCCTN can be used as an indicator of effectiveness because the questions are designed to be answered by nurses and examples comprise problems that may appear during interpersonal support situations.

Table 1 Chosen item contents

No	Item contents
1	Cognition
2	Automatic thoughts
3	Schemas
4	Cognitive restructuring
5	Unfounded judgments
6	Black-and-white thinking
7	Partial focusing
8	Overestimation and underestimation
9	Ought-thinking
10	Extreme generalization
11	Self-association
12	Emotional reasoning
13	Self-fulfilling prophecy
14	Listening to clients
15	Problem-solving
16	Brainstorming

Study 2

Purpose

This study attempts to examine the reliability and validity of the KCCTN developed in Study 1, which can serve as an indicator for the effectiveness of knowledge regarding CBT for nursing professionals.

Methods

Subjects

In this study, 300students were included from a nursing college, and 100 randomly selected students were re-examined four weeks later. Additionally, 50 nurses working in hospitals were selected as the intervention group and trained in CBT. Furthermore, 100 undergraduate students who had not received training in CBT comprised the control group, and the KCCTN scores of each group were compared.

Although nurses should be used as controls, it has proven to be difficult given their busy schedules. Conversely, undergraduate students have been selected because basic education on CBTis rarely provided in nursing education programs.

Presumably, no difference in knowledge of CBT exists between nurses and nursing college students; hence, nurses were assigned to the intervention group, and nursing college students were assigned to the control group.

Data Collection Period

The data was collected from April 1, 2015, to August 31, 2016.

Data Collection Method

Study Procedure. Nursing college students located in the Kansai area were enrolled in this study, which was conducted during breaks between lectures. The nurses in the intervention group were recruited from 10 hospitals that were randomly selected from acute care hospitals situated in the Kansai area with more than 400 beds. At the three hospitals where consent was obtained, we went to a training session for nurses hosted by the hospitals and asked mid-career nurses with five or more years of clinical experience to participate in the study. Afterward, nurses in the intervention group were subjected to a group session

of CBT once a week for a total of three sessions and were evaluated before and after the intervention. The data were anonymously processed and matched before and after the intervention through an Identity Document (ID).

Evaluation Indicators.

***A: Personal Attributes*.** Nursing college students were asked about their ID, age, and gender, whereas nurses were inquired about their ID, age, gender, department, education, and years of experience.

***B: KCCTN*.** The KCCTN developed in Study 1 was used, which is a 16-item questionnaire constituting questions concerning possible human relationships and cognition in interpersonal support situations.

***C: KBPAC*.** Although the shortened version was used in this study[10], the KBPAC was originally invented which consists of 50 questions[7]. The shortened version, however, comprises 25 questions.

Analytical Assumptions

To examine the reliability and validity of the KCCTN, the following analytical assumptions were made. For reliability, the alpha coefficient should be 0.70 or greater[21], and the intraclass correlation coefficient (ICC) should be between 0.81 and 1.00, appearing in the range of "almost perfect"[22]. As for validity, we attempted to demonstrate that there was no correlation between the KBPAC and the KCCTN since the acquisition of knowledge concerning both cognitive change and behavioral change are assumed to be independent. Besides, there was a connection between the intervention group that underwent cognitive-behavioral therapy and the control group, highlighting a significant increase of correct answers in the intervention group.

Method of Analysis

A cross-sectional study on nursing college students was performed for items A through C. For A and B, a second survey was conducted four weeks after the first survey to ensurere test reliability. Also, the nurses at the hospitals were evaluated using A and B before and after the CBT intervention.

Examining Reliability. Cronbach's alpha were estimated to validate each question's internal consistency, and Cronbach's alpha were checked when items were deleted from each question to scrutinize items and enhance the holistic reliability of the test. To ascertain reproducibility, a second survey was implemented four weeks after the first survey to determine the ICC employing the data regarding the number of correct answers before and after the KCCTN of the successfully matched nursing college students.

Examining Validity. The correlation coefficient between the KCCTN and KBPAC was calculated to check the validity of the constructs of the KCCTN. Since these constructs appertain to different knowledge systems, we presumed that discriminant validity could be confirmed. Also, to ensure interaction between the CBT intervention group and the control group and if an improvement in the percentage of correct answers in the intervention group was evident, we utilized a two-factor analysis of variance with timing and group as the independent variables and the KCCTN score as the dependent variable. For the intervention group, the percentage of correct answers for each question was compared using the chi-square test before and after the intervention.

Results and Discussion

The questionnaire was administered to 300 students from a nursing college, and 260 students (28 males and 232 females, mean age 19.74±2.64 years) responded to the questionnaire (i.e., response rate: 86.7%). The questionnaire was circulated again four weeks later among 100 students from the initial 260 respondents, and 88 students (8 males and 80 females) responded to the questionnaire. Altogether, 76 students who were matched before and after the questionnaire were included in the analysis. Besides, we asked 50 nurses working at the hospital and obtained consent from 30 nurses (2 males and 28 females) for participation in the CBT training. The mean age of the nurses was 30.53±5.35 years, Furthermore,22 nurses reported having vocational school qualifications, two nurses had an associate's degree, five nurses had a bachelor's degree, and one nurse was a postgraduate. The mean years of clinical experience were 6.70±3.92 years, with nine nurses in medical wards, 10 nurses in surgical wards, three nurses in outpatient departments, three nurses in operating rooms, four nurses in obstetrics and gynecology, and a single nurse in pediatrics.

Cronbach's alpha was calculated to check the reliability of the KCCTN, and 0.63. We also measured Cronbach's alpha when items were removed from each question, discovering a range between 0.61 to 0.64 for all questions (refer to Table 2). Generally, Cronbach's alpha of 0.70, or higher, signifya high degree of internal consistency, and scales below 0.50 should be reviewed[21].Thus, we believe that reasonably high levels of reliability were obtained, even though they were not perfectly satisfactory. The ICC was calculated using the data of the number of correct answers before and after the KCCTN among successfully matched nursing college students (r=0.65, p<0.01). According to Landis and Koch's[22] grading criteria for the ICC, a range of 0.61 to 0.80 is considered "substantial." Although not perfectly satisfactory, we were able to affirm a reasonably high level of reliability (refer to Table 3).

To inspect the validity of the constructs, we calculated the correlation coefficient between the KCCTN and KBPAC and found no correlation(r = 0.05; not significant) (refer to Table 4). Accordingly, the knowledge of cognitive therapy measured by the KCCTN, and the knowledge of learning theory gauged by the KBPAC refer to different constructs, and therefore, the discriminant validity of the two tests was confirmed.

The hospital nurses were assigned to the intervention group (nurses N=30), wherein CBT was implemented, and nursing students were placed in the control group (nursing students N=76) that was devoid of intervention. A two-factor ANOVA was implemented, with timing and group as the independent variables and the KCCTN score as the dependent variable. The results revealed a significant interaction between the timing of the intervention and the group (F [1, 210] = 9.29, p < 0.01) (refer to Table 5). The simple main effect analysis also specified a significant difference between the pre- and post-intervention periods in the "intervention group" (F [1, 210] = 14.53, p < 0.01).

Moreover, to explicate the changes in the specific questions of the KCCTN due to the CBT intervention, a chi-square test examined the percentage of correct answers before and after the intervention. The findings displayed significant improvements in "partial focusing" (χ^2[1]=3.75, p<0.05), "overestimation/ underestimation" (χ^2[1]=15.56, p<0.01), "extreme generalization" (χ^2[1]=6.67, p<0.10), "listening" (χ^2[1]=5.19, p<0.05), and "brainstorming" (χ^2[1]=8.52, p<0.05) (refer to Table 6). No significant difference was determined in other questions, but an overall improvement in the percentage of correct answers was confirmed. Therefore, CBT increased the percentage of correct answers, establishing the validity of the constructs.

Table2 Cronbach's alpha when items were removed from each question

No	Item contents	Cronbach's alpha coefficient
1	Cognition	.64
2	Automatic thoughts	.63
3	Schemas	.64
4	Cognitive restructuring	.62
5	Unfounded judgments	.62
6	Black-and-white thinking	.61
7	Partial focusing	.63
8	Overestimation and underestimation	.62
9	Ought-thinking	.61
10	Extreme generalization	.62
11	Self-association	.61
12	Emotional reasoning	.63
13	Self-fulfilling prophecy	.62
14	Listening to clients	.61
15	Problem-solving	.63
16	Brainstorming	.63

Table 3 Intraclass correlation coefficient (ICC)

	95% Confidence interval	
Intraclass correlation	Lower	Upper
0.61**	0.45	0.74

** p<.001

Table 4 Correlation coefficient of KCCTN and KBPAC

	KCTN	KBPAC
KCCTN	1	0.05 n.s
KBPAC	0.05 n.s	1

n.s:nonsignificant

Table5 Changes in KCCTN due to cognitive behavioral therapy

	Intervention group (N=30)				Control group (N=78)					
	Pre		Post		Pre		Post		Interaction	Time
	M	SD	M	SD	M	SD	M	SD	F	F
KCCTN score	10.17	2.18	12.40	2.16	7.85	2.40	7.97	2.21	9.29**	11.68**

** p<.001

Table 6 Changes in the specific questions of the KCCTN due to the CBT intervention

NO	Pre	Post	χ^2	P
1	15%	17%	1.65	0.78
2	8%	8%	1.34	1.00
3	22%	28%	0.02	0.30
4	42%	42%	0.00	1.00
5	47%	48%	1.34	1.00
6	50%	50%	0.00	1.00
7	35%	45%	0.50	0.05
8	23%	47%	0.14	0.00
9	47%	48%	2.06	0.55
10	33%	47%	2.59	0.01
11	38%	45%	0.05	0.17
12	23%	32%	0.47	0.19
13	38%	40%	1.31	0.75
14	38%	48%	1.28	0.02
15	20%	30%	4.67	0.12
16	28%	45%	0.02	0.00

Overall Discussion

The KCCTN was highlighted as an effective checklist to measure knowledge of the cognitive aspects of CBT, and hence can be used to indicate the effectiveness of relevant training sessions. The purpose of Study 1 was to develop a cognitive therapy checklist used as an indicator of the effectiveness of the nurses' CBT training. Subsequently, 16 items were selected to devise the cognitive therapy checklist. Meanwhile, Study 2 addressed the reliability and validity of the KCCTN as an indicator of the effectiveness of the respective training for nurses. Based on the results of Study 2, Cronbach's alpha were calculated to check the reliability of the KCCTN. Cronbach's alpha was checked when items were deleted from each question to appraise the items and enhance the overall reliability of the test. The results proved that the alpha for all questions ranged between 0.61-0.64. Using the number of correct answers before and after the KCCTN among the successfully matched nursing college students, the ICC was calculated and indicated a reasonably high level of reliability, although not perfectly satisfactory. Contrarily, the validity of the constructs was confirmed by the fact that the KCCTN and the KBPAC were uncorrelated and that the number of correct answers improved in the intervention group that received training in CBT as opposed to the control group. Hence, it is reasonable to assume that the reliability and validity of the KCCTN were confirmed.

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Ethical clearance : This study was conducted after obtaining approval from the Ethics Review Committee of the author-affiliated university.

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