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Original Article

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Basic Life Support Training by Simulation: Qualitative Study about Medical Students' Experiences

C Vasantha Kalyani[1], Kusum K Rohilla[2]

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Authors Affiliation:
[1]Professor, College of Nursing, All India Institute of Medical Sciences, Deoghar 814152, Jharkhand, India, [2]PhD Scholar, College of Nursing, All India Institute of Medical Sciences, Rishikesh, 249201, Uttarakhand, India.

Coressponding Author: C Vasantha Kalyani, [1]Professor, College of Nursing, All India Institute of Medical Sciences, Deoghar 814152, Jharkhand, India.

E-mail: vasantharaj2003@gmail.com

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Abstract

Background: Basic life support is a basic procedure which every health professional or even an ordinary man must know. Various modes of basic life support training have been used, in which simulation based training is one of the advanced methods. Literature search evident that, a little information is available regarding subjective experience of learners when they got basic life support training by simulation method.

Objective: The aim of present study was to explore medical student's experiences when they underwent basic life support training by simulation technique.

Methods: This was a qualitative study, in which 24 medical students were interviewed after their Basic life support training with an open ended questionnaire. The researchers explored medical students' experiences with simulation based on basic life support training. Collected data was analysed by using a phenomenological approach.

Results: The results showed medical students' experience with simulation based basic life support training mainly included five categories. (1) Focused training (2) Easily focused (3) Practice in group is beneficial (4) No diversion from training (5) No focus loss when passive in group. We interpreted medical students' experience and compared it with other research findings and the risk and benefits of using simulation based training in learning were explored.

Conclusions: Simulation based basic life support training beneficial aspects will confirmed new avenue for this method. Create a well-established and good learning environment to get maximum participation. Take regular feedback to check students are in active mode. Use of simulation based basic life support training may contribute to novice methods of teaching learning methods that can improve their clinical performance further.

Keywords: Basic Life Support Training; Simulation; Qualitative; Medical Students; Experience; Cardiopulmonary Resuscitation.

Introduction

Medical students or doctors require some necessary skills while taking care of their patients. It's an obligation also, to provide optimal treatment and safety for each patient.[1] Medical students' training programs should be systematically to inculcate various skills in them.[2] Simulation is the best technique to amplify real time experiences under controlled situation.[3] Simulation based training is helpful to improve knowledge, skill and attitude of health professionals where patients protect is prime

responsibility.[4,5] It also provide a platform where ethical mitigate, practical dilemmas and tensions resolved during medical students training.[6]

Various research supports the use of simulation based Basic life support (BLS) training in medicine.[7-9] BLS training is usually performed by a task trainer under the supervision of an instructor, which mainly focuses on an individual's psychomotor skills. By using a qualitative research approach, we can explore new knowledge about simulation based training, which further contributes to rapidly developing knowledge for simulation. The aim of present study was to explore medical student's experiences who took simulations based on basic life support training.

Methods

This present study was a qualitative study. After obtaining ethical approval from the Institute Ethical Committee (AIIMS/IEC/20/694), All India Institute of Medical Sciences, Rishikesh (India). In this present study, 24 first year medical students were recruited. Inclusion criteria mainly include previous Basic life support training within 15 days in Advance Center of Continuous Professional Department (CPD), All India Institute of Medical Sciences, Rishikesh. Exclusion criteria for the study was any student who had previously real time experience of basic life support. During focus group discussion, medical students were invited to share their experiences regarding simulation based basic life support training.

Written informed consent was obtained from each study participant and their confidentiality was maintained. 24 medical students who were enrolled in this study got simulation based on basic life support training. After two weeks of their training, they were follow up as informants.

Training modules for simulation based on basic life support include two scenarios. First scenario in which a teacher in classroom collapsed because of cardiac arrest and there students witnessed this event and took action i.e. circulatory arrest diagnosed and BLS started as per American heart association (AHA) guidelines.[10] Following AHA guidelines, call for help after confirming cardiac arrest, start early Cardiopulmonary Resuscitation (CPR) and relieve rescuers to maintain the effectiveness of chest compressions. The second scenario occurred outside of their school building, where one of their close friends collapsed. Each participant had to perform again call for help after confirming cardiac arrest, start early CPR and relieve rescuers for effective chest compressions. In addition, they have to make phone calls to 911, give brief reports of patients and guide paramedics to the victim. Both scenarios run for 5-6 minutes each. After each scenario, instructor re-assembled all participants for oral feedback. Feedback mainly focused on how to coordinate their activities in the resuscitation team and adherence to the CPR algorithm.

After two weeks of their simulation based BLS training, a group discussion approach was used using semi structured interview questions. (Table 1) In group discussion, a group consists of a total of eight participants each along with one moderator. The main aim of this group discussion was to explore participants' experience with BLS training. Interview data was recorded on audio record and the discussion lasted for 50 to 65 minutes. Each participant was encouraged to respond freely. The moderator was to pose questions and highlight inconsistency. Data saturation was achieved after three focus group discussions with 24 participants.

Table 1: Focus Group Discussion Interview Questions.

Theme	Questions
Key question: How is simulation based BLS training (technique, group dynamics/interaction with others, and engagement)	
Technique	• What were your thoughts during the training? • How simple or difficult was it to give effective BLS? • Did you have some "flow" moments? If so, how often and how much?
Engagement	• What were your thoughts and feelings during the training? • What was your level of engagement? • What made you (or didn't make you) unengaged? • What would be needed to increase your level of participation?
Group dynamics	• What was it like to function as part of a group? • How important did your group's peers play in completing the task?
Effect on knowledge and skills	• Do you believe BLS you practised in simulated environment would impact how you react in a real-life emergency medical situation? • Did the training teach you anything? What are you talking about?
Interface regarding simulation based BLS	• What was it like to be portrayed and behave in a simulated world? • Did it make a difference if you had previously behaved in a simulated world? How do you do it? • How did you find using this training tool? List the most significant advantages and disadvantages.

A similar type of approach was used in a qualitative study by describing phenomenon with description generation by use of theories and models. The aim of present study was to get experience of CPR training among medical students in simulation mode.[11] In our study, Data transcriptions were doing back and forth direction by reading by two independently researchers (KKR, CVK). Audio materials were transcripted in verbatim and validation of data was again compared by recording and transcripts. (KKR, CVK) Themes were extracted from data and which were then converted into codes. All codes were redefined once again and combined conclusions were drawn from it. At the end, categories were extracted. Discussions and negotiations took place between two authors (KKR, CVK) to ensure quality in the ongoing phase of grouping, structuring, drawing interpretation and decontextualized the contents. Group discussion was conducted in Hindi and then its quotes were translated to English by authors.

Results

Table 2: Biodemographic of the participants (n=24)

Variables	Options	Frequency (%)
Age	Mean ±SD (20.5 ±2.05)	
Gender	Male	18 (75)
	Female	06 (25)
Residence	Rural	05(20)
	Urban	19 (80)
Grades in 12th Class (%)	71 to 80	14 (58)
	81 to 90	08 (34)
	More than 90	02 (08)
Any experience of simulation based training	Yes	04 (16)
	No	20 (84)

Quantitative Data on Mental Strain, Concentration and Self-Efficacy

Before and after Simulation based BLS training medical student's mental strain and concentration level assessed by validated instruments[12] and self efficacy level were used by 5 point validated scale. Mental strain was moderate level and stable during training (mean±SD=34/100±15 during 1st scenario; mean±SD=30/100±06 during 2nd scenario) and concentration level was very high (mean±SD=70/100±05 during 1st scenario; mean±SD=75/100±04 during 2nd scenario).

Self efficacy level was high before simulation based BLS training (mean±SD=5.2/7±0.9) and increased after simulation based BLS training (mean±SD=6.4/7±0.4; P<.001). This theoretical triangulation for quantitative data was further carried out by qualitative analysis too.

Qualitative Analysis

Five categories end assessments were evolved from qualitative information: (1) Focused training (2) Easily focused (3) Practice in group is beneficial (4) No diversion from training (5) No focus loss when passive in group.

Focused Training: Training learners specifically stated that they thought the simulated approach was a fair and excellent way to go through BLS protocol. Their main emphasis was on when and how BLS should be performed. The following representative quotes demonstrate their views of it as a cognitive training:

.....it forces you to change with each repetition... It feels like a great compliment you want to do it again and again. (Woman-22)

……Yes, you think, you know, planning ahead in the simulation and being a step ahead, kind of..… (Man-24)

However, several comments suggested that the scenarios were realistic. Physical realism was present, with participants performing all aspects of the BLS procedure by hand. The participants also stated that, while mental stress level was modearte, it was comparable to a real life BLS/CPR situation, as evidenced by:

Okay, I feel like I know what we did, and I feel like I should train because it is so practical. (Woman-20)

…It is not, there is bit emotional strain at all; there may be some mental difficulty in that that you must think about, at least a little about, what you must do, but it is not, there is mild stress in that sense. (Man-18)

Easily Focused: Participants stated that in a simulation based approach, it is very easy to understand and remained focused throughout the complete session. It is an excellent way to understand BLS and CPR algorithms. Participant's quotes following views for it experience regarding training:

.....during training, I feel I am a part of this scenario. I was completely active during the whole simulation. (Woman-12)

There was no diversion I felt when I was doing whole drills. Best method to teach and person..… (Man-14)

Practice in group is beneficial: Participants in simulation based training simulations worked in two person groups. Training in group is more engaging. Two subgroups of this concept's strengths that came up regularly during the discussions:

In a group, practicing as a team activity, CPR is always performed in groups. In simulation-based training, trainees were able to engage in group activities that were similar to what they would encounter in the real world; they were able to interact, seek help, and make decisions. Some elements of BLS/CPR guidelines were simulated by team as:

It was great because as it was a new process to be done by me, but now I have to figure out who does it is, what and whether I should do it now or later and that was a huge improvement. I learn to cooperate in a team in a different way than when you do it alone, and then you're shocked when you join other people who are doing the same thing. What should I do now? You, on the other hand, learn how you can divide tasks and you can learn ina short time too. (Woman-22)

Yes, cooperation is essential and it is also where the most problems exist... The moderator asked, how did the preparation help? Yes, it's possible that it can't be conditioned any other way. (Man-14)

Training in group is engaging. Some participants quoted that this training improved their commitment and made it fruitful for them (for example, making it easier to suspend feelings of unreality and benefiting from input and encouragement from peers during training).

When I was kind of team leader, I liked what other team members told me, it was fine..... I'm sure it was a lot more enjoyable. (Man-10)

No diversion from training: The level of care they received during training was substantiated in the following discussion by all medical students who could demonstrate the interface to the simulation environment. Students with little to no experience with simulated environments were unsure of how to communicate in a simulated environment. Apart from the lack of familiarity, it was simple to monitor, and trainees felt more connected to what was happening in the simulated environment.

….Because, I haven't played simulated drills before, but I felt at ease with all phases i.e. how it works and where to look and...(Man-06)

I guess I was a little apprehensive about doing the first practice, so I took a more passive approach. I gained interest by doing repeated rehearsal….. (Woman-22)

No focus loss when passive in group: During simulation training, there was a lot of talk about feeling involved in the mission. During the discussion, there were many clear statements and suggestions about how to improve directedness in training. Throughout the training, medical students thought they were in an active mode. A popular experience suggested that the preparation became routine and less challenging after the inclusion of similar scenarios. Participants were engaged when there was a need for action, but when there was no need for action, they also paid attention. Trainee feels it was most tough mentally challenge and more concentrated, as shown by the following quotes:

… and it's interesting, I think it happened in same way in real world, what I learnt here. (Man-9)

….throughout the situation, I find it fascinating and engaging. (Man-8)

Discussion

For all of the participants, using simulation-based BLS training was a new experience. Several advantages of this training tool that have been suggested in the literature (for example, the emphasis of the cognitive portion of the training and the added value of group practise) have also resurfaced in our five categories. Our findings, however, highlight other significant characteristics of scenario based BLS training as used in medical education.

The most significant finding was the close association between the subjects' recorded levels of involvement and their level of activation and difficulty. One of the most widely believed advantages of using the simulated approach is the ability to involve participants and their belongingness.[13-15] Our findings back this up, as all participants expressed satisfaction with the experience and provided examples of their participation in the simulated training. This commitment could be a result of the teaching tool, but it could also be linked to the subject's seriousness and significance. The ability of this simulation based technique to generate granted interaction is an inherent feature of it.[16, 17]

Using our psychometric results, we found that after the first training scenario, mean concentration (a) conceptually significant component of flow) tended

to increase. When these results are combined with the students' personal experiences, it's possible that this newer modality can be used as a strongly recommended teaching module for medical students.

As a result, they become more noticeable in the simulated world, and interaction in a simulated world could be more reliant on difficulty. The idea that a simulated world provides a rich atmosphere in which experience in the learning space improves our learning methods. Furthermore, the use of simulated tasks is not monotonous, which is one of the most important characteristics of a successful educational tool (engagement).

Peers in the simulated environment provided the majority of performance feedback, while a teacher in the real world provided immediate feedback during each scenario. Overall, the participants appreciated the input, but they requested more direct feedback inside the simulated environment. Active involvement, experimentation, and interaction are all features of simulation.[18]

Both cognitive and psychomotor abilities have been distinguished by training. Psychomotor skills training was mentioned by several trainees as a significant feature of simulation-based BLS training. Mental pressure was moderate to high during training, confirming that mental stress was seen as a practical aspect of simulation training. The high level of stress suggests that the training situation has become more organised and optimal. BLS practising in a stressful and dynamic setting, on the other hand, aids them in transferring to real world CPR situations. Discussions with the participants revealed that simulation possesses any practical property.

In medicine education, a common cause of suboptimal success and harm has been described as a lack of teamwork skills.[19] This issue appears to be present during CPR as well.[20] The participants seemed to value team emphasis, and development of an environment of mutual tasks and responsibilities seemed to be important for participation in the scenarios, according to our findings. Not only did the students agree that practising a team endeavour in a team environment was beneficial, but they also thought that training together was more enjoyable, empowering, and satisfying.

In two occasions, participants were trained in two simulation-based scenarios. Several participants acknowledged the rapid degradation of CPR skills and recommended that simulated training be used to repeat and retrain. For gaining in depth information, skills, and practise in CPR, distributed training in the presence of a moderator is a very appealing choice.

Strengths and Limitation

Since our informants was homogeneous group of first year medical student's, so it was difficult to extrapolate this research finding. From these results, we can conclude that simulation-based training programmes can be easily applied in medicine, where clinically novice learner can be trained in a simulated environment. The innovation and ability to demonstrate some characteristics of medical team training in simulated environments, as well as how it is experienced, are the study's strengths. To improve the credibility of our findings, we triangulated them with psychometric process variables and previous findings.[21]

Scenarios which were created, were related to BLS/ CPR, and simulation training environment was created specifically for this analysis, with several features similar to real-world scenarios. The aim of our study was to understand how simulated world team CPR training is experienced and completely achieved, despite the fact that it was planned for a large amount of data input.

There are a few flaws in this report. Our participants were 24 first year medical students who responded to an open request for volunteers. Including more informants may have resulted in more interactions and the discovery of new categories. Person subjectivity, team structure, and the learning situation in which the research is conducted all influence outcomes.

Conclusions

Five categories, i.e. Focused training, Easily focused, Practice in group is beneficial, No diversion from training and No focus loss when passive in group illustrate the phenomenon of simulation based BLS training for medical student's. We recommend that scenario based simulation BLS training was conducted to address issues i.e. how actively trainee as involved during simulated methods, what are level of group interaction among themselves and feedback about whole training also. So, learning happens on all levels through simulation based BLS training.

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Conflicts of Interest: None declared

Authors' Contributions: The study's creation and overall design were co-authored by all of the contributors. The interview guide was created by CVK and KKR who also chose qualitative approaches for data interpretation and analysis. KKR was in charge of data collection and community discussions. CVK and KKR were in charge of data collection, description, and triangulation. CVK and KKR helped with critical revisions after KKR drafted the manuscript. The final manuscript was read and accepted by all contributors.

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Review Article

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Age Estimation in Middle Aged Adults: An Administrative and Clinical Forensic Medicine Issue for Hospital Management

Abhishek Yadav[1], Abilash S[2], Benjy Tom Varughese[3], Kulbhushan Prasad[4], Sudhir K Gupta[5]

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Authors Affiliation:
[1]Additional Professor, [2]Senior Medical Officer, [3]Senior Resident, [4]Additional Professor, [5]Professor and Head, Department of Forensic Medicine and Toxicology, All India Institute of Medical Sciences, New Delhi 110029, India.

Coressponding Author: Abhishek Yadav, Additional Professor, Deptartment of Forensic Medicine & Toxicology, All India Institute of Medical Sciences, New Delhi 110029, India.
E-mail: drayad_in@yahoo.com
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Abstract

Age in middle aged adults is an important factor in certain legal and administrative matters like determination of eligibility for a particular employment or post, fixing of retirement age of an individual etc. Hospital administrators may also face such an issue. The current medical methods in age estimation include assessment of skeletal changes which helps in arrival of the approximate age range based on medical criteria, literature and previous studies. The age estimation in the middle aged individuals (45-65 years) is a difficult task due to the factor that at the end of examination, conclusion drawn is given in wide age range. This may be of minimal use to the administrators or employers as they require a specific age or at least a short age range to finalize the issues in question. So, for purpose of the administrative matters for fixing a particular age the criteria which may be used have been discussed in the article. Further studies and multiple other factors which determine these skeletal changes needs to be studied and a method should be improvised for proper conclusions. There is also a need for standardization of criteria for arriving at scientifically reasonable conclusions in determination of age. Virtual autopsy is a boon in this aspect and opens door for study of possible parameters and determinants in age estimation.

Keywords: Age estimation; Age clinic; Skeletal Changes; Cranial suture fusion; Symphysis pubis; Forensic anthropology; Hospital Administration.

Introduction

Age is an important factor in determining certain legal responsibilities, eligibility for some desired posts and also marks the end of service under Government agencies. Age is mainly evaluated by birth certificate from registration department of births and deaths. In absence of birth certificates, many other documents like class tenth mark sheet of school, village panchayat certificate, hospital birth documents, Aadhar card, Voter ID etc may be considered. The issue of determining age arises when there is a complaint of falsification of these documents or in cases where no such document is available to prove the age. In such cases the only method of determining age is medical examination of the individual. Age related issue can arise in both criminal proceedings, as well as civil suits related to employment, age of superannuation, marriage etc. Radiographs of joints and bones along with the dental changes are used to estimate skeletal age of an individual. The Medical examination thus involves assessing different parameters and is given in a range. A short age range can be opined

in young individuals of less than 18 years of age but with increasing age this range becomes wider. The referring authorities and some procedural outcomes usually expect and sometimes insist an exact age or a very short range and are not satisfied with Medical opinion. One such challenging age group is that of middle age, it is that period of an individual where there is a transit between young adulthood and old age, the age range usually accepted as 'middle age' is between ages 45 and 65.[1-4] The aim of this review is to discuss the circumstances that result in requests for age assessment in middle aged individuals, problems faced in the Hospital at the Clinical Forensic examination, scientific parameters used for age determination and possible solutions for sorting out the issue.

Problem Faced at the Administrative Level

Age estimation is a challenging area not only when criminal proceedings are undertaken, but also in various administrative matters as well. Age estimation in middle age is usually requested in cases like

- Age criteria for holding posts and there is allegation of false certificates.
- Superannuation of an individual.
- Inconsistent records having ambiguous age mentioned in different records.
- Skeletal remains of an individual who belongs to middle age
- Unknown dead bodies appearing to belong to middle age.
- Civil suits related to inheritance of property.

One frequent problem being faced at the administrative level is when a dispute arises regarding age of a pensioner. In our country, in individuals who are now in the age group of 45-65 have a questionable documentation regarding their age. The reason for this being absence of mandatory documentation/registration of the birth before the implementation of 'The Registration of Births and Deaths Act, 1969' in our country.

Dr Ramnath Jha, discussed on "Upping Retirement Age in India."[5] He stated that, "On 12 Nov 2019, newspapers reported a statement arguing for rising the age of retirement beyond 60 years. Now a days people remain physically fit to work even after completing the age of 60 years. The retirement age of employees should be increased". If such effort of re employment and superannuation takes place, many will come forward claiming their age to be of the required category. The challenges regarding verification of age by an officer-in-charge will be daunting in absence of proper documentation and sometimes simply left on the discretion of the Officer-In-Charge regarding verification of the papers submitted to him/her.

The concerned officer-in-charge has to take reasonable steps to verify the information submitted to him. If the officer-concerned is not satisfied with the document provided by the appellant for age verification, he/she can seek alternate domain for the age verification like taking help of the medical examination. The real challenge begets the verification of age in individuals of the middle age group. With age estimation already being a tough task in younger age group due to high variability of different factors, verification of the same in above 45 years where the changes are very subtle becomes quite the daunting task.

Medico Legal Importance of Age

There is medicolegal importance of every age group among people which varies according to civil or criminal requirements as well as varies for different countries. Beyond 45 years most of the cases belong to civil suits or civil formalities determine age of superannuation and employment disputes. The medicolegal importance of age above 45 years in reference to Indian constituency is as below 6:

Medico-legal Importance of 50 years Age

It is upper limit of eligibility for employment in various government services.

Medico-legal Importance of 58 years and 60 years age

The age of retirement varies in different states of the country with few states retiring its employees at 58 years and other at 60 years. The age for senior citizen concession in Indian railways is 58 years for females and 60 years for males.

Medico-legal Importance of 65 years

As per Section 10 (2) of the Consumer Protection Act 1986, a member of District Forum can hold his/her office not more than a term of 5 years or up to the age of 65 years, whichever earlier. The retirement age for doctors in the Ministry of Health and Family welfare, Government of India is 65 years.

Criteria used for Age Estimation in Middle Age 45-65 years

The current medical practice utilizes determination of changes in the bones which is interpreted by radiological investigations like X-ray or CT-scan. There is limitation of choice of radiological study of bones in this age group as after fusion of all the major bones including long bone the correct estimation of age becomes difficult. The following are few of the parameters considered among the living in the age group of 45-65.[7-11]

A. Changes in Symphysis Pubis

As the age advances the degenerative changes in Symphysis Pubis starts. The irregular surface of symphysis pubis bone starts becoming more granular or smooth. It partly becomes granular around 25 years with well defined inner and outer surface. Granularity becomes more extensive by 35 years; also the lipping of the pubic symphysis face commences at 35 years of age. During the middle age group in the early 50's symphyseal surface is oval, smooth with raised upper and lower margins, which become beaded in late 50's. The surface starts to erode during 60's and the erosion becomes irregular by 70's. Among living these changes can be seen through computed tomography (CT scan).

Table 1: Changes in pubic symphysis in middle age.

Age of person*	Characteristics
During early 50s (years)	Symphyseal surface is oval, smooth with raised upper and lower margins
During late 50s (years)	Surface has narrow beaded rim
During 60s (years)	Surface starts to erode with breakdown of outer margin

B. Closure of Cranial Sutures during middle age

The fusion of the cranial sutures is helpful in determining the age among middle age and elderly. The closure of the cranial suture starts endocranially and proceeds ectocranially. The union in the inner aspect of the skull occurs 5–10 years earlier than externally. The main cranial sutures suitable for age estimation post middle age are sagittal suture, coronal suture, lambdoid suture and parieto temporal suture. It occurs externally in the following order: posterior third of the sagittal suture around 30–40 years, anterior third of the sagittal and lower half of the coronal around 40–50 years and middle sagittal and upper half of the coronal around 50–60 years. Lambdoid suture closes around 45-50 years while parieto temporal suture sutures close much later around 60-70 years.

Table 2: Skull suture closure.

Closure of sutures	Age of closure
Sagittal suture	
- Posterior 1/3rd	30–40 years
- Anterior 1/3rd	40–50 years
- Middle 1/3rd	50–60 years
Coronal suture	
- Lower half	40–50 years
- Upper half	50–60 years
Lambdoid suture	45–50 years
Parieto temporal suture	60–70 years

C. Fusion of sternum

Fusion of sternum bone starts at 20 years among male and female. Fusion completes by the age of 40 years in male and 45 years in female. A male should be considered above 40 years if fusion of sternum is complete and a female should be considered above 45 years if fusion of sternum is complete.[12] The manubrium sterni also unite with the mesosternum.

D. Scapula

Though the changes in scapula are less uniform but lipping of ventral margin of Glenoid cavity may start by 30-35 years of age. Irregular lipping occurs around clavicular facet between 35–40 years of age. Also inferior surface of Acromion process develop facet like changes in between 35-45 years of age. The triangular demarcation of scapular ridge becomes prominent by 50 years.

E. Vertebrae

Around 35–50 years, lipping of vertebral bodies can be detected. Atrophic changes occur in the intervertebral discs and osteophytes (lipping) can be seen on x-rays.

F. Dental

The dental age estimation in the living is conducted by evaluating the timing and sequence of eruption of teeth along with stage of growth and development of dentition utilizing non-invasive methods.[13] The eruption of the teeth with age has been well studied, documented and accepted method for age determination. But after complete eruption of all the permanent teeth the assessment of age becomes difficult in adults and invasive techniques are required for assessing age. Most of the methods

of dental age estimation require tooth extraction of tooth, and hence cannot be used in living individuals. OPG or ortho pantomogram has been a popular choice for age determination in living. The radiological techniques are used to analyze apposition of secondary dentin which is a simple and convenient method. Throughout a person's life secondary dentin gets deposited along the wall of the tooth pulp, so the radiographic measurements of the pulp, tooth length as well as width and ratio of length and width are used to analyze age.[14] The measurements of the pulp cavity on dental radiographs can be used as an age indicator in adults. Apart from this aspartic acid racemization technique from dentine and dentine biopsy has been used as method of age determination but latter is complex and expensive.[15,16]

G. Other Senile Changes in Skeleton

- Beyond middle age, retrogressive changes occur in many parts of the skeleton. The thyroid and cricoid cartilages of the larynx tend to calcify and the horns of the hyoid bone unite with the body.
- The costal cartilages ossify and may unite with the sternum.
- The alveolar margins of the jaw become resorbed and the angle of the jaw is opened up.
- All the bones undergo osteoporosis changes.
- With the loss of cancellous tissue, the proximal end of the medullary cavity of the humerus assumes a cone shape, the tip of which gradually ascends, reaching the surgical neck during 41–50 years and the epiphyseal line during the age of 61–74 years. Similar changes involve the upper end of the femur also and can be seen on x-ray or by longitudinal section.

Discussion

Middle age of an individual is the transit period between young adulthood and old age, the age range usually accepted as 'middle age' is between ages 45 and 65. 1-4 Age estimation in younger age is usually based on the developing dentition, eruption of temporary or permanent teeth, growing and ossifying skeleton or in old age is by degenerative changes of the skeleton.[17] Middle age is the period where the only significant dynamic change happening in the human body is the processes of bone resorption, deposition and remodeling. This is the only criteria to assess the age of an individual during this time period, but the major problem here is that these processes are highly variable and depend on various factors like nutritional, metabolic and genetic factors which differ from person to person. The other problem is that this remodeling process of skeleton in middle age is a very subtle process and differs in the time and manner of occurrence in each individual posing a major challenge to Medical investigators.[18]

There are no standardized reference data to formulate uniform criteria for age determination in this age group. A lot of parameters are used to come to a conclusion which are easily questionable. Even medical literature and research studies are have variable results depending upon sample population due to variations in racial factors, environmental factors, and regional variation. So, even for radiological evaluation very less reference data is available for middle age radiological examination. Moreover the conclusions generally have a wide age range as the opinion which may be of least use for the concerned officials because the matters they need to settle have financial implications. For example if a officer has to determine the age of superannuation then the age opined in range of 45-60 years or 50-60 years will be of no use in the solution of the matter. Doctors should establish a guidelines based on which conclusions need to be drawn and UK model of " Good Medical Practice" kind of similar model responsibility needs to be taken by doctors before giving conclusions.[19]

Recommendations

1. The radiological age estimation is given in a range, so for purpose of the administrative matters for fixing a particular age the following criteria may be used:

- Self declaration from candidate.
- School entry Certificate.
- Last School passing certificate.
- Year of marriage.
- Age of first born child.
- Vaccination certificate.
- Oldest Driving license.
- First passport.
- Age mentioned at the time of registration in Voter list.

- Oldest employment records.

2. In India there is a need for standardization of the protocols for age determination and also regarding drawing uniform conclusions. This needs a more detailed study of the skeletal changes and also exploration of possible better and easier ways to determine age.

3. Virtual autopsy is a boon in this aspect as more radiological parameters are at disposal for study for creating a reference database. The benefit is that the PMCT data is captured as a part of routine autopsy and can be used for studying the skeletal changes at different stages of age.

Conclusion

Age estimation thus in middle age group is a very tough process considering all the difficulties in relation to medical assessment of the changes happening in the body during this period and also complex intricacies of the Administrative issues regarding the need for a very specific age of an individual to solve the complaints. This is an area where further research is needed for developing easier techniques with which age can be assessed. The benefit of doubt must be given to candidates keeping a lenient and sympathetic view. The advent of Virtual Autopsy recently in India opens the door for further research in this aspect and more needs to be explored on the timely changes happening in human bodies to estimate the age of an individual.

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Review Article

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Assessment on level of Stress Regarding Examination during Covid-19 Pandemic Among Students of Selected Nursing School

Suhasini Vinayak Sanas

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Authors Affiliation:
Associate Professor, Department of Nursing, Sinhgad College of Nursing, Pune 411041, Maharashtra, India.

Coressponding Author: Suhasini Vinayak Sanas, Associate Professor, Department of Nursing, Sinhgad College of Nursing, Pune 411041, Maharashtra, India.
E-mail: suhasini_s009@yahoo.com
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Abstract

The present study was Assess the level of stress regarding examination during Covid-19 pandemic among students of selected nursing colleges of city.

Objectives: Toassess level of stress regarding examination during Covid–19 pandemic.

Methodology: Research, Design Non experimental descriptive design, sampling technique Convenient sampling, Research Setting selected Nursing colleges of City.

Result: Findings of the study found that students experience severe stress i.e. 23.33%, moderate stress i.e. 23.33% and low stress i.e. 5% respectively. Given the harmful consequences of stress and the importance of mental and physical health among nursing students.

Conclusion: The study concluded that the psychological health of students is a significant issue. Some of these symptoms may be improved with better communication between the friends or family members of the students and the provision of more information regarding the academics and examinations. As well as college should starve to provide better support for students regarding their academics and examinations and also relaxation techniques.

Keywords: Assessment; Level of stress; Examination; Covid 19 Pandemic etc.

Introduction

COVID-19 entered into our lives at the end of 2019 in the whole world threatening the health of countless people and reached pandemic status as well. Since December 2019, there has been an outbreak of pneumonia of an unknown aetiology that was first reported in Wuhan, Hubei Province, China (Wang et al. 2020).

Due to this pandemic outbreak, lot of students developed psychological problems that are affecting learner's not only academics but all over personality (WHO, 2020). Countries worldwide implemented strict precautions on its citizens in an attempt to control the spread. The country switched its in person educational system to virtual learning, closing public places of aggregation and invoking travel bans. Living in quarantine period

which is also known as lockdown can be great mental toll for everyone. Quarantine affects mainly three components of mental health i.e. autonomy, competency and connectedness. People feel isolated as they get cut off by meeting their friends and perform their daily routine.[1]

Due to COVID-19 crisis, education was shifted into emergency remote learning, and virtual classes were given through different educational platforms such as Blackboard, Zoom, and Google classroom. Besides, all assignments were handed out and submitted electronically to keep on evaluating students through different evaluation strategies. At the end of the semester, an online exam was assigned through blackboard as the final evaluation of the students' performance during COVID-19 crisis.[2]

Problem Statement

'Assessment on level of stress regarding examination during Covid-19 pandemic among students of selected nursing colleges of city.'

Objectives

- To assess level of stress regarding examination during Covid-19 pandemic among students of selected Nursing School.
- To associate the findings with selected demographic variables i.e. Age, gender, type of family, type of society, educational status.

Hypothesis

$\mathbf{H_0}$: There is no significant difference on level of stress regarding examination during Covid-19 pandemic among students of selected nursing colleges of city.'

$\mathbf{H_1}$: There is significant difference on level of stress regarding examination during Covid-19 pandemic among students of selected nursing colleges of city.

Review of Literaure:

1. Review of literature related to stress regarding examination among students.
2. Review of literature related to examination during Covid-19 among students.
3. Review of literature related to stress regarding examination during Covid-19 among students.

Coceptual Frame Work

Dorothy Johonson Conceptual Framework Dorothy Johnson is known for her "Behavioral System Model of Nursing," which was first proposed in 1968. Her nursing model states that, each individual has patterned, purposeful, repetitive ways of acting that comprises a behavioral system specific to that individual. Fig. 1.1 Dorothy Johonson conceptual framework model. The general system theory was developed by Ludwig Von Bertalanffy during the late1930.

Research Methodology

- *Research approach:* This study was based on evaluator approach.
- *Research design:* non experimental descriptive design was considered as the appropriate design for this study.
- *Research setting:* Selected nursing colleges of city.
- *Research population:* In this study the population was students of Various College of Nursing available during the study period of City.
- *Sample:* Students Nursing colleges of selected colleges of City.
- *Sample size:* In this study, the sample consisted of sixty students from selected nursing college of Pune city who fulfilled the criteria laid down for the selection of the sample.
- *Sampling technique:* Non probability convenient sampling technique was used to select the sample for this study.

Tool Preparation

A tool is an instrumentor equipment used for collection of data.

Development of the Tool

Validity: Tool of the study will be content validated by 15 experts from specialized field and CVI (Content Validity Index). 2-Mental health nursing, 1-Child health nursing, 2-Community health nursing.

Reliability: Reliability will be calculated using split half method and test retest method separately. r

value will be calculated by Pilot study: pilot study will be conducted on samples before actual data collection on 10% of the sample size.

Study Instrument: The following sections consist of:

Part I ***Section A:*** Consent form from the participants.

Part II ***Section B:*** Demographic variable

Section C: Structured questionnaire to assess the level of stress. A 4 point likert scale to assess level of stress. It consists of 10 questions. A 4 point likert scale to assess level of stress. It consists of 10 questions.

Method of Data Collection

The data collected from 8-7-21 to 9-7-21 prior the data collection permission obtained from the authority from colleges. The purpose of the study and method of data collection explained to subjects for getting true response assurance given regarding confidentiality of information and then informed consent was obtained from participants. The subject who fulfil the sampling criteria were taken for the study from selected colleges of city. Total 60 samples selected for the study with the help of non-probability convenient sampling technique. The data was collected through Google forms from the students with the help of Sheldon Cohen's perceived stress scale for assessment of stress of examination in the COVID-19 pandemic.

Description of the Tool

The researcher will use structured questionnaire to assess level of stress, among students studying in college. Sheldon Cohen's Perceived Stress Scale to assess level of stress among students.

Plan for Statistical Analysis

The data will be presented in the form of tables and graphs. The collected data was coded, tabulated and analysed by using descriptive statistics (mean percentage, frequency). The association between stress and demographic variables was done by Fisher's Exact test.

Significance of findings

Main findings of the study are discussed under the following headings

Section A: This section deals with the data pertaining to demographic characteristics of the people with the respect to age, gender, family type, health habits and duration of course.

Major Findings

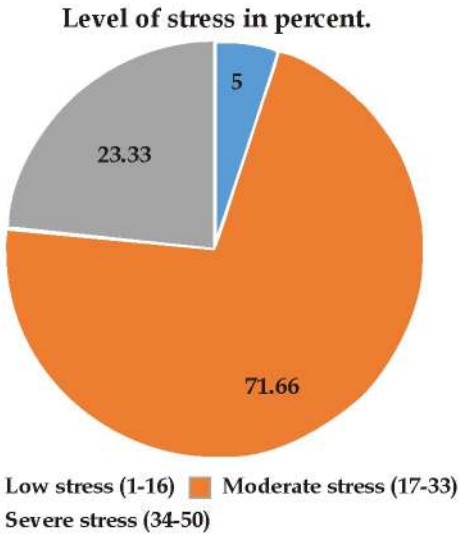
Finding related to age Data reveals that 3.3% of the students had age 17 to 18 years, 3.3% students had age of 18 to 19 years, 16.7% students had age of 19 to 20 years and 76.7% students had 20 to 21 years of age.

- Finding related to gender Data reveals that 51.7% students are male and 48.3% students are female.
- Finding related to family type Data reveals that 80% of students belong to nuclear family, 20% of students belong to joint family.
- Finding related to duration of course Data reveals that 28.3% students have duration of course of 2 years and 71.7% of student has duration of course of 4 years.
- Finding related to health habits Data reveals that 1.7% student consumes alcohol and 98.3 students do not consume any substance.

Section B- This section deals with the analysis of data related to assessment on level of stress regarding examination during COVID-19 pandemic among students of selected nursing colleges of city.

N=60

Stress	Frequency	Percentage (%)
Low stress (1-16)	3	5
Moderate stress (17-33)	43	71.66
Severe stress (34-50)	14	23.33



The table and graph denotes that, 71.66% students is having moderate stress and 23.33% students having severe stress and 5% of students is 2

having low stress.

Section C- Analysis of data to find the association between the study findings and selected demographic variables.

N= 60

Demographic variables		Stress			Total	p- value
		Low	Moderate	High		
Age in years	17 to 18 years	0	2	0	2	0.3025
	18 to 19 years	0	1	1	2	
	19 to 20 years	1	7	2	10	
	20 to 21 years	2	33	11	46	
Gender	Male	3	21	5	29	0.1068
	Female	0	22	9	31	
Family type	Nuclear	3	34	11	48	0.5054
	Joint	0	9	3	12	
	Three generation	0	0	0	0	
Duration of course-	2 years	0	9	8	17	0.3606
	4 years	3	34	6	43	
Health habits	Cigarette	0	0	0	0	0.95
	Tobacco	0	0	0	0	
	Alcohol	0	1	0	1	
	None	3	41	15	59	

Since p-value of all is greater than 0.05, it was found that there is no significant association of stress with demographic variables.

Conclusion

In this study the majority of the students experience severe stress i.e. 23.33%, moderate stress i.e. 23.33% and low stress i.e. 5% respectively. Given the harmful consequences of stress and the importance of mental and physical health among 40 nursing students. It is clear that the psychological health of family members is a significant issue. Some of these symptoms may be improved with better communication between the friends or family members of the students and the provision of more information regarding the academics and examinations. As well as college should starve to provide better support for students regarding their academics and examinations and also relaxation techniques.

Recommendations

Keeping in view the finding of study the following recommendations are made:

- A similar study may be replicated on large samples, there by findings can be generalised.
- Other relaxation techniques with management can be done for the study.
- The study can be undertaken in different settings and in different target population.
- A study can be done on association between various demographic variables which are significant on larger sample size.
- A study can be conducted to assess the knowledge and attitudes related to stress and their coping strategies among students.
- A study may be conducted to evaluate the effectiveness of stress management in students.
- This study can be done on various factors such as anxiety, depression and distress.

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