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Oasis of knowledge

The hand drawn illustration on the cover of JSTMU encapsulates philosophy of the University and its Journal. It depicts a traveler in the desert stopping by an oasis to take a note to themselves, symbolizing the point after which their journey requires steadfastness and dedication. The note is an excerpt from the Qur'an where God beseeches human beings to reflect. This is the essence of scientific research which prescribes itself in the University logo and is represented through red and blue color in the form of the water and the red sand, and taking further inspiration in the form of the notebook and the quill.

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The *Journal of Shifa Tameer-e-Millat University (JSTMU)* is an open access bi-annually peer reviewed medical journal of the Shifa Tameer-e-Millat University (STMU), Islamabad, Pakistan. The journal encompasses papers from biomedical research, clinical specialties and interdisciplinary medical fields; thereby entertaining the scientific, research and clinical work of a wide variety of health care professionals such as medical practitioners, surgeons, nurses, pharmacists, medical technicians, paramedics, laboratory scientists, physiotherapists, dietitians and bioengineers. The journal is premised on creating influence on the academic as well as corporate thinkers. It is dedicated to presenting advances in medical sciences supporting the recognition and publication of medical scientific research and its effects on human health and well-being. A key question we apply to submission is, "Is this paper going to help readers better understand and conceptualize the research topic while adding something new and innovative to the current pool of knowledge?"

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2. To inculcate the habit of medical writing.
3. Enable medical professionals to remain informed in multiple areas of medical and health sciences, including developments in fields other than their own.
4. To share the experience and knowledge for benefit of patients in particular and humanity in general.
5. To document medical problems and challenges pertinent to the community.
6. To achieve the highest level of ethical medical journalism and to produce a publication that is timely, credible, and authentic to read.

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EDITORIAL

Role of educational institutions in promoting medical research and publications in Pakistan

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Keywords: *Editing, Educational Institutions, Healthcare, Medical Journalism*

There are several types of journalism like political journalism, crime journalism, business journalism, arts journalism, celebrity journalism, sports journalism, education journalism and so-forth. There is a dire need to nurture medical journalism in Pakistan.[1] A science journalist reports news and other information about science to the general public. This involves consisting new searches, new discoveries and relevant findings, interviews with expert scientists and researchers. It conveys the information and ways that a non-specialist audience can understand.[2]

The major role of a medical institution or a university is dealing with biological, biomedical and health sciences and providing quality healthcare for the mankind.[3] The medical universities are meant for creation of knowledge, preservation of knowledge, dissemination of knowledge and application of knowledge. In the current era, these medical institutions may establish the department of Medical Journalism and Editing. The following is a list of ‘‘a-z’’ of the role of such institutions in promoting journalism and medial publications;

a) to create research temper
b) to frame research agenda (themes for research)
c) to increase funding for research
d) to hunt researchers
e) to arrange training of researchers
f) to manage short courses, workshops and sabbatical for researchers
g) to link and team up with research centers
h) to instruct creative thinking / critical appraisal
i) to adopt openness & flexible working hours
j) to create endowments for research
k) to publish journals of university and to strive to acquire national/global rankings
l) to arrange the research conferences/ symposia/workshops at the institutions
m) to allow investigators to present their work periodically at internationally forum
n) to develop institution-industry linkages for commercialization of research for copyrights
o) to build infrastructure for publication center duly installed with equipment and customized workforce
p) to develop a sophisticated animal care center for experimental research
q) to arrange good computational and linguistic courses
r) to have device against plagiarism
s) to formulate institutional ethics and review board
t) to have a state of the art computational and digital library
u) to establish a smart meeting room with audio visual provision
v) to establish a good IT resource center
w) to have publication / printing press
x) to arrange intellectual meetings of think tanks
y) to nurture synthesis, analysis and evaluative judgment of the editors

z) to inculcate multidisciplinary and inter-professional methods in research

aa) to initiate certificate / diploma / master / doctoral programs in medical journalism

Today, medial journalism and medial publications is a career. It stands not only as a prestigious profession but also as a challenging career option[4]. The pivotal objective of medical journalism is to enlighten masses about health care challenges and the remedial or therapeutic measures. The institutions must endeavor to trigger research, quality publications and medical journalism to promote knowledge and research-based economy leading to betterment of the healthcare for the community.

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ORIGINAL ARTICLE

Perceptions of nursing students and nursing faculty about incivility and its factors in nursing education: A descriptive qualitative study

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Author`s Contribution

[1] Conceptualization of study, analysis and interpretation of data

[2-3] Drafting the article or revising it critically for important intellectual content. final approval of the version to be published

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A B S T R A C T

Introduction: Incivility is commonly observed in number of schools including nursing institutions around the world. It affects both, students and faculty members by interrupting class discipline and the learning environment. Thus, understanding the factors leading to incivility in nursing college will assist in identifying strategies to deal with the problem.

Objective: To explore the perceptions of nursing students and faculty members about incivility and its factor in nursing education.

Methodology: A qualitative descriptive design was used and participants, from a private college of nursing Islamabad, Pakistan, were recruited through purposive sampling. One on one in-depth interview was conducted with five faculty members and 12 students using an open-ended interview guide. Using content analysis, codes were identified and similar codes formed the categories and theme evolved from the categories.

Results: Data analysis generated a description of incivility, uncivil behaviors, factors causing incivility, and strategies to overcome incivility as categories. The most leading factors of incivility were the lack of teaching-learning strategies and the socio-cultural and family background of students. The strategies that suggested overcoming incivility were orientation sessions, professional development activities, and developing policies to reduce incivility in the institution.

Conclusion: For improving civility in nursing college, insight about incivility among students and faculty members is to be developed and policies to be in place to address unacceptable behaviors in a timely and effective manner.

Keywords: *Perceptions, Faculty Uncivility, Nursing students, Uncivility, Nursing education*

Introduction

Incivility refers to social behavior including lack of courtesy and regard to others.[1] It is increasingly seen in nursing students and faculty members and it results in uncooperative and unpleasant educational environment.[2] The most commonly seen uncivil behaviors in students are coming late and leaving early, coming unprepared, using a cell phone, speaking loud, irrelevant and inappropriate conversation, and showing a rude gesture, irrelevant content sharing, asking and giving special favors, chewing gums, eating snacks, deviating from the course syllabus, and changing assignments or test dates.[3, 4] These behaviors can be observed between students and faculty members, or among faculty members. The potential causes of incivility include getting attention, ignorance, unnecessary expectation, personality traits and upbringing of an individual.[4, 5]

Incivility affects both students and faculty members. It can influence one's personal and professional life resulting in low self-esteem and a loss of confidence. Also, it interrupts class discipline and acts as a barrier in learning. If students are bullied in during their professional development, they can adopt the negative behaviors and

project them onto others.[6] Specifically, in nursing education, uncivil behavior is carried by nursing student to their professional practice and it affects their interaction with co-workers and the patients.[7, 8]

A policy of zero tolerance, a set rule if violate that must be punished or have penalty to all academic incivility can be enforced in the institutions, and regular monitoring and evaluation can be done as part of the preventive strategies.[9] Incivility can be minimized at workplace through effective student-faculty members' communication. This would not only improve the behaviors among nursing students but also contribute to improving patients' care in the health care setting.[10, 11] Previous research about incivility reports conflicting results due to distinct sociocultural contexts, language, and background of students and the faculty. Hence, it is important to explore the perceptions of nursing students and faculty members about incivility from Pakistani perspective.

Methodology

A qualitative descriptive design was used. This approach is useful when a researcher wants to capture lived experiences related to the phenomenon. It helps the researcher to explore what happened, why it happened, where did it happen and who was involved.[12] The study was conducted in one of the private colleges of nursing in Islamabad, Pakistan. The population included students of all four years of Bachelor of Science in Nursing (BSN) program and faculty members teaching in the same program. Purposive sampling was used to recruit participants based on the inclusion criteria: students studying in the BSN program and teachers with a minimum of three months' experience.

The data were collected during November 2019 to February 2020. In-depth interviews were conducted by the primary researcher using an open-ended interview guide. During the interviews, description and causes of uncivil behavior, experiences and observation of such behaviors in nursing college, the way it was managed and lastly, the suggestions for enhancing civil behaviors were explored from the participants. Interviews were conducted in English and Urdu languages for better expression and articulation of experiences. The researchers have expertise in both the languages. After the transcription of the interviews, translation from Urdu to English was done by the primary investigator and it was ensured that the true meaning and essence of content was maintained.

The faculty members were recruited by emailing to them the information about the study and those who volunteered were included in the study. To allow variation in participants, no specification was made in terms of age, ranks, and subjects taught. For students, the information sheet with the contact details of the primary investigator was displayed on the notice boards of the college. Those students who contacted the primary researcher and volunteered were included in the study.

As per the convenience of the participants, in-depth interview with each participant was conducted and it took approximately 30-60 minutes. All interviews were audiotaped and transcribed verbatim by a research assistant and verified by the research team. Data were analyzed using Hsieh and Shannon's (2005) content analysis method. The steps involved were transcribing the interviews, verification of the transcript with audio recording, and highlighting the keywords and phrases to develop codes. The similar codes were grouped to form categories and finally categories into a theme.[13] The rigor was established using Lincoln and Guba's (1985) trustworthiness criteria. Credibility of data was ensured by prolonged engagement with participants, by giving them enough time to express their thoughts, probing questions for detailed information, observing their gestures, and returning to two interviewees for clarification of few terms. Lastly, the data and all sources were also checked and reviewed by the co-authors of this study. To ensure dependability, the researcher listened to the recordings to cross-check the transcription and read it several times to verify codes and categories aligned with raw data collected. To maintain conformability, an independent peer researcher was involved to look at the data to see the consistency of the findings and interpretations.

This process confirmed the accuracy of the results except for difference in one of the codes. For example, the researcher coded description of incivility as 'rudeness'' while the independent reviewer labeled it as 'aggression'. Also, co-authors listened to recordings and read the transcripts to see the consistency of the findings. The in-depth interviews with 17 participants allowed collection of rich data. It can be proposed that the richness of the descriptions provided in the study was sufficient to

enhance the transferability of study findings. Thus the findings can be transferrable to the other nursing institutions within Pakistan provided the context is similar.

The study approval was obtained (IRB) # 282-772-2019). Written informed consent was obtained and the participants were given the right to withdraw from the study at any time. To maintain the confidentiality of the participants, codes such as F-01, F-02 and so on for faculty members and S-01, S-02, and so on for student participants' were assigned. In-vivo and interpretative coding was used to assemble information into 10 sub-categories, four (4) categories and a theme. The theme evolved is 'incivility in nursing education'. The four main categories include a description of incivility, types of uncivil behaviors, factors of incivility, and strategies to address incivility (Figure 1).

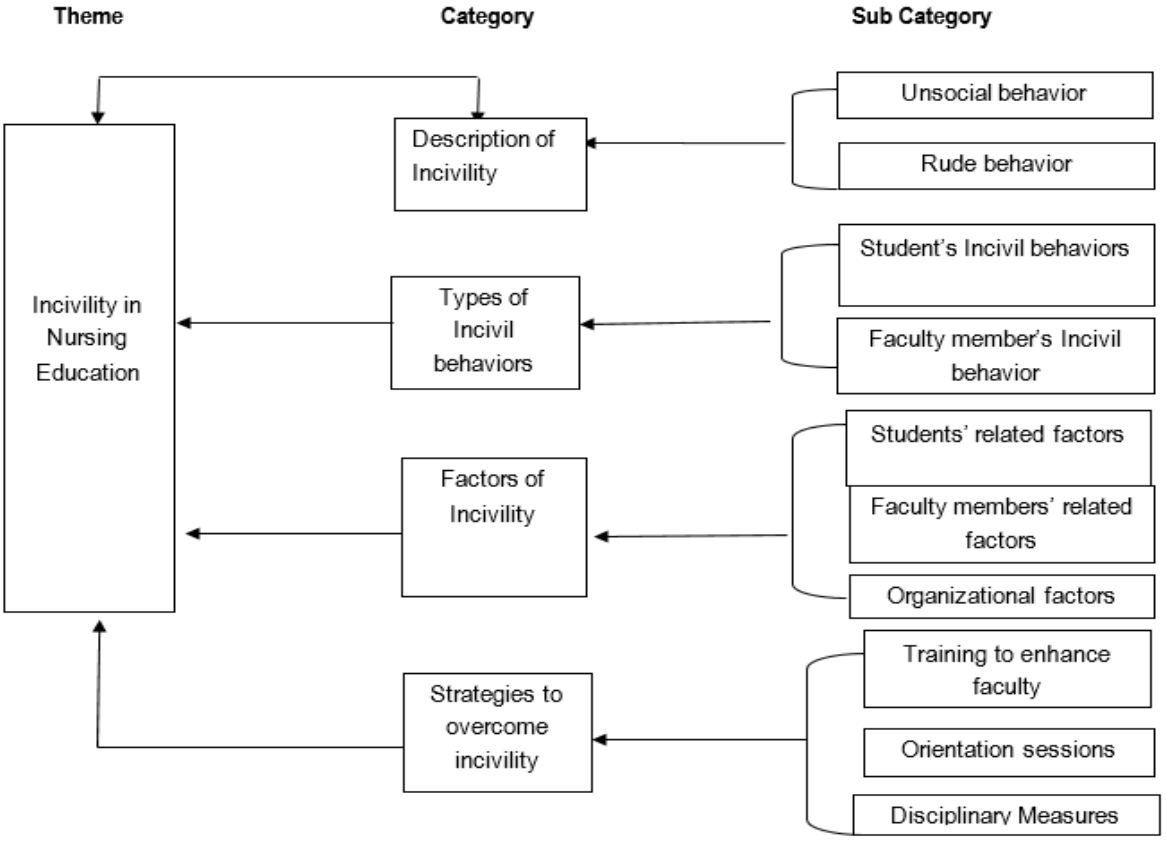

Figure 1: Themes and Categories Emerged from Subcategories

Results

Of 17 participants, 12 were students and five were faculty members. The majority of students (8) were female and participants' age ranged between 20-25 years. Regarding educational background, nine had Intermediate qualifications from private institutions (Table 1). Of the five faculty members, three were female with age ranged of 31-39 years (Table 2).

Table 1: Demographic Characteristics of Student Participants (n=12)

Demographics (Students)		
Variable	No of Participants	Percentages
Gender		
Male	4	33.33 %
Female	8	66.66%
Age		
20-22 year	7	58.33%
23-25 year	5	41.66%

Matriculation		
Private	7	58.33%
Government/public	5	41.66%
Intermediate		
Private	9	75%
Government/public	3	25%
Year of BSN		
I year	3	20%
II year	3	20%
III year	3	20%
IV year	3	20%

Table 2: Demographic characteristics of faculty **members'** participants (N=5)

Demographics (Faculty)		
Variable	No of participant	Percentages
Gender		
Male	2	40%
Female	3	60%
Age		
31-33 years	1	20%
34-36 years	2	40%
37-39 years	2	40%
Qualification		
Bachelors of science	1	20%
Post Registered Nursing	1	20%
Master in Public Health	2	40%
Master of Philosophy	1	20%
Rank		
Junior Lecturer	1	20%
Lecturer	1	20%
Senior Lecturer	2	40%
Assistant Professor	1	20%
Teaching Experience		
3-5 years	1	20%
5-10 years	3	60%
10-15 years	1	20%
Classification of Faculty members by Profession		
Nursing	4	69.2%
Non-Nursing	1	30.7%

Description of Incivility

The majority of the participants described incivility as unsocial behavior or rude behavior. Each of these descriptions is supported by participants' quotes in the below section.

Unsocial Behaviour

The participants shared that they all felt bad when people dealt with them inappropriately. Participants expressed incivil behavior as a result of pre-set rules and regulations created by the society being violated. If an individual does not comply with the rules, it is considered incivility. As illustrated by one of the faculty members' participants, "*Behavior that are not socially acceptable, could be a lack of good manners; it's not only the manners but also some of the behaviors; disrespecting behavior and undesirable behavior in certain circumstances*" (F-01)

Rude Behaviour

Participants considered behaving rudely, having a rude tone and inappropriate body language as incivility. One of the participants expressed, *"Rudeness is seen when the students are told where they are wrong. They consider it as their insult, and it is then either evident by their rude tone or inappropriate body language" (F-01)*.

Types of uncivil Behaviours

The second category includes types of uncivil behaviors which are further divided into two subcategories that is students' uncivil behaviors and faculty members uncivil behaviors.

Students' uncivil Behaviours

Various types of uncivil behavior mentioned by the participants were interrupting learning behaviors, disrespecting faculty, and breaking rules and regulations.

1. Interrupting learning behaviours.

This is a subcategory of student incivility. As shared by the participants, it is depicted in the classroom in various forms like making noise, gossiping during the lecture, responding in chorus while answering to the faculty members and sleeping in the class. One of the participants mentioned, *"Texting and paper chats while sitting at the back of the class are very common" (S-01)*. Another participant shared, *"We tend to call others by different names like fat, dark or short height" (S-04).*

2. Disrespecting faculty

A subcategory of student incivility as shared by students includes talking in high tone, entering the faculty's

office without permission, and blaming and disrespecting faculty. One of the participants shared, *"Students think that the teachers have all the answers. Therefore, if teacher fails to respond they start behaving rudely" (S-05)*.

3. Breaking Rules and Regulations

Participants shared, breaking rules and regulations include dressing inappropriately, not doing pre-post readings, coming late, using cell phone in the class. One participant explained*, "If a student posts the marks, his/her friends posts irritating and discouraging comments and their screen shots are later shared on WhatsApp. (S-06).*

Faculty's In-civil Behaviours

Various types of faculty members uncivil behaviour include do not guide students and faculty members modelling incivility.

1. Do Not Guide Students

Several participants shared their views that, in the classroom, students look up to teachers for giving direction and guidance which teachers fails to do. Participant shared*, "When asked questions, teachers show ignorance and refer us to Google" (S-02).*

2. Faculty members Modelling Incivility

Participants shared that the teachers should be the role models for them. However, when teachers are disrespectful towards students, students also become disrespectful towards teachers. Students hardly pay attention and pass degrading comments. One student explained, "At times *faculty members demonstrate anger, aggression and shout in class" (S-01).* Several participants shared that faculty-student boundaries are violated, *'the male teacher said that "yeah you look very beautiful with that smile but please control it because it confuses me"(S-11).*

Factors Affecting Incivility

This category includes factors that influence incivility among students and faculty. These factors are sub-categorized as students' related, faculty members related and organizational related factors.

Lack of motivation.

According to the participants, they lack interest in the profession, are pressurized to join nursing, and lack experiencing innovative teaching and learning strategies. One participant shared, "*we lose interest if a teacher fails to engage students "(S-02).* Another participant expressed, *"Families force students to get into the nursing profession; hardly 3 or 4 out of 45 will share that they joined the profession on their own will* (S-03).

Multiple Assignments.

The high expectations of the faculty members were highlighted as a reason for incivility. As one of the faculty members stated the multiple duties she performed. *"Every day new assignment, new task and new objectives which makes it difficult for us to fulfill all the tasks and it creates stress" (F-01).* Expressing the burden of assignments, a student participant stated, *"I feel like we are being grinded* [Aisa lag raha tha kay hame grinder may dal kay pisa ja raha hai]*" (S-01).*

Attention Seeking.

Attention-seeking behavior is another cause of incivility. A participant shared, *"To become the center of attraction, student tries to look different" (F-05).* Another participant stated, *"Students distract class continuously, moving in and out of classroom." (S-03).*

Socio-cultural and Family Background.

Socio-cultural and family issues were considered as one of the major factors for student incivility. A participant shared, "HostelHostile environment is not good to study and the courses are tough. In addition, financial issues and family *pressure to score good marks add to it and may lead to uncivil behavior*" (F-03).

Faculty Members' Factors

This category represents factors that lead to uncivil behavior in faculty; it includes incompetent faculty, lack of classroom management skills, and student faculty members' relationship.

Incompetent Faculty.

Incompetent and less experienced faculty members lead to a high incidence of incivility. One of the participants shared, *"If a teacher is new and lacks teaching experience, she may not be able to deal with students, make a lesson plan, or use appropriate [teaching] strategy" (S-08).*

Lack of Classroom Management Skills.

The class management is one of the necessary skills which were thought to be lacking in teachers. One participant expressed,

The teacher does not utilize effective strategies to engage learners. The teacher comes unprepared, wastes class time by sharing his/her own or sometimes other's story with the students. She teaches in haste and thus it becomes a burden for the student and they have to study on their own (S-07).

Student-Faculty members Relationship

According to the participants, faculty members demonstrate frankness and favoritism in class. A participant shared, *"The times have changed; faculty members is frank with some students as compared to others" (F-01).* Another participant expressed, *"If I have scored good marks, I am in good books of the teacher as compared to the ones who didn't score well [in tests/exams]" (S-05).*

Organizational Factors

The organizational factors included faculty members' workload, faculty members taking Masters of Science in Nursing (MSN) courses, financial issues, and un-checked behaviors of administrative staff.

Faculty members Workload

Few participants shared the heavy teaching load, involvement in different committees, and expecting good teaching without assessing teachers' expertise leads to faculty members' incivility. One participant expressed that, "Involvement in different committees at college, teaching subjects with no expertise… dealing with their family issues affects their performance and also lead to uncivil behavior, which might include not covering the objectives and not teaching properly" (F-04).

Faculty members Enrolled in Masters Courses.

Faculty members enrolled in the MSN program are teaching and learning simultaneously and it can burden them and lead to uncivil behavior. A participant stated, *"Teachers who are involved in both studying and teaching don't get time for themselves and thus react differently by exhibiting uncivil behavior" (S-04).*

Financial Issues.

The financial issues were thought to contribute to incivility. A participant expressed, *"Salary package is not satisfactory so this could cause faculty members incivility" (F-03).* Another participant shared, "*Promotion matters, faculty members may behave in an uncivil manner and may get angry for not being promoted" (F-04).*

Unchecked Behaviour of Administration Staff.

Several participants verbalized that administrative staff should be given feedback on their inappropriate behavior. A participant stated, "*Faculty members are being evaluated one or two times in a semester but no one is evaluating the administrative staff [for their misbehavior]" (F-01).*

Strategies to Overcome Incivility

The last category evolved from the study was strategies to overcome incivility. This is further is divided into sub-categories: enhancing orientation sessions for students, training to enhance teacher competency and disciplinary sanctions.

Enhancing Orientation Sessions

During the orientation of inducting class, the norms and values of the organization including civil and uncivil behaviors and its consequences can be explained. Also, involving new students' parents can help them support their children for successful completion of studies. Participant stated, "*As new students join in, they are much stressed and need counseling to make them comfortable to adjust. The family should be involved and counseled not to expect too high from their children; I believe family support is of great importance*" (S-07).

Training to Enhance Faculty members Competency

The participants suggested conducting workshops for faculty members on incivility, time management, innovative teaching, and dealing with difficult students. A few participants verbalized the importance of above competencies, *If the teacher is well prepared, has good command on subject, managing time [well], I feel a student will give you more respect" (F-03).*

Disciplinary Measures

To maintain discipline in the college, it is necessary to have policies on civility, feedback system, and observing faculty members and students' behaviors and performance during the class. Faculty members' participant expressed, *"if policies are in place, we make sure those are implemented properly to reduce incivility. These policies must be explained to faculty, staff and students"* (F-02).

Discussion

Most of the participants perceived that incivility exists amongst students and faculty members due to limited understanding and awareness. We identified various uncivil behaviors such as calling a student by derogatory name, gossiping during the lecture, and responding in chorus while answering to the faculty. The literature also supports using of conversations during class, making sarcastic gestures, sleeping in class, demanding make-up examinations, extensions, and refusing to answer direct questions as uncivil amongst students.[1, 4, 14-18] The uncivil behaviors described by the participants can result in disruptive learning environment. Such environment hinders students' learning and could be a possible reason for ineffectiveness of strategies like working in groups or learning in larger groups.[5]

The types of faculty members uncivil behaviors identified were lack of guidance to students, rudeness, and nepotism. A mixed method study in nursing education within the South Eastern United States noted that first-year students described faculty members showing favoritism and uncaring attitude whereas the final year students described faculty members being rigid and acting superior[19] Although faculty members acting superior did not emerge from the current study but ignoring students and not guiding them properly were identified as incivility. Previous studies also reported poor classroom management, demeaning comments, and biasness as uncivil behaviors.[19, 20]

The faculty members of the opposite gender crossed faculty-student boundaries by their verbal and non-verbal gestures. Also, the crossing of faculty-student boundary has a reciprocal effect. Hyun et al[21] mentioned that the blurred boundaries between faculty members and students can promote inappropriate behaviors. The participants mentioned that they lacked motivation due to parents forcing them to join the program and not having a clear nursing vision. Selecting a career by choice is very crucial which enables a student to do things constructively. [22]

Attention-seeking behavior was considered as one of the causes of students' incivility. Students aged 15-24 tends to gain everyone's attention through both verbal and non-verbal cues and may disturb the class decorum. [23] This attention seeking behavior imply the effect of personality traits, early life circumstances, types of friends, and teachers' encounters.[7] Knowing students' background is important for teachers. Sometimes the most mature and stable students also cope maladaptive when faced with high expectations and role adjustments in a new environment. [24] Socio cultural dynamics was identified as factor leading to uncivil behaviors. Some of the issues related to these factors include living away from family, financial crisis, and family responsibilities. [25, 26]

Dealing with students effectively by providing them equal time, attention and opportunity is required to maintain effective classroom decorum. Diener [27] found that students mentioned that faculty members give scores according to her preconceived ideas rather than assessing the quality of work and such bias creates a sense of inequality and incivility among students. The participants highlighted orientation sessions for students, continuing professional development (CPD) for faculty members and disciplinary measures to reduce incivility. CPD of faculty members needs to be an integral part of any institution as it helps with learning new teaching-learning strategies and ways to deal with difficult students. [8] Faculty members can practice de-escalation techniques (e.g., active listening, and reflection).[20]

Limitation

The study was conducted only in one institution however; the findings appear to be similar in number of international nursing institutions. The researcher was the part of the same institution where the study was conducted which might have affected the openness among participants in sharing information despite assuring confidentiality throughout the research.

Conclusion

Nursing students and faculty members face anxiety and stress which may lead to frustration, anger and uncivil behavior. The results also highlighted the types of uncivil behaviors common in both the students and faculty. The strategies suggested by participants such as orientation sessions, trainings, policy development and its execution can promote civil behavior in students and staff and may improve the overall decorum of educational institutions.

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ORIGINAL ARTICLE

Effects of disposable suctions bottle in endotracheal suctioning COVID-19 infection and exposures of nurses

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Author`s Contribution

[1] Conceptualization of study, analysis and recommendation

[2] Data collection and data analysis, conclusion

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A B S T R A C T

Background: Covid-19 is a highly contagious infection that affects healthcare personnel and patients in critical care units. Specifically, while doing endotracheal suctioning of patients, those having severe lung obstruction may have a higher risk of transmitting infections. The speedy emergence and global extent of this COVID-19 shaped a major challenge in the healthcare industry, mainly with the unavailability of personal protective equipment (PPE) to take care of families, patients and Health Care workers.

Purpose: The objectives of this study was set out to measure the evidence-based practices and impact of the disposable suction bottles on patients as well as health care workers who are directly in contact with COVID-19 patient handling.

Methodology: Data have been collected from 200 intensive care nursing staff of 3 public &private hospitals in the Islamabad surveillance. Weekly reports and physical surveys were done in critical areas, from the infection control committee, The NCOC data centers. The quantitative research has been design. Data analysis is done on SPSS version 21.

Results: Data collected from both male and female staff. Male nurses were 80, and females were 112 in number. The age group of 25 years was 51% more than 49%. Work experience: 5 years, 69% more than 7 years, 30% more than 10 years, and 11% of nurses had interviewed. The questionnaire 8 statement data had collected from more than 200 nurses, working in public and private hospitals in Islamabad. Results show more than 17% of chest infections among admitted patients in ICU with other than chest infections and health care staff had exposed to corona.

Conclusion: The use of disposable suction bottles shows less exposure to disease in admitted patients and health care workers. The number of cases had reduced after the use of disposable suction apparatuses. It has revealed that disposable suction is more effective than glass jars.

Keywords: *COVID-19, Disposable Suction, Health, Infection, NCOC, Nurses*

Introduction

As reported by the infection control committee previously, glass jar suction apparatuses were used for endotracheal suctioning in critical areas, which is the source of spreading infection from one patient to another.[1] Endotracheal suctioning practices of nurses and respiratory therapists use the same suction apparatuses for other patients are risk factors for introducing the respiratory infection to other patients. Uses of disposable equipment, suction bottles, ETT tubes, fluoroscopes, and vent tubes PPEs for Healthcare Workers to Clean the Intensive Care Unit Leaks are sources of cross infections as shown in Figure 1.[2]

Nosocomial infections create significant medical issues with high prevalence, morbidity, and death rates around the globe. Nosocomial contamination has become evident in Intensive Care Units (ICUs), where the occurrence is to multiple times higher than in the overall hospitalized populace. In developing countries such as India, Pakistan, Bangladesh, and Sri Lanka, Intensive care unit patients are more vulnerable to diseases due to variety

of factors such as malpractices, lack of negative pressure room, a single-use suctioning apparatuses, and presence of fundamental diseases, prolonged stays, multiple demonstrative methods, and checking performed on impaired invulnerability. High danger factors for fostering in ICU patients are a significant stage to carry out vital insurances for the anticipation of contamination. The underlying advance ought to be focused on the most probable local pathogens when a NI is suspected.[3]

Compared to glass jar suction apparatus, disposable suction apparatus delivers a favorable clinical response for patients with respiratory diseases like COVID-19. In hospitals, fomites can also become contaminated by cleaning suction apparatus, changing catchers of an infected patient, or less commonly, via aerosols, water, or food items. Nosocomial infections create significant medical issues with high incidence, morbidity, and death rates around the globe.

While cleaning the suction container or transporting it from one patient to another, critical care health personnel tested positive for COVID-19. As Pakistan is still developing, all public and private hospitals could not place disposable suction bottles for all COVID-19 patients on ventilators and with large emergency setups. Patients Nurses and healthcare professionals are at high risk while using suction bottles in a hospital setting. The study's goal was to determine the extent of infection spread and whether examining knowledge regarding cross-infection is critical for proper usage and disposal of contaminated items and to find out about the outbreak of COVID-19 patients on ventilators and health care staff. Many episodes of respiratory tract infection and COVID-19 pneumonia, most patients in critical care units are on ventilators, occurred in association with suction and tubing (uses of suction apparatuses), and the uses of devices for multiple patients at the same time. COVID-19outbreaks an immune-compromised patient was associated with infected nebulizers and other tubing used for inhalations of different mobilization.

According to WHO's guidelines, do not reuse the items exposed to COVID-19 pneumonia patients (WHO. December 2020). A randomized controlled trial was conducted in two areas of hospital to replace a disposable suction bottle and monitor the results of the critical care unit's admissions every month. Use disposable equipment, suction bottles, ETT tubes, fluoroscopes and vent tubes as Personal Protective Equipment for Healthcare Workers.[3] Cleaning the Intensive Care Unit is a source for cross infections by changing the pieces of equipment from one patient to another patient.[4]

States, most health care workers are exposed due to malpractices while cleaning non-disposable jars.[5] Poor handling of fomites cause infection among indoor patients and caretakers in intensive care units.[6] Frontline intensive care staff is causing exposure to patients as well as themselves.

Regular infection prevention practices have mounted. In addition, weekly and monthly, critics have to discuss adjustments and updates to the frontline team, coordinated with the head of the branch of waste management, HOD ICU, and senior infection control nurse.[7] COVID-19 nosocomial infection examining the risk of mortality in those who are at high-risk. New behaviors had to sustain through an adjustment in facility subgroups, and staff leaders led the exchange efforts using the example. No go-transmissions were identified due to the implementation and continued recognition of the infection prevention obligations.[8] World Health Organization (WHO) corona virus disease (COVID-19) dashboards (2020) are due to miss management of COVID-19 patients.[9, 10] According to the Clinical characteristics of 138 hospitalized patients with novel corona virus-infected pneumonia is causing massive spread in those who are more prone to get.[11] Most chest infections across the public and private sector are the result of sharing PPES. The concerned authority nurses and doctors have refocused on possibilities that have been modified or highlighted via fact-finding authority and quality departments, surveillance, weekly report notifications, supervisor shift reports. For instance, a skill in single vicinity will become hardwired, including using hand gel before carrying and after discarding gloves. The focal point may also alternate to every different infection prevention challenge improvement.[12, 13]

Figure 1: Personal Protective Equipment

Methodology

A 10-statement questionnaire had distributed in three public and private hospitals (PIMS &FGSH, Kulsoom international, Quaid-e-Azam & Shifa International Hospital) in the context of awareness of cleaning, methods of placing suction bottles, Importance of PPES, the willingness to replace disposable suction jars and to follow the proposed guidelines in Islamabad (Pakistan) in November 2020. Post-implementation data has been gained from the same public and private hospitals. Statistics gathered from infection control departments and comparison done to identify the impact of disposable suction bottle uses. The Staff had knowledge about hand hygiene, but they were not aware of the causes of frequent exposure of COVID-19 among working personnel and admitted patients and have no awareness about disposable suction bottle benefits.

Initially, hand hygiene compliance measured 94% and progressively increased. PPE observations showed 67% compliance is getting better with regular education and following standard procedures during duty. No records had been formerly accrued on device cleaning, as it turned into a brand new observation positioned into the area all through the capabilities honest.

Results

A total population of 200 nurses from critical care units in public and private hospitals was 80 male nurses and 112 female nurses. The age group of 25 years old was 51%, more than 25 years old was 49%. Work experience: 5 years was 69%, more than seven years was 30% more than ten years was 11% of the nurses as shown in Figure 2. The questionnaire 10 statement's data ran on SPSS version 21. Results showed 96% of HCWs found not well trained for suction bottle cleaning; only 4% trained staff. Wearing PPES gloves 70%, face shield 20%, and gown 10%. Those who knew about the spread of COVID-19 were 92%, and those who did not were 6% or maybe 2%. The sick leave ratio during shift once a month was 45%, twice a month was 52%, and more than twice was 3%. Knowledge about disposable suction: (No) 96% (Yes) 3% and don't know about suction was 1%. The 91.5% of staff wanted to replace disposable suction, 7.5% did not want to replace disposable suction as shown in Figure 3. Results emphasized that usage of disposable suction units will prevent infection exposure in patients and healthcare workers.

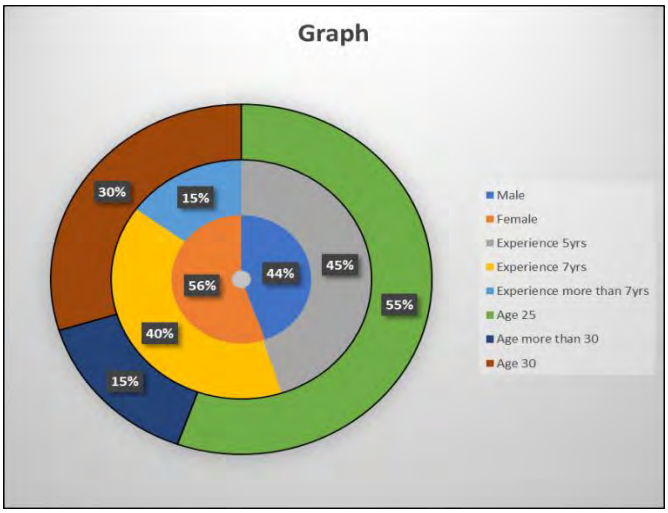

Figure 2: Distribution of Respondents

Those hospitals that adopted this disposable equipment and negative pressure rooms significantly showed atropine the number of cases of COVID-19 cross-infection and fewer people became sick. As reported by the infection control committee, change requires a secure environment for frequent and open conversation. Regular infection prevention practices installed weekly and month-to-month to communicate modifications and updates to the frontline workforce. Implementations have been maintained for over 12 months as of this writing. For example, a change in a single region turns into hardwired, which includes the usage of hand gel before wearing and

after removing gloves. The focal point may alternate with every other infection prevention project for improvement.

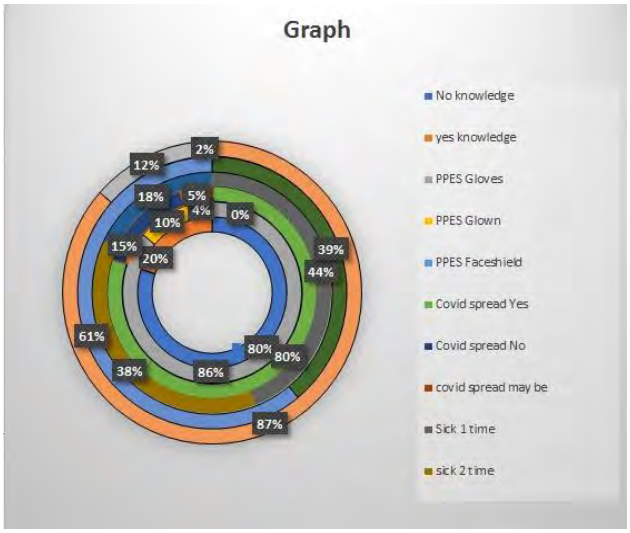

Figure 3: Response of respondents in Percentage

Conclusion

Spread of nosocomial infection found high in an early outbreak of COVID-19 15% of admitted patients reported by infection control committee. The infection rate had reduced by 3% after the intervention of the disposable end tracheal suction method. Make the coverage for the utilization of gadgets, proper disposal of waste from COVID-19 patients, and prevent spillage of the infected people's secretions. Do educate staff and families of patients and attendees of patients in hospitals that they must take private safety. Use a disposable device. Healthcare workers must be conscious about the spread of disease and be proactive in covering themselves and the sufferers properly. There is a need for extraordinary clinical, academic interventions and applications on contamination manipulation practices for COVID-19 across all healthcare professions. Occupational fitness and protection are paramount to minimize the risk of transmission to healthcare professionals and patients and offer care for patients.

Recommendation

Utilized patient-care hardware ruined with blood, body fluids, secretions, or discharges ought to be taken care of cautiously to forestall skin and mucous membrane exposures, contamination of clothes, and transfer of microorganisms to HCWs, different patients, or the climate. Assurance that reusable equipment isn't utilized for the consideration of another patient until it has been cleaned and properly sanitized. Ensure those unmarried-use gadgets and sharps have thrown out well. Replace disposable or reusable transducers. Waste and sharp removal strategy. Schooling and preparing for ICU staff about the anticipation of nosocomial diseases routine cleaning, disposal of waste material, and assembling contaminated cloth.

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ORIGINAL ARTICLE

Undergraduates' experiences of the post RN BScN program, Karachi, Pakistan

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Author`s Contribution

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[3] *Contributed data and analysis tool*
[4] *Review the article*

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A B S T R A C T

Introduction: Nursing education has a major responsibility in preparing nurses for clinical practice. In Pakistan, most of the nurses are diploma qualified. Post Registered Nurse Bachelor of Science in Nursing (Post-RN BScN) program plays a substantial role in the transition from diploma to degree. Therefore, it is necessary to explore the experiences of graduates of Post-RN BScN for the successful implementation and quality improvement of the program.

Objectives: This study explored the strengths and weaknesses of the Post-RN BScN through experiences of the nurses who completed the BSc N program in 2015 in nursing education institutions in Karachi, Pakistan.

Methodology: The qualitative descriptive exploratory study was designed to explore the experiences of the nurses who completed the Post-RN BScN in 2015. Purposive sampling was used for data collection through semi-structured interviews. Data was analyzed through the content analysis method, through which sub-themes and themes emerged.

Results: The study participants from a public sector highlighted the strengths of program, such as integration of theoretical knowledge into clinical practice, having graduate qualified faculty, and having appropriate technological and education resources. Whereas, majority of the participants were concerned about the lack of integration of theoretical knowledge into clinical practice, under qualified faculty with unsatisfactory teaching competencies, inaccessibility to and unavailability of resources.

Conclusion: The study provided recommendations for stakeholders for improvement in the quality of nursing education by addressing major areas such as integration of theory into practice, competencies and shortage of the faculty members, and provision of technological and educational resources.

Keywords: *BSc, Experiences, Post RN, Undergraduates*

Introduction

Pakistan is a developing country where accessibility to quality-based health care is a challenge. Quality of health care is closely associated with nursing care, its benchmarks and standards of practice. Nursing care depends on two key components, such as the level of qualification and the quality of the nursing education program.[1] Globally, it is observed that a baccalaureate degree is an essential prerequisite for entering the profession for practice. Nursing education comprises two essential components: theoretical and clinical practice.[2] Therefore, to ensure quality, nursing institutions need to provide quality-based nursing education that produces nurses who are equipped with theoretical knowledge integrated into clinical practice.[3] To achieve this objective, the recruitment process of appointing nurse educators should be quality-based, ensuring professional competencies of educators for better learning of the students.[4]

Quality nursing education is critical for accessing opportunities for students to be knowledgeable, problem solvers, and critical thinkers.[5] However, one study has identified the flaws in nursing institutions, such as poor facilities for learning, incompetent nurse instructors, and outdated curriculum in educational institutions. [5] In Pakistan, the association of nursing education with clinical training and learning approaches is still in its infancy stage, because nursing schools are still not well prepared with updated resources.[6]

Nursing education in Pakistan comprises two undergraduate programs: post-RN BScN (two years) and the generic BSc Nursing program (four years). Recently, the HEC and the PNC have directed all the nursing academic institutions to discontinue the three-year nursing diploma programs from 2018 and to start a baccalaureate program for professional development.[7]

Most of the nurses in Pakistan are having a diploma in general nursing.[7] Post-RN BScN program is a significant transition from diploma to degree for diploma holder nurses. There were several aspects that motivated me to explore the experiences of the nurses who had completed their post-RN BScN program, such as challenges observed in terms of quality of nursing institutions and quality of nursing education. Therefore, is necessary to explore and understand the challenges of the post-RN BScN program from the perspective of the graduates of the program.

Study Questions

The following study questions were explored in the study:

- What are the experiences of post-RN BScN students who graduated in the year 2015?
- What are their recommendations for improving the post-RN BScN program?.

Methodology

The methodological process applied during the research study is following.

Study Design

A qualitative descriptive exploratory study was designed.

Sampling

The study population consisted of nurses who had completed their post-RN BScN degree program in 2015, at two public and two private nursing institutions in Karachi, Pakistan. Purposive sampling of a sample size of 8-12 participants was considered appropriate for exploratory qualitative research studies.

Inclusion Criteria

- Post-RN BScN graduates of 2015 working in public and private hospitals in Karachi, Pakistan.
- Participants who were proficient in speaking either Urdu or English.

Data Collection

Data was collected through in-depth semi-structured interviews which focused on the participants' experiences about the post-RN BScN program. The questions were asked through a semi-structured interview guide using probes to obtain additional information. Each interview lasted for almost 20 to 30 minutes.

During the interview, field notes were taken to note the non-verbal cues of the study participants. Each interview was audio-recorded, transcribed and translated in English, coded and saved on a password-protected personal computer and a copy was kept in another data storage device as a backup.[8] The transcription of the interviews was cross-checked, also, the recordings of the interviews were played and listened to several times to ensure the accuracy of the data with the help of a linguistic expert.

Data Analysis

Data analysis was performed following the Creswell's[8] guidelines of qualitative data analysis. Firstly, the interviews were transcribed, and the material was scanned and catalogued. Then, it was typed up and organized properly. Secondly, each transcription was repeatedly read for the purpose of the accuracy of the data and the transcript was matched with the audio recording. The transcription was read carefully, word by word, and every effort was made to understand the latent message in order to maintain the accuracy of the data.8 Thirdly, the related data was then coded into a separate table with reference to the transcriptions of the interview. It involved separating sentences (or paragraphs) into categories and labelling those categories with the original verbose of the participant. The related data was then encoded into a separate table with reference to the transcriptions of the interview. After this, similar statements were grouped and

emerged as categories. Lastly, these categories were then grouped to form holistic themes.

Rigor of the Study

Rigor in this study was ensured following Lincolin and Guba's criteria of trustworthiness. Their criteria of trustworthiness include credibility, dependability, confirmability and transferability.[9]

The credibility of the data was maintained through the audio recording and verbatim transcription, member checking, reflexive journaling, and notes taking during the interviews. The credibility was ensured through the prolonged interaction of the interviewer with the study participants. Dependability was enhanced by careful documentation of the research process at every stage. Confirmability of the study was ensured by debriefing and review of the research process and research findings with the research committee members. Transferability was maintained through the detailed and clear description of the research process. The detailed and clear description of the research process also ensures the authenticity of the study.

Ethical Considerations

The ethical procedure was followed with ethical approval from the Ethical Review Committee (ERC), and permission letters from the institution for data collection. Secondly, the confidentiality and anonymity of the participants was ensured.

Results

The analysis of data from the semi-structured interviews by the participants led to several categories from which three themes emerged (Figure 1). These themes include curriculum implementation, the infrastructure of the institution, and administrative issues.

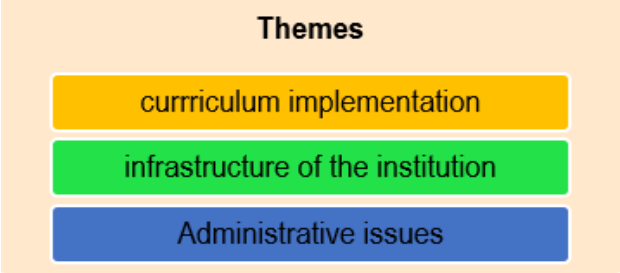

Figure 1: Themes emerged from the data

Table 1: Themes and Categories from the findings of the participants

Themes			
Categories	Curriculum Implementation	Infrastructure of the Institution	Administrative Issues
	• Integration of theoretical knowledge into clinical practice • Course Content • Competence of the Faculty • Teaching and Learning Resources	• Infrastructure of the library • Infrastructure of the classroom	• Extended Semester and Delay in the award of the degree • Complaint system • Monitoring system

Theme 1: Curriculum Implementation

Curriculum implementation emerged as a major theme in the findings with the following categories: integration of theoretical knowledge and clinical practice, coarse content, orientation to the semester, faculty competence, and teaching/ learning resources.

Integration of Theoretical Knowledge into Clinical Practice

Most of the participants expressed that they were not able to integrate theory with practice, which they felt was a big gap in their program. A study participant from the private sector remarked, **"***Whatever we learned in class, we could not apply in the clinical area.*" P-10. Similarly, another study participant from another institution reported, "*We had theoretical classes five days a week. We had a few hours of clinical practice in our schedule per week. We could not practice skills as there was no equipment on which to learn the clinical skills."* P-12.

Course Content

A few of the study participants shared their concerns about the course content. A participant said, "*There must be a standardized curriculum of post-RN BScN program prescribed by the PNC for all nursing institutions rather than being provided by affiliated universities" P-11.*

The participants further expressed that the curriculum should contain courses such as Pharmacology, English and Bioethics as these are important for nurses in order to provide competent nursing care. Also, courses such as biostatistics and research should be taught by the nursing faculty rather than the non-nursing faculty.

One of the study participants from the public sector expressed, "*We did not learn pharmacology as a course, as it was not included in our BSc N curriculum." P-* 05.

Besides, the core courses, one participant from another institution also had suggestions about the improvement of the English course, and said, *"English skills of the nursing students should be improved, as there was less focus on improving English skills*" P-03. A participant from the public sector further suggested, "*Biostatistics and research should be taught by nursing faculty. The non-nursing faculty of biostatistics and biochemistry did not teach us effectively"* P-06.

Competence of the Faculty

This category reflects the experiences of the study participants regarding the competencies of the faculty members who were teaching in the post-RN BScN program.

The study participants also commented on the teaching/learning methodologies and said, "*Group discussions and class participation were the main teaching strategies that were encouraged by faculty members*" P-04. While the study participants from one institution reported that their experiences of the teaching skills of the faculty were unsatisfactory. "*Teaching/ learning strategies were mainly presentations and self-directed learning without the guidance of teachers"* P- 03. Regarding the knowledge and skills of the faculty, there were almost negative views by the study participants, *"Mostly, teachers were not even aware of the content of the slides and were not competent enough to deliver" P-06.* Moreover, participants also shared their experiences about the qualification of the faculty from the perspective of their competencies. One of the study participants said, "*The faculty members with Masters of Science in nursing degrees were more competent and helped us to improve our knowledge and skills.*" P-01. A study participant from the private sector suggested, "*post-RN BScN program should be taught by experienced and master prepared teachers*" P-07.

Study participants discussed issues of irregularity in classes and reported the careless behavior of faculty in the sense of teaching. A study participant complained, *"The teachers did not take classes according to schedule. The faculty did not provide guidance; they avoided clarifying our confusion regarding the taught material. There was no feedback by the faculty to the students for any improvement"* P-07.

Teaching and Learning Resources

The study participants also shared their concerns about the availability of teaching and learning resources. A participant from the public sector remarked, "*There was an insufficient number of teachers as compared to the subjects taught per semester.*" P-05. Another participant from the private sector also commented, *"Shortage of faculty was common in our institution. There were few teachers who were overburdened with many subjects"* P-11.

Inaccessibility to the internet was another issue reported. A study participant from the public sector remarked, "*There was no internet facility for the students. Students always brought their own internet devices*" P-06. Most of the study participants shared their experiences about computer access, "*There were 10 computers for sixty students of the two batches of post-RN BScN program of year one and two; in addition, most of the time the computers remained turned off, and it was difficult for us to do without computers in the computer lab*" P-05. However, one of the study participants from the public sector expressed satisfaction by saying, "*Computers were updated and were sufficient for students. The time was monitored strictly to provide a chance to all the students*" P-01. The study participants from the same institute appreciated that they had accessibility to a library equipped with updated books and journals or magazines, and said, *"The library facility was available, with updated books and journals. We had access to current books and nursing magazines in the library,"* P-01. Only one participant, from one public sector institution, responded positively about the availability of the multimedia and printing facilities. The study participant from the public sector said, *"Multimedia and printing facilities are easily available in our institution"* P-01.

Theme 2: Infrastructure of the Institution

Study participants also shared their experiences about the infrastructure of the institution which emerged as a theme.

Infrastructure of the library

The infrastructure of the library was also a major issue. One of the study participants from the public sector said, "*The library was cramped and non-spacious. The environment of the library was also very congested and hot."* P-05.

Infrastructure of the classroom

Regarding the infrastructure of the classroom, the study participants from the public sector shared positive experiences about the infrastructure of the classrooms, and said, "*The classroom was air-conditioned and was appropriate in size and spaces. The rooms were well ventilated, with enough chairs available for the students*" P 01. Similarly, a study participant from the private sector said, "*The classrooms were congested and could not accommodate all the students, as there were insufficient numbers of classrooms in our institution.*" P-11.

Theme 3: Administrative Issues

Administrative issues included the categories, such as extended duration of the semester and delay in award of the degrees, complaint systems, and attendance of the nursing students.

Extended Semester and Delay in the Award of the Degree

Most of the study participants commented on the delay in semesters. A study participant expressed, "*The sessions started five months late due to improper management and lack of coordination between the institution and the affiliated university"* P -02. Likewise, a participant from the private sector said, "*The degree was awarded four months later than the expected time*" P-08. Another study participant complained about the delayed announcements of the results of the semesters. A study participant said, "*The announcement of the result was delayed usually, and the delay was due to the lengthy process and lack of coordination between the university and affiliated institution*" P-10.

Complaint System

Most of the study participants had the same grievances about the disorganized complaint system in their institutions. A study participant from the public sector said, "*Complaints were not addressed regarding infrastructure, teaching and learning resources and attitude of the faculty by our administration*" P-01.

Monitoring System

Mostly, study participants from the private sector shared their experiences about the absenteeism of students and the monitoring system during the semester. A study participant said, *"Absence of students was rampant. Students appeared just only during the final days of the semester to appear in the exams. There was no proper monitoring system*" P-07.

Discussion

Curriculum Implementation

Curriculum implementation was reported to be the major area of the post-RN BScN program in which participants shared their experiences regarding theoretical integration into clinical practice, The participants shared their positive experiences from one public sector institution about their clinical experiences where they were able to apply the theoretical knowledge into clinical practice; while experiences of the study participants from one public and two private sector institutions were opposite, as there was a lack of application of theoretical knowledge into clinical practice. Most of the students reported that they could not find an opportunity to apply theoretical knowledge to clinical practice.[10,11] The above studies reported that students' clinical experience was inadequate; therefore, their learning was compromised.

Participants also commented that pharmacology and bioethics were not taught and may be included in their curriculum. In addition, participants expressed that the English faculty did not focus on their English language improvement. These findings were not found in the literature review.

The study participants reported that the curriculum of the program was provided by the university to which the institutions were affiliated. As there was no standard curriculum for the post-RN BScN program provided by the PNC. Literature suggests that curriculum provides academic rigor and quality assurance.[12] Also, the study participants from one of the public sector institutions, situated in a university had positive experiences about the competence of the faculty while the rest of the three institutions had unsatisfactory experiences The study participants who had positive experiences about the

master prepared faculty which was competent enough and delivered better. This finding is similar to a study in which nursing and midwifery students from State University in Turkey strongly supported the findings that nursing faculty members who teach subjects should be well qualified and properly trained.[13]

Bachelors qualified faculty members were considered as under-qualified due to having insufficient knowledge and inadequate teaching skills. Participants were concerned about the teaching-learning strategies used by faculty at their institution, as they were mainly depending on the students instead of preparing and delivering the lectures themselves. Furthermore, participants reported a weak role of faculty in facilitating their learning as there was a lack of feedback and guidance for the students' improvement. Faculty competency for teaching the assigned course was also a concern that often resulted in receiving unsatisfactory answers to the questions that arose during class; which often showed that the faculty was unprepared for teaching in the class. This is similar to the findings in the existing literature have reported in their study that the most serious factor related to students' dissatisfaction was the inadequate levels of knowledge of the nursing faculty.[14] Results of a study conducted on college students in Turkey corroborated with the existing findings that students were not satisfied with the performance of the nursing faculty members, as they were unprepared for the topics of the course to be taught, and gave unsatisfactory answers to students' questions during lectures, and utilized ineffective teaching methodologies during the delivery of lectures.[14]

The study participants also commented on learning resources such as the shortage of resources as a weakness during their undergraduate program, while the participants from one of the public sector institutions considered the availability of the resources in their institutions as the strength of the program. The shortage of faculty was commonly experienced by one public and two private sector institutions. The faculty was seen to be overburdened with too many courses; therefore, they responded unsatisfactorily to the questions asked by students and could not meet the learning requirements of the students. The World Health Organization reported that a shortage of faculty is a major challenge.[15]

The study participants from one public sector institution considered the availability of the educational and technological resources as a strength of their program, whereas participants' comments, from one public and two private sector institutions, were not satisfied with technological resources Therefore, participants were not adequately facilitated during their study program due to deficiency of the resources.

A study found that a pleasant and conducive physical environment of the school, such as a new building, with a properly ventilated environment, increased the outcomes of the students' performance.[16] There are several studies that validate the current findings as reported by the students about infrastructure.[11, 16-18]

Infrastructure of the Institution

The study participants expressed that the infrastructure of their institutions affected their learning. The experiences of the participants from the public sector institutions regarding the space and number of the classrooms were positive, whereas the experiences of participants from private sector institutions were negative as insufficient numbers, limited space in the classrooms and congested libraries were major issues. These classrooms were congested and could not accommodate a large number of students. And improper infrastructure and location, which disturbed the concentration of the students. The findings of the current study were similar to the findings of several studies in which students reported that they found the classrooms and their sizes inadequate for the study: and the basic needs of infrastructure as insufficient.[11]

Administrative Issues

Exploration of nurses' experiences about the administrative issues revealed new findings in this research study, which have not been reported in the reviewed literature so far. These administrative issues included the extension in the duration of the semester for several months without following the schedule prescribed in the curriculum and delays in the issuance of the degree. These issues caused frustration to the students as they lost several job opportunities because of these delays.

Another finding was reported that there was an improper and disorganized complaint system for the students in both the private and public sectors and

therefore, their complaints regarding administrative and educational issues remained unaddressed.

The finding about the unfair practices also surfaced in the experiences of the study participants from the private sector. Unfair practices were observed by the faculty members such as favoritism and discrimination in marking criteria. Another unique finding was reported that students were given admission during the semester in the post-RN BSc N program because of no specific admission criteria. Thus, this indicated a flaw in the admission process.

A major finding was observed through the experiences of the study participants that the main campus of the university provided a positive learning environment, while participants from one public sector and two private sector institutions, which were affiliated with a university but located outside, had unsatisfactory experiences about the program. This finding was unique to the study, one not found in the literature.

Strengths

1. As the study is, apparently, the first of its kind, additional similar studies need to be done in Pakistan. Results of this study revealed new information regarding administrative issues, such as poor monitoring of the students' attendance and regularity in the class. Additionally, semester delays and prolonged duration of the degree program were also reported by the study participants.
2. Poor implementation of the nursing curriculum during the undergraduate program of the post-RN BScN program was also highlighted by the study participants as a major flaw in the program, which was not identified earlier.

Limitation

1. The study was conducted only on students' experiences. This study could be strengthened by obtaining faculty, administrative staff and other stakeholders' perspectives to gain in-depth knowledge of the program.
2. The reluctance of the heads of many private nursing institutions in giving permission to provide contacts for the study participants.
3. Few nursing institutions were selected for study in Karachi, while there are more than twenty nursing institutions in Karachi that conduct post-RN BScN program.

Implication

This study highlights the several implications for stakeholders in nursing as well as the health profession.

1. This study has provided a guideline for improving the competencies of the faculty members in nursing education. Therefore, the PNC will have to monitor and enhance the required competencies of faculty members and their qualifications for teaching in the post-RN BScN program.
2. The findings of this study will help the Pakistan Nursing Council in making policy by providing guidelines for reviewing, revising and implementing the standard undergraduate curriculum for the post-RN BScN program.

Recommendation

Recommendations are provided based on the analysis of findings. It is recommended that:

- Monitoring quality assurance measures should be taken for the improvement of the program by the PNC, and the HEC.
- MSc N prepared faculty should teach the post-RN BScN program.
- Attendance and regularity of the nursing students should be monitored.
- Similar research could be conducted to obtain perspectives of faculty members, management of the institutions, and other stakeholders.

Conclusion

This study is the first of its kind in Pakistan, which explored the experiences of the under graduated study participants regarding the post-RN BScN program, in both public and private sector institutions in Karachi, Pakistan. The study findings indicated that nursing institutions are still not well equipped with highly qualified faculty, appropriate technological and educational resources, appropriate administrative support and effective academic program. There is also a need for appropriate measures, such as integration of theoretical knowledge with clinical practice and modification in the curriculum regarding a few courses. Therefore, all nursing institutions offering the

post-RN BScN program should review their policies as per recommendations and seek ways to improve the weak areas identified in the study.

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ORIGINAL ARTICLE

Surgical outcome of pediatric patients with symptomatic tethered cord syndrome at a tertiary care hospital

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Author`s Contribution

[1] *Conceptualization of study and writing*
[2] *Data analysis*
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[4, 5, 6] *Collection of data*

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A B S T R A C T

Introduction: Patients with tethered cord syndrome become symptomatic during the period of their growth spurt. Apart from progressive foot and spinal deformities, patients also develop motor deficits and bladder and bowel dysfunction. Early diagnosis and adequate release of the tethered cord are indispensable to successful management.

Objectives: To study the trends in the neurological outcome after surgical treatment of cord tethering in pediatric population.

Methodology: Study was carried out from January 2018 to December 2019 at neurosurgery department, Fauji Foundation Hospital Rawalpindi. Thirty-five patients were included in the study who fulfilled the inclusion criteria.

Results: The average age of the patients at the time of the intervention was 11 years. There were 21 females (60.0%) and 14 males (40.0%). The distribution of neurological status improvement tells improvement in back pain in 28 patients (80%), improvement in motor function in 14 patients (40%), and improvement in urinary incontinence in 7 patients (20%).

Conclusion: This study concludes that back ache improves significantly after surgery while urinary incontinence is the least benefited symptom. Untethering along with the rehabilitation also helps majority of the patients with motor deficit. The ratio of symptomatic relief was best for backache and motor function and then improvement in the urinary control.

Keywords: *Backache, Motor deficit, Neurological outcome, Tethered cord syndrome*

Introduction

Tethered cord is a disorder which refers to the hitching of the spinal cord to the structures within the spine such as dura, scar tissue, a bony spur or a lipoma of the cord.[1, 2] If it is related to spinal cord dysplasia, it is classified as primary, and if it develops after surgery on the back, it is classified as secondary.[3] Primary tethering is usually from an inelastic short, thick filum which is tethering the cord caudal end as a short & thickened filum terminal.[4] The secondary tethering is induced by scarring after repair of a spinal meningocele.[5] Adhesions cause traction on the spinal cord during truncal movements resulting into aggravation of symptoms of the tethered cord syndrome.[6]

Patients usually present with the symptoms of backache, gait difficulty, muscle atrophy, sensory deficit and bladder dysfunction.[7] Cutaneous findings like hypertrichosis, subcutaneous lipoma, hemangiomatous skin, dermal sinus, are present in the spina bifida occulta.[8] Orthopedic abnormalities are also present like foot arches, scoliosis and kyphosis.[9] Radiographically, there is a profound conus medullaris and thick filum terminale.[10] Preoperative cystometrogram is strongly recommended especially if the patient seems incontinent.[11] Electrophysiologic studies are also helpful in the early detection of subtle symptomatic cord tethering.[12]

Aim of the surgery is to prevent the progression of the deficits and relief from the pain.[13] Early is the surgery, better are the results.[14, 15] The thickened filum terminal is identified and transected in primary tethered cord syndrome to relieve the symptoms.[16] There are high chances of favorable outcome in primary tethered cord syndrome.[17, 18] Goal of the surgery is to excise the sac and repair the dura in myelomeningoceles and lipomyelomeningoceles.[19] There is a risk of re-tethering in these patients due to scar formation and adhesions.[20] Symptoms of re-tethering do occur during growth spurt.[21] Multiple untethering surgeries are often required in such patients.[22] Pain was the most benefited symptom after surgery.[23] Motor deficit also improved in significant number of patients after six months of vigorous physical therapy. [24] Urinary symptoms were the least to recover.[25]

Purpose of our study is to highlight the trends in the neurological outcome after surgical treatment of tethered cord syndrome patients. Even motor deficits have favorable outcome but urinary incontinence leaves its mark permanently. Lifelong indwelling urinary catheter is not without complications and such patients need to learn and act the technique of intermittent self-catheterization for the rest of their lives.

Methodology

This prospective study, that comprised of thirty-five patients, was conducted at Fauji Foundation Hospital in the department of Neurosurgery, Rawalpindi from January 2018 to December 2019.Only those patients were included in the study who were symptomatic and there was no previous surgical history for tethered cord syndrome. Asymptomatic patients were excluded from the study. Non probability purposive technique was used in sampling. Patients were enrolled from neurosurgery department of Fauji foundation hospital Rawalpindi. The detailed history was taken and thorough central nervous system examination was performed to assess the preoperative pain and neurological status of the patients. Medical research council (MRC) grading (Table 1) was used for motor functions of the patients and visual analogue scale (VAS) was used for pain assessment (Figure 1). After preoperative assessment, informed consent was taken for inclusion in study. Final outcome was assessed at 06 months of follow up though patients were appraised and rehabilitated every month. Follow up was ensured through telephone contact. The data was collected by the researcher consultant himself on preformed proforma and result was compiled. All data was interpreted with SPSS version 14.0. Post stratification chi square test was applied taking p-value (≤0.05) as statistically significant.

Table 1: MRC grading of motor function

Muscle Grade	Observation
0	No contraction
1	Ficker or trace contraction
2	Active movement with gravity eliminated
3	Active movement against gravity
4	Active movement against gravity and resistance
5	Normal power

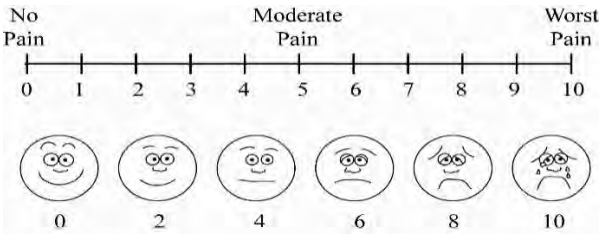

Figure 1: Visual analogue score:

Results

Mean age of the patients was 11 years. There were 10 (28.5%) patients in the age range of 07 –09 years, 15 (42.8%) patients in the age range of 10 –12 years, 10 (28.5%) patients in the age range of 13 –15 years (Table 2). In the distribution of patients by gender, there were 21 (60.0%) female and 14 (40.0%) male patients (Table 3).

At preoperative visit there were 28 (80%) patients who had severe back pain. The final outcome of pain control was assessed at 06 months of the follow up and it was only mild in nature in 28 (80%) patients. At preoperative visit there were 28 (24.0%) patients with moderate to severe motor deficits and after six months of surgery and vigorous physical therapy this percentage fell to 20% (Table 4).

Table 2: Distribution of patients by age (n = 35)

Age (Years)	No. of Patients	Percentage
07 – 09	10	28.5
10 – 12	15	42.8
13 – 15	10	28.5

Table 3: Distribution of patients by Sex (n = 35)

Sex	No. of Patients	Percentage
Male	21	60.0
Female	14	40.0
Total	35	100.0

Table 4: Comparison of pain

Back pain	Preoperative	Postoperative	Preoperative				Postoperative			
Mild	0	28(80%)	T test	Sig	95% CI		T Test	Sig	95% CI	
					Lower	Upper	15.65	.000	Lower	Upper
Moderate	07 (20%)	07(20%)	33.00	.000	2.58	2.92			1.02	1.32

Table 5: preoperative and postoperative motor function (n = 35).

Motor deficit	Preoperative	Postoperative (06 months)	Chi Square	P-Value
Severe (MRC 0-1)	07	02	25.22	0.000
Moderate (MRC 2-3)	21	05		
Mild (MRC 4-5)	07	28		

*0.05% level of significance.

Table 6: Distribution of patients

Urinary incontinence	Preoperative	Postoperative	Chi Square	P-Value
Yes	35 (100%)	28(80%)	7.778	0.005
No	0	07(20%)		

*0.05 level of significance

Table 7: Results at 6 months of follow up (Chi square was applied on all parameters collectively)

Neurological status	Yes	No	Chi Square	P-Value
Improvement in pain	28(80%)	7(20%)	26.25	0.000
Improvement in motor	14(40%)	21(60%)		
Improvement in urinary incontinence	07(20%)	28(80%)		

*0.05 level of significance

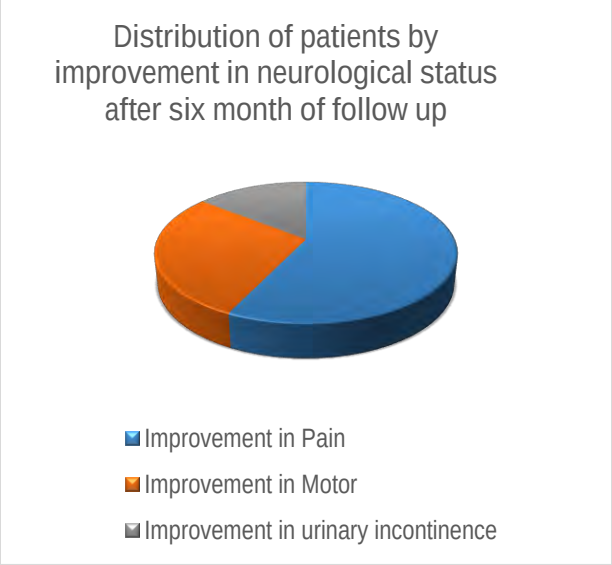

Figure 2: Distribution of patients by improvement in neurological status after six months of follow up

At preoperative visit there were 35 (100%) patients who had urinary incontinence. final outcome of the urinary control was assessed at 06 months of follow up (Table 5). Only 7 (20%) patients got relief from the incontinence but 28 (80%) patients had still urinary incontinence (Table 6). These patients were advised intermittent self-catheterization. In the distribution of improvement in neurological status, there were 28 (80%) patients had improvement in back pain, 14 (40%) patients had improvement in motor function and 07 (20%) patients had improvement in urinary incontinence (Table 7; Figure 2).

Discussion

Tethered cord syndrome is a set of symptoms consisting of backache, weakness in legs, gait abnormality and inability to control urine.[1] It occurs because spinal cord is anchored with the surrounding structures like dura, lipoma, tumor, scar tissue and adhesions.[2] Tethering causes abnormal stretch on the distal cord resulting into aggravation of symptoms.[3] These symptoms abruptly appear during growth spurt phase of the children.[4] Tethering of the cord is always associated with spina bifida in children.[5] Tethering occurs secondarily due to the scar of the myelomeningocele excision in spina bifida apperta.[6] Spina bifida occulta is associated with diastematomyelia, lipoma of the cord, thickened filum terminale and dermal sinus tract.[7]

Children usually present with the obvious mass on the back, subcutaneous swelling, hyperpigmentation of the skin, hypertrichosis or any dimple on the back.[8] common complaints are backache aggravated by movements and relieved by rest.[9] Other symptoms are pain and numbness in the legs, gait abnormalities, scoliosis and poor bladder control.[10] These symptoms increase in their intensity as child grows.[11] Magnetic resonance imaging is the gold standard investigation to evaluate the tethering of the cord.[12] Urodynamic studies help to assess the bladder control.[13]

Prompt untethering of the cord is carried out as the symptoms of tethering appear.[14] Surgery varies from section of the tight filum terminal to the exploration of the previous surgical scar and untethering of the cord.[15] Dura is closed while making sure that there are no adhesions of the cord around it.[16] post-operative recoveries are favorable if preoperative motor deficit is mild.[17] Vigorous physical therapy and rehabilitation help in improving the motor abilities and urinary control.[18-20] Though there are less chances of post-operative complications, still patient may develop worsening of the motor deficits and poor urinary control.[21-23]

Khan MA conducted a study in which they studied the outcome in children as well adult patients with tethered cord syndrome. Their study showed improvement in backache in 70% of the patients while in our study 80% of the patients got relief from the backache. Their patients had a better outcome as far as urinary symptoms were concerned.[21] Their study exhibited improvement in urinary symptoms in 34% of the patients while it was 20% in our study.

Seki T studied the effectiveness of prophylactic surgery in asymptomatic tethered cord syndrome. Mean age at the time of surgery was 26 months. Follow up at 94 months and 177 months showed increasing neurological deficit in 14% of the patients.[22] This study is the evidence that repeated release surgeries are needed to untether the cord in pediatric population. Sofuoglu OE were interested to find out the surgical outcome in adults with tethered cord syndrome. Their study showed 60.9% improvement in backache while it was 80% in our study. Urological symptoms improved in 34.8% of the patients while in our study this percentage was 20%.[23] Garg K included 24 patients aged ≥16 years who underwent release surgery for tethered cord syndrome. They planned surgery as early as possible after the radiological evidence of tethering. Their results showed 83.3% improvement in backache comparable to our study.[24] Urological symptoms improved in 50% of their patients which is a very promising outcome. Patients presented late in our study and showed urological improvement only in 20% of the patients.[25]

Above discussion emphasizes that backache improves significantly after the surgery. Early recognition of the symptoms of tethering of the cord is very important, especially, the urinary incontinence. If patients are presenting late with months and years of history of incontinence then even untethering the cord may not be fruitful. Most of the studies are showing improvement in backache with a good percentage of 70 to 80% but improvement in urological symptoms is from 20 to 35%. Motor deficits also improve with Aggressive physical therapy and rehabilitation. Multiple release surgeries are considered with recurrent tethered cord syndromes. Early recognition of the symptoms and prompt action carries the good outcome.

Conclusion

It is concluded that early recognition of the symptoms of tethered cord syndrome and prompt release of the cord is advised to achieve better results. Tethered cord syndrome patients who present with backache have good results post operatively than those who present with urinary incontinence.

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ORIGINAL ARTICLE

Restless leg syndrome (RLS) in end stage renal disease

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[1] Organized manuscript, Sample Collection, Writing
[2] Original Idea, Sample Collection
[3] Statistical analyses, Final drafting
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A B S T R A C T

Introduction: End stage Renal Disease refers to permanent, irreversible loss of renal functions due to variety of underlying disorders. The condition is quite prevalent in our part of the world. The occurrence of Restless legs syndrome (RLS) in such patients, especially those on hemodialysis, surpasses that in the general population. RLS significantly blemishes their quality of life. The syndrome has subtle and nonspecific symptoms which are commonly neglected in dialysis centers. The study aims to determine the frequency of restless leg syndrome in patients of advanced renal disease.

Methodology: A Cross Sectional Study conducted at Department of Medicine, Mayo Hospital Lahore from Dec 2018 to June 2019 (6 months). Patients of 20-80 years of age and of both genders, diagnosed as ESRD for ≥3 months were enrolled and evaluated for RLS. The condition was diagnosed as per International RLS Study Group (IRLSSG) criteria. The demographic data (age, gender, BMI and duration of symptoms) was recorded. History of smoking, alcohol use and chronicity of disease was also noted. Data was analyzed with SPSS v25.0. Mean and percentages were calculated. Chi-Square test was applied. p-value of ≤0.05 was taken as significant.

Results: Total of 75 patients were enrolled. Males were 54 (72.0%) while 21 (28.0%) were females. Mean age was 47.3±13.1(22-73) years. RLS was observed in 29 (38.7%) cases. Age, gender, duration of illness, smoking and alcohol consumption had no significant association with RLS (p values 0.642, 0.669, 0.208, 0.245, 0.565, 0.745) respectively.

Conclusion: Restless legs syndrome is frequently encountered condition in ESRD patients.

Keywords: *End Stage Renal Disease, Restless Legs Syndrome*

Introduction

End-stage renal disease (ESRD) refers to advanced stage of chronic renal failure(CRF), where kidneys can no longer function on their own. Such patients must receive dialysis or kidney transplantation for survival. Majority of patients remain on hemodialysis for next many years as transplantation is not affordable or possible for most of the cases. Although CRF is more commonly encountered in elderly patients but younger population is also frequently diagnosed as CRF due to various underlying conditions. Global estimate of ESRD patients needing renal replacement therapy is between 4.902 and 7.083 million.[1] Almost 21.2% of Pakistani adult population suffers from CKD.[2] At advanced age of ≥ 50 years' incidence is 43.6% whereas younger than 30 years have almost 10.5% incidence.[3] Variety of underlying diseases are responsible for ESRD. Diabetes, hypertension, glomerulonephritis and renal stones are identified as prevalent predisposing conditions.[2, 3] Anemia, metabolic bone disease, heart failure, fluid and electrolyte imbalance and neurological disorders are potential implications of ESRD.[4, 5] Restless

leg syndrome (RLS) / Willis Ekbom disease, is quite commonly encountered in ESRD patients undergoing hemodialysis.[6] It is a condition that causes an uncontrollable urge to move the legs, usually because of an uncomfortable sensation. Diagnosis is made, following revised International Restless Leg Syndrome Study Group (IRLSSG) diagnostic criteria (2012).[7] It can present as a primary, isolated neurological disorder or can be seen, secondary to certain diseases or conditions i.e., pregnancy, iron deficiency, kidney failure, some types of medication, sleep deprivation, Parkinson's Disease, peripheral neuropathy and varicose veins.[7, 8] Due to its subtle presentation, RLS goes unnoticed in many cases. Zhenchuan with coworkers reported that ESRD patients undergoing hemodialysis can have RLS up to 25-50%.[8]

The prevalence of RLS in ESRD varies over the globe. Literature reports 19.4% in Saudi Arabia[9] ,25.3% in Taiwan[10] and 38.6- 64.8% in Pakistan.[11, 12] The sensations of RLS usually are worse during inactivity and often disturb sleep, leading to chronic sleep deprivation and stress. Approximately 85% of patients with RLS have periodic movements of sleep.[12] Treatment of the condition is most effective in secondary cases. The drug therapy includes dopaminergic agents, benzodiazepines, opioids, anticonvulsants and iron supplements.[7, 12] Renal transplantation cures the condition in ESRD patients.[11]

Mortality of ESRD patients with or without RLS remains the same.[12] Untreated RLS increases risk for development and aggravation of hypertension, learning and memory difficulties.[11] Aim of our study was to determine the frequency of restless leg syndrome in patients of end-stage renal disease.

Methodology

This cross sectional study was conducted in Department of Medicine, Mayo Hospital Lahore over a period of 6 months i.e. (Dec 2018 – June 2019). Total of 75 cases were enrolled in the study (95% confidence level with 9% margin of error and taking expected percentage of restless leg syndrome in patients with ESRD as 19.4%.[8] Patients of age 20-80 years who were suffering from ESRD for at least ≥3 months (as per operational definition) were included in the study.[13] Patients having Pregnancy, Parkinson's disease, Peripheral neuropathy, Periodic leg movement of sleep and seizure disorder were excluded. After taking informed consent, demographic data (age, gender, BMI and duration of symptoms), History of smoking and alcohol use was recorded on a self-designed proforma. Patients were evaluated clinically for restless leg syndrome. If patient complained of irresistible urge to move the legs and/or arms, often associated with a sensation of pain, burning, pricking, tingling, numbness, or other unpleasant or unusual sensations, then restless leg syndrome was labeled (as per operational definition).[8] Data were entered and analyzed through SPSS v25.0. Mean and SD were calculated for quantitative variables like age, BMI and duration of ESRD. Frequency and percentage were calculated for qualitative variables i.e. gender and restless leg syndrome. Data were stratified for effect modifiers like age, gender, BMI smoking, alcohol use and duration of ESRD. Chi-Square test was applied to compare restless leg syndrome in stratified groups taking p-value ≤0.05 as significant.

Results

Total of 75 patients were enrolled. Males were 54 (72.0%) while 21 (28.0%) were females. Mean age (in years) at diagnosis was 47.3±13.1 (22 and 73). Patients between 20-40 years' age group were 28 (37.3%), while 33 (44.0%) and 14 (18.7%) were between 41-60 years and >60 age groups respectively. The 35 (46.7%) patients had normal weight while 15 (20.0%) cases were underweight. Overweight and obesity was seen in 19 (25.3%) and 6 (8.0%) cases respectively. The ESRD with <1-year duration was found in 25 (33.3%) cases while 24 (32.0%) and 26 (34.7%) had duration of disease 1-3 years and >3 years respectively. Among ESRD patients, 7 (9.3%) had alcohol consumption and 45 (60.0%) were smoker. RLS was observed in 29 (38.7%) patients of ESRD (Figure 1). The 10 (34.4%) males while19 (65.5%) females had RLS.

No significant difference among gender, age groups, smoking, BMI, usage of alcohol and duration of disease and RLS (p=0.642, 0.669, 0.208, 0.245, 0.565, 0.745 respectively) could be seen.

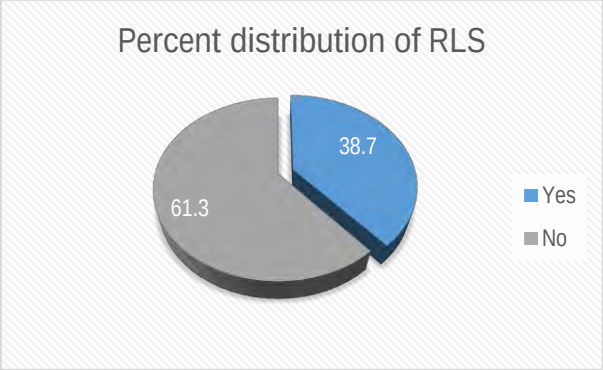

Figure 1: Percent distribution of restless legs syndrome (RLS)

Table 1: Association of RLS with various factors

Characteristics	RLS (f)	RLS(%)	P -value
Smoking	20/45	44.4	0.208
Alcohol consumption	2/7	28.7	0.565
Duration of Disease			
< 1 year	11/25	44	0.745
1-3 years	8/24	33.3	
>3 years	10/26	38.5	
Age group in years			
20-40	9/28	32.1	0.669
41-60	14/33	42.4	
>60	6/14	42.9	
Gender			
Male	20/54	37	0.642
Female	9/21	42.9	
Body mass index			
Underweight	4/15	26.7	0.598
Normal	13/35	37.14	
Overweight	9/19	47.36	
Obese	3/6	50	

Discussion

RLS is now recognized as a neurologic movement disorder which typically appears during inactivity, relieved with movement and worsens in sleep hours.[7, 13] RLS sufferers represent 2 to 3% of the general population.[14] Seyed Mohammad et al positively screened 1580 individuals for RLS with a reported prevalence rate of 60/1000.[14] Our cohort consisted of targeted (ESRD) population only. We found 38.7% of RLS in ESRD patients, all of them were on hemodialysis. Literature reports incidence of 13.3-36.7% [14-17] in various populations. Researches who used IRLSSG criteria for diagnosis of RLS also report wide range of positivity in results. Xiao and coworkers reported prevalence of RLS in ESRD as 20.44%.[21] Higher value in our population may be due to heterogeneity of the study populations and difference in diagnostic criteria. Simultaneous occurrence of iron deficiency anemia and inadequate hemodialysis might increase RLS in patients.[18-20] Increase in prevalence of RLS is reported with advancing age.[14] We found most cases around age of 60 years (42.9%). Mean age at presentation was 47.3% in our population, while Priya with coworkers found 50.7 years which is comparable.[23] Females are more commonly affected with RLS as compared to males (42.9 Vs 37%). Similar findings were observed by Xiao and coworkers.[21] Whereas Seyed and colleagues did not find any gender difference in their cohort.[14]

Multiple studies have been done to find out the associated risk factors which may have a role in development of RLS. It revealed in literature that smoking is associated with RLS whereas consumption of coffee and tea could not be related to development of RLS.[24] We did not find statistically significant association of alcohol consumption (p value 0.565) and smoking to RLS (p value 0.208) whereas literature reports significant association of RLS with alcohol consumption.[21]

Though 50% of our obese patients had RLS yet it was not statistically significant (p value 0.598). Niloufar with coworkers found BMI to be significantly associated with RLS.[24] The iron deficiency and other types of anemias as well as serum calcium level have all been linked to RLS but we were unable to get enough data on this.[22, 23]

Certain studies report that incidence of RLS increases with chronicity of the disease and HD but our results for <1 year and >3 years' disease duration were comparable without any statistical significance (p value 0.745).[8, 9, 24] Our study had few limitations like relatively small sample size. We could not gather information of anxiety depression, laboratory data like anemia and data on treatment of RLS. Further studies with large sample size are required to establish effective treatment of the condition which will improve suffering of these patients.

Conclusion

It is concluded that RLS is prevalent in patients with ESRD. Females are predisposed to develop RLS as compared to males.

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ORIGINAL ARTICLE

Frequency of asthenopia symptoms among tailors of Rawalpindi: A cross-sectional survey

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Author`s Contribution

[1] Conceptualization of study, data collection
[2] Drafting, analysis
[3] Data analysis
[4] Review the article critically
[5] Design drafting and analysis

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A B S T R A C T

Introduction: Textile experts perform extensive close labor in small, densely packed workstations, exposing themselves to a variety of ocular and vision-related issues.

Objectives: To find the frequency of asthenopic symptoms among tailors and to associate their asthenopia with their working environment profile which includes many factors such as lighting conditions, position blubs, working hours, working days, and taking breaks during work.

Methodology: This cross-sectional study was conducted over five months from October 2018 to February 2019 and it included 325 sewing professionals of garments (tailors) from the tailoring market of Rawalpindi. Study subjects were interviewed through a structured questionnaire that included demographic, working profiles, and symptoms of asthenopia. Data were analyzed by using SPSS version 21. The Chi-square test was used to check the association of dependent and independent variables.

Results: A total of 325 subjects were included in this study. In the current study total of 48% of the asthenopia is present in tailors. Almost every patient presented with more than one complaint. The most frequent asthenopic symptoms were headache 54.5% followed by watering of the eyes 44.6% and blurriness of vision 44.3%. A significant association was found between asthenopia and lighting conditions with a p-value of 0.01. The working days and spectacle-wearing were also significantly associated with asthenopia.

Conclusion: This study showed a relatively high frequency of asthenopia among subjects and it is strongly associated with the lighting conditions and working hours of the subjects.

Keywords: *Asthenopia, Sewing Professionals, Tailors, Visual discomfort, Refractive error*

Introduction

Asthenopia is a term that refers to a group of somatic or perceptual typically arise after using a computer, mobile phone, or near activities.[1] Visual discomfort symptoms such as decreased reading skills, light sensitivity, hazy vision, diplopia, eye strain, headache, and perceptual distortions are all indications of asthenopia.[2] Because these asthenopia symptoms can be severe enough to limit personal activities and possibly accelerate the development of age-related eye diseases, they have become a major public health concern.[3] Asthenopia frequently appears to be associated with activities requiring near vision or close work.

Sewing is the skill of repairing or attaching materials with stitches created with a needle and thread. Sewing specialists, often known as tailors, work on clothing, designs, and precise patterns, which all need a high level

of visual attention and mental concentration and are frequently a near-point task. In our country, tasks are typically conducted for long periods in small, densely packed workstations, exposing workers to a variety of vision-related issues because these professions are the source of income.[4] Due to poor working conditions, incorrect working posture, and excessive prolonged concentration by constant gazing at a stationary object with limited blinking of eyelids, these professionals are prone to a variety of ocular illnesses and vision impairments.[5] It has been noted that prolonged close viewing/tasks induce visual symptoms such as impaired vision or squinting, frequently losing place when reading, diplopia, and neck, shoulder, and back pain. Refractive error and binocular vision abnormalities can cause or intensify these symptoms.[6] The binocular vision anomalies and many asthenopia symptoms could be manifest due to the prolonged near tasks and activities thus the main aim of this study was to assess the frequency of asthenopia symptoms among tailors and to associate their asthenopia with their working environment profile which includes many factors such as lighting conditions, position blubs, working hours, working days and taking breaks during work.

Methodology

This study was conducted at the tailoring market of Rawalpindi. This cross-sectional study included only male respondents residing in Rawalpindi with the age of 15 to 60 years and working experience of at least 5 years. By using the non-probability consecutive sampling technique, data was collected over five months from October 2018 to February 2019, and data collection was done in the first two months of the study duration.

A structured questionnaire was used for data collection, the first part of the questionnaire collected information about the socio-demographics of the patients while the second part included questions regarding the working profile of the respondents such as working hours, working days, and the position of the bulb, and lighting condition. The third part contains questions regarding symptoms of asthenopia and their visual status. The respondents who had more than two symptoms would be considered as the asthenopia same criteria used in the previous study.[7] The questionnaire was written in the English language initially, but it was translated into the local language to ensure the understanding of the participants. Permission was taken from the Ethical review committee of Al-Shifa trust eye hospital before data collection. Moreover, verbal informed consent was also taken from every individual before they participated in this study. Face and content validity was checked by circulating it to experts in the field. All the data was collected by the primary researcher itself. The confidentiality of the patient's data was maintained and ethical values of research were properly considered and followed at every step of the study.

The responses in the questionnaire were recorded and analyzed using Statistical Package for social sciences (SPSS) version 21. The descriptive analysis was done on the categorical and continuous variables. Percentages and frequencies were reported for categorical variables, as well as mean and standard deviation was reported for continuous variables. The inferential analysis was done by applying the Chi-Square of independence to find the association between dependent and independent variables.

Results

A total of 325 participants were included in this study. All the respondents were male with a response rate of 100% and with a mean age of 31.5 years, ranging from 18 to 45 years. Out of the total majority of the respondents were married (215, 66.2%) having no education (127, 39.2%). The majority (289, 89%) of the respondent reported that they do not use any spectacles either for distance or near (Table 1).

Table 1: Socio-Demographic characteristic of the respondents (N=325)

Variable	Category	F	Percentage
Education Status	No Education	127	39.2
	Primary	89	27.4
	Secondary	90	27.7
	Higher	19	5.8
Marital Status	Married	215	66.2
	Unmarried	110	33.8
Monthly Income	10,000-15,000	142	43.7
	15,000,20,00	96	29.5
	>20,000	87	26.8
Spectacle Wear	Yes	36	11
	No	289	89

The majority of the respondents (157, 48.3%) reported that they work in moderate lighting conditions while the minimum (23, 7.1%) reported that they work in poor lighting conditions. Almost 60% of the respondents reported that they work for maximum hours of 10 to 12 on a maximum of six working days (Table 2).

Table 2: Working profile of the respondents (N=325)

Variables	Category	F	Percentage
Lighting Condition	Poor	23	7.1
	Moderate	157	48.3
	High	145	44.6
Position of the Bulb	Front	38	11.7
	Back	22	6.8
	Side (left/right)	33	10.2
	Up on roof	232	71.2
Working Hours	6-7	10	3.1
	8-10	89	27.4
	10-12	188	Every
	More than 12	38	11.7
Break during work	No break	181	55.7
	Often	132	41.5
	Every after 1 hour	9	2.8
Working Days	7 days	88	27.1
	6 days	205	63.1
	5 days	26	8.0
	Others	6	1.8

Headache (54.5%) was the most common asthenopic symptom found in the respondents followed by watering of the eye (44.6%), blurriness of vision (44.3%), and eye fatigue (43.1%). Almost 98% of the respondents reported that they don't experience double vision during their near work (Table 3).

There were significant associations found between the asthenopia and lightning conditions, spectacles wearers and refractive error having p-value of less than 0.05 (Table 4).

Table 3: Frequency of asthenopic symptoms among respondents N=325

Variables	Category	F	Percentage
Headache	Yes	177	54.5
	No	148	45.4
Eye fatigue	Yes	140	43.1
	No	185	56.9
Double vision	Yes	27	8.3
	No	298	91.7
Blurriness of vision	Yes	144	44.3
	No	181	55.7
Watering of eyes	Yes	145	44.6
	No	180	55.4
Eye strain	Yes	71	21.8
	No	254	78.2
Redness of eyes	Yes	68	20.9
	No	257	79.1
Difficulty tracking objects	Yes	56	17.2
	No	269	82.8
Burning sensation	Yes	76	23.4
	No	249	76.6

Total 156, 48% asthenopia were reported among tailors whereas 169, 52% were those having no asthenopia.

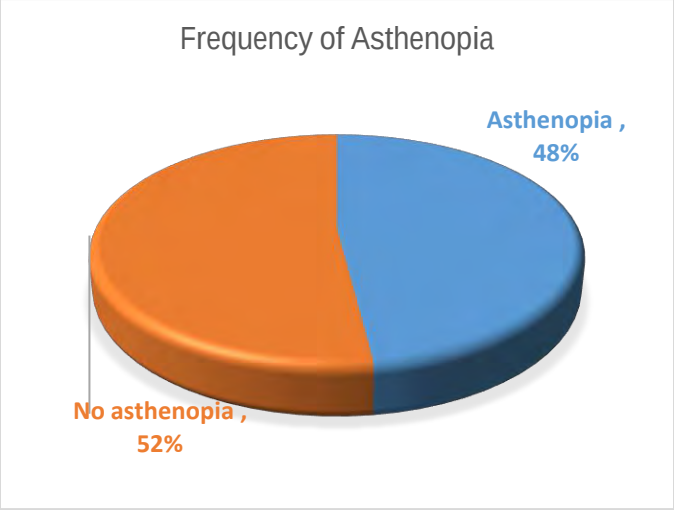

Figure 1: Frequency of asthenopia among tailors

Table 4: Association of asthenopia and working profile of the tailors

Variables	Categories	Asthenopia N (%)	No Asthenopia N (%)	P-value
Lightening condition	Poor	6 (2)	17 (5)	0.01
	Moderate	64 (20)	93 (29)	
	High	96 (29)	49 (15)	
Position of Bulb	Front	17 (5)	21 (7)	0.636
	Back	13 (4)	9 (3)	
	Side(right/left)	15 (5)	18 (5)	
	On the top	121 (37)	111 (34)	
Break	No break	87 (27)	94 (28)	0.196
	Often	76 (24)	59 (18)	
	At every 1 hour	3 (1)	6 (2)	
Working Hours	6-7 hours	3 (1)	7 (2)	0.482
	8-10 hours	49 (15)	40 (12)	
	10-12 hours	94 (29)	94 (29)	
	More than 12 hour	20 (6)	18 (6)	
Working Days	7 days	28 (9)	60 (19)	0.01
	6 days	122 (37)	83 (25)	
	5 days	15 (4.6)	16 (5)	
Spectacle Wear	No	157 (48)	134 (41)	0.002
	yes	9 (3)	25 (8)	
	Yes	17 (5)	35 (10)	

Discussion

The main objective of this study was to find the frequency of presenting clinical feature asthenopic symptoms among tailors who are sewing professional garments. The study was carried out at the tailoring market of Rawalpindi over six months from October 2018 to February 2019. This is the first study that addresses the asthenopic symptoms of this profession according to the best of our knowledge.

In the present study, only male tailors were targeted and a total of 48% of asthenopia was reported among tailors which is greater than the study conducted among sewing professionals where asthenopia was found to be 38.7%.[8] Similar studies conducted among jewelry workers showed that 65.22% were found to have symptoms like computer vision syndrome.[9] The study conducted in Swedish found 23.1% asthenopia among school children but they used different questionnaires.[10] Another study conducted in China stated that 57% of study subjects had asthenopia which means that asthenopia is more common among school children due to their excessive near work and tailors also have excessive near work which leads them to have asthenopic symptoms.[11] The scarcity of population-based studies, particularly on tailors, makes it difficult to compare our findings to those of other researchers. To put it another way, the absence of research on similar age ranges, the same population, the use of diverse criteria and outcomes, and the analysis of some professions with more exposure to close work make it difficult to compare the findings of this study with those of other similar studies.

In the present, study there is a strong association between the spectacle-wearing and asthenopia having a p-value of less than 0.05 and it is by the study conducted in an Australian population-based study with 6 to 16 years children, in which asthenopia is seven times more likely to be using spectacle than those who do not use glasses with the odds ratio of 7.1 95% CI (4.6–10.9).[12] Asthenopia symptoms are typically one of the criteria used by eye care specialists to prescribe glasses, this link could be related to reverse causation.

The present study showed that the most common symptoms of asthenopia were headache 54.3% followed by the blurriness of the vision 44.6%, the results are similar

to another study conducted in Pakistan which states that the most frequent asthenopic symptoms were headache 93% followed by blurred vision 90%.[13] Accommodation, convergence, and meiosis occur when near work is performed, causing extra-ocular muscles to contract for the respective movement, resulting in eyestrain. As a result, headache and eyeball ache become the most asthenopic symptom, accounting for 38.7% of cases, which is consistent with our findings.[14]

The current study showed a significant association between asthenopia and lighting conditions which means that poor light could exaggerate the asthenopic symptoms and working days are also found associated with asthenopia. In the modern era load work on the tailors. As a result of our findings, we believe that visual tiredness is becoming a rising public health concern among professionals who do a lot of close work. The high occurrence of asthenopia symptoms is most likely linked to a person's psychological condition, surroundings, health status, and dietary and lifestyle behaviors. As a result, regular eye exams, workplace safety requirements, and the use of adequate eye-protective equipment can help workers' eyesight and productivity.

Conclusion

It is concluded that physician satisfaction with laboratory services in public hospitals of AJK was very low, more than 50% of the patients showed dissatisfaction with the services. The main factors which affect the overall satisfaction of physicians with laboratory services were the absence of the assistance handbook, laboratory request form, and turnover time of the reports. So targeted strategies are needed to improve the overall quality of these services.

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ORIGINAL ARTICLE

Physician's satisfaction with clinical laboratory services of District Headquarter hospitals of Azad Jammu & Kashmir

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Author`s Contribution

[1] Conceptualization of study, data collection
[2] Drafting, analysis
[3] Data analysis
[4] Review the article critically
[5] Design drafting and analysis

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A B S T R A C T

Introduction: Laboratory services are critical to the quality of patient treatment. For proper patient management, clinical services and physician decisions are heavily reliant on laboratory test results. As a result, physician satisfaction with laboratory services is a critical indicator of service quality, emphasizing the importance of improving laboratory services to benefit patients.

Objectives: To determine physician satisfaction and factors affecting physician satisfaction with laboratory services in Azad Jammu & Kashmir (AJK).

Methodology: Data were collected in all the seven DHQs of AJK over three months. This cross-sectional study included all the practitioners and clinicians. Intern or undergraduate medical students in training programs along with other healthcare providers were excluded from this study. Data was collected through a structured questionnaire from (N=202) physicians using a non-probability convenient sampling technique. Chi-Square tests were used to determine the factors which showed a statistically significant relationship with outcome.

Results: A total (N=202) of respondents included in the study with an overall mean score of physician's satisfaction with clinical lab services was 38 ± 9.6 ranging from a minimum score of satisfaction 22 to a maximum of 56. A statistically significant association was found between the age of the Physicians, area of residence, and their level of education with a satisfaction level of lab services with the p-value= 0.013, 0.013, and 0.001respectively.

Conclusion: It is concluded that physician satisfaction with laboratory services in public hospitals of AJK was very low, more than 50% of the patients showed dissatisfaction with the services. The main factors which affect the overall satisfaction of physicians with laboratory services were the absence of the assistance handbook, laboratory request form, and turnover time of the reports.

Keywords: *Azad Jammu Kashmir, COVID-19, DHQ Hospital, Laboratory services, Physician satisfaction*

Introduction

Physician satisfaction is considered the most important and desired outcome of the healthcare system and it is directly related to the use of healthcare services.[1] Satisfaction of physicians is associated with different healthcare outcomes, including healthcare quality, patient satisfaction and adherence to treatments, and interpersonal aspects of patient care.[2-4] Physicians are considered the primary client of the laboratory services, and their satisfaction level with services is the key quality indicator in most quality assurance programs.[5] The client's (Physician, nurses) satisfaction with the laboratory services is the requirement for the certification by the

College of American Pathologists (CAP) and the joint commission on accreditation for healthcare organizations.[6] Hospital laboratories where confirmatory tests and investigative procedures are used to determine the patient's health are an essential component of the healthcare services as it greatly contributes to the diagnostic decision-making and patient health management.[7]

Laboratory services are one of the best indicators of the quality and quantity of the health care services in hospitals and incorporation of this indicator plays a massive role in quality improvement planning for services in the hospitals.[8] Provision quality of laboratory services is a challenging process that needs help from clients, clinical service providers, laboratory professionals, and other stakeholders. Physician's satisfaction with clinical laboratory services can be measured using standardized tools according to the prior studies. Quality and validity of the test results, staff coordination, accessibility and responsiveness of laboratory management, test menu availability, lab courier services and turnaround time (TAT), clinical report format, phlebotomy services, quality of laboratory results, accurate collection manual, and many more are the vital features could be inspected from the physician perspective and are used in many previous studies.[9, 10]

The discipline of laboratory medicine is evolving day by day. New reimbursement models, as well as new or improved electronic health records and laboratory information system, is being created and the number of laboratories available test continues to expand so assessment of important clinical parameters on regular basis is important for comparison of results over time and the evaluation of the efficacy of the instruments. A physician satisfaction survey in this regard helps to assess the limitation and efficiency of the laboratory instruments. The survey result should prompt the laboratory results and implement the plans through proper plans and improve the quality of services and contribute to the high-quality management. There is a dire lack of adequate data on this matter in Azad Jammu & Kashmir (AJK) to the best of the authors' knowledge, and the availability of this data can be vital for the health system strengthening in AJK. Hence, this study aims to assess physician satisfaction with laboratory services provided and factors associated with it at District Headquarters Hospitals (DHQ) of AJK.

Methodology

This study was conducted at District Headquarters hospitals (DHQ) of Azad Jammu & Kashmir (AJK). AJK is the liberated part of Jammu& Kashmir, situated in the north of Pakistan, and has a total area of 13,297 square kilometers.[11] It is divided into ten administrative districts but only seven of them have DHQ hospitals namely Neelum, Hattian Bala, Pallandari, Bagh, Kotli, Bhimber, and Mirpur.[12] These health facilities provide different medical, therapeutic, and investigative services to its catchment population of over 4.04 million.[13] A public hospital laboratory provides all basic (urine test, blood sugar test, blood pressure test), routine (blood complete picture), and advanced diagnostic tests (histopathology, microbiology, biochemical profile, lipid function, renal function).[14]

This cross-sectional study included all the practicing/on-duty general practitioners and clinicians from all departments in the hospital. Clinicians and general practitioners who were off-duty or who did not wish to participate in the study were not included. Intern or undergraduate medical students in training programs along with other healthcare providers (e.g., paramedical staff) were excluded from this study. By using a consecutive non-probability sampling technique, data was collected from the physician over three months from January to March 2020. Although initially the study was planned for a longer duration, we had to reduce it due to the start of the COVID-19 pandemic. The sample size was not predefined as we wanted to include all participants fulfilling the study criteria during the study duration. This will allow a more accurate analysis of the factors associated with physician satisfaction. A structured questionnaire was used for data collection which was based on similar studies published previously and was finalized after doing a pilot study in a similar setting which was not included in the study.[8, 15]

The outcome variable of the study was physician satisfaction with laboratory services which was measured on a 15-items scale. A 5-point Likert scale was used ranging from very dissatisfied to very satisfied, with the former having the lowest score (1) and the latter having the maximum score (5). The first part of the questionnaire collected information about the independent variables like

socio-demographics of the physician while the second part included questions the about satisfaction of the physician with three major sections which included statements on services, accessibility, and information provided by the laboratories. The questionnaire was written in the English language initially but it was translated into the local language to ensure comprehension of the participants.

Permission was also taken from the Ethical review committee of Al-Shifa trust eye hospital (reference no. ERC 47/AST-20) and the health ministry of the AJK government before data collection and also from the medical superintendent of every hospital. Moreover, verbal informed consent was also taken from every participant in this study. Face and content validity was checked by circulating it to experts in the field. Few questions were found redundant and unclear to interpret, which were then removed or modified. All the interviews conducted during the pilot study were done by the primary researcher and these interviews were observed by the individuals who conducted interviews afterward.[16, 17]

Confidentiality of the physician's data was maintained and ethical values of research were properly considered and followed at every step of the study. The responses recorded in the questionnaire were recorded and analyzed using SPSS version 21. Reliability analysis of the scale demonstrated a Cronbach's alpha value of 0.92 for the physician satisfaction scale. The descriptive analysis was done on the categorical and continuous variables. The percentages and frequencies were reported for categorical variables, and mean scores, as well as minimum and maximum values, were reported for continuous variables. Mean scores were calculated for each item on the scale, and an overall score was computed and categorized into two variables using the cut-point of the 38. The Chi-square independence test was applied in the inferential part of the analysis to check the association between dependent and independent variables. A Binary logistic regression model was performed to identify predictors of physicians' laboratory services.

Results

A total of 202 physicians participated in the study, out of which 53% (n=107) were female. The respondents were divided into 3 age groups, of which the majority i.e. 56% (n=114) were 24 to 29 years old. Forty-two percent (n=85) individuals were residing in rural areas of Kashmir district, the majority of whom i.e. 72% (n=146) were married (Table 1).

Table 1: Socio-demographic profile of respondents (N=202)

Variable	Categories	Percentages	Frequency
No of Physician from hospitals	Neelum	13.9	28
	Hattian Bala	3.5	7
	Kotli	15.8	32
	Pallandari	13.9	28
	Bagh	14.4	29
	Bhimber	11.9	24
	Mirpur	26.7	54
Gender	Male	47.0	95
	Female	53.0	107
Age (years)	24-29	56.4	114
	30-40	25.2	51
	More than 40	18.3	37
Residence	Urban	57.9	117
	Rural	42.1	85
Marital status	Married	72.3	146
	Unmarried (Single, Divorced, Widowed)	27.7	56
Educational status	MO	59.4	120
	Specialist	21.8	44
	Consultant	18.8	38
Years of experience	1-2	42.1	85
	2-5	38.1	77
	More than 5	19.8	40
Current work station	OPD	41.6	84
	Wards	23.3	47
	Emergency	35.1	71

On the 5-point Likert scale physician gave different responses related to satisfaction of laboratory services. The majority 149 (73.8%) of the physician showed dissatisfaction with the availability of the Handbook for assistance while a minimum of 49 (24.3%) dissatisfaction showed towards the lab clinical interface. Further details are given below

Table: 2 Physician's satisfaction Variables (N= 202)

Variable	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
Assistance of Hand book	24.8	73.8	1.5	0	0
Availability of Lab staff at working Hour	13.9	26.2	12.4	43.6	4.0
Ability to resolve complaints	12.9	33.7	14.9	36.6	2.0
Lab request form	17.3	69.3	12.9	0.5	0
Availability of test menu	2.5	32.2	15.3	50.0	0
Legibility and completeness of lab reports	24.3	35.6	10.9	28.2	1.0
Provision of urgent report timely	20.3	19.3	13.4	47.0	0
Lab Clinical Interface	0.5	24.3	24.3	48.5	2.5
TAT is adequate for outpatients	4.0	68.8	15.3	11.9	0
TAT is adequate for inpatients	3.0	71.8	13.4	11.9	0
Attitude towards research projects	10.9	32.2	16.3	39.1	1.5
Lab workers promptly answer the phone calls	32.2	49.5	7.9	10.4	0
Lab reports are convenient to read	10.4	43.6	15.8	30.2	0
Manual Reporting	36.1	48.0	9.4	6.4	0
Overall satisfaction	23.3	29.2	18.3	29.2	0

The overall mean score of "Physician's satisfaction with clinical lab services" was 38 (+9.6) on a scale of 15 to 75, ranging from a minimum score of 22 to a maximum of 56. The 60% of respondents covered a range of 28 to 129. The mean scores were dichotomized into dissatisfied and satisfied with clinical lab services using a cut-off limit of 38, revealing that 52% (n=104) of physicians dissatisfied were with the clinical lab services (Table 2).

When asked whether the respondents had an updated lab handbook, the response was a unanimous No. Similarly, all the respondents denied the availability of a backup or referral system, immediate notification of critical results by the lab, or notification by the lab if there is an interruption in time. All the physicians voted in affirmation for an electrical patient record system.

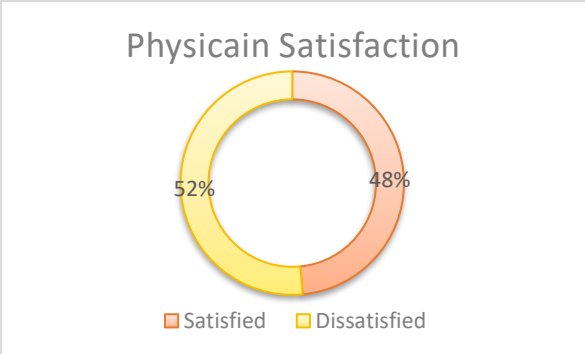

Figure 1: Physician satisfaction with laboratory Services

A Chi-square test of independence was run to check the association between socio-demographic variables and physician's satisfaction with clinical lab services. A preliminary analysis was performed to check that there is no violation of assumptions. A statistically significant association was found between the age of the Physicians and their satisfaction levels with clinical lab services [χ^2 (2) =8.654; p-value= 0.013]. Similarly, residence of the physicians [χ^2 (1) = 6.208; p-value = 0.013), level of education [χ^2 (2) = 14.589; p-value = 0.001] and years of experience [χ^2 (2) = 9.430; p-value = 0.009] also exhibited statistically significant association with the outcome i.e. Physician's satisfaction with clinical lab services. All the other variables had no statistically significant association with the outcome (Table 3).

Binary logistic regression was performed to assess the impact of a number of factors (i.e., statistically significant independent variables) on the likelihood that respondents would be more satisfied with the clinical lab services. The preliminary analysis was to check that there was no violation of assumptions. The model contained four predictor variables (age, residence, educational status, and years of experience). Overall, the model was statistically significant, χ^2 (7, n= 202) = 27.109; p<0.0005, indicating that the model was able to distinguish between respondents who were satisfied and dissatisfied with the clinical lab services. The model as a whole explained

between 12.6% (Cox and Snell R square) and 16.8% (Nagelkerke R squared) of the variance in Physician's satisfaction and correctly classified 63.4% of cases. However, only 2 of the independent variables made a unique statistically significant contribution to the model (residence and educational status).

Table 3: Association of Socio-demographic **characteristics with the Physician's Satisfaction with** clinical lab services

Socio-demographic characteristics	χ^2 (df)	p-value
Gender of Participants	0.201 (1)	0.654
Age (in years)	8.654 (2)	0.013*
Residence	6.208 (1)	0.013*
Marital status	0.011 (1)	0.917
Educational status	14.589 (2)	0.001*
Years of experience	9.430 (2)	0.009*
Current work station	1.183 (2)	0.554

Significant at $\alpha = 0.05$ with $p < 0.05$

Discussion

The study was conducted on physicians working in 7 districts of AJK ages diverse ages, experience, and qualifications to assess physician satisfaction with clinical lab services.

The current study shows half of the participants were satisfied with the available clinical lab services in AJK. Similar findings were reported in a national survey of Ethiopia using the same questionnaire where overall physician satisfaction was 55% same findings were observed in a Korean study of lab services where physician satisfaction was 58.1%.[18, 19] Whereas the study conducted in Rwanda the satisfaction was even lower at 36% and the major reasons were the Staff unavailability in the laboratory and non-responsiveness which is quite similar to our study.[20]

In this study, the male physicians were more dissatisfied than female physicians working at AJK hospitals this result is not far from the study conducted in Ethiopia where only 39.6% of the male physician were satisfied with the lab services.[21] The reason could be the male physicians were more at specialist & consultant posts and looking for more advanced lab services. Urban physicians were found more satisfied with lab services as compared to rural residents the reason could be the quality of lab services in urban and city areas. Similar findings were observed in the Indian Study where physicians working in city areas are more satisfied as compared to villages due to lack of physician training, lack of infrastructure, and poverty in rural areas.[22]

The physicians who are currently working in OPDs were comparatively found more satisfied as compared to physicians working inwards and emergency where quick lab reports are required. The possible reason could be the delay in lab result reporting. The Ethiopian and Arabian studies show similar findings where the physician working in emergency 44% was satisfied with the panic results and only 33% satisfaction with the time they reported in the emergency department. [10, 20] The unique area of focus and the region where the study was conducted helps us to address an important gap in the existing body of literature. Therefore, it can be used to develop evidence-based health policy recommendations targeting health care services at the DHQ level of AJK.

Conclusion

It is concluded that physician satisfaction with laboratory services in public hospitals of AJK was very low, more than 50% of the patients showed dissatisfaction with the services. The main factors which affect the overall satisfaction of physicians with laboratory services were the absence of the assistance handbook, laboratory request form, and turnover time of the reports. So targeted strategies are needed to improve the overall quality of these services.

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ORIGINAL ARTICLE

Artificial Intelligence in Medical Education: A citation-based systematic literature review

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A B S T R A C T

Purpose: This review aims to describe the existing and emerging role of Artificial intelligence (AI) in medical education, as this may help set future directions.

Methodology: Articles on AI in medical education describing integration of AI or machine-learning (ML) in undergraduate medical curricula or structured postgraduate residency programs were extracted from SCOPUS database. The paper followed the guidelines of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) research methodology. Articles describing AI or ML, but not directly related to teaching and training in structured programs were excluded.

Results: Of the 1020 documents published till October 15, 2020, 218 articles are included in the final analysis. A sharp increase in the number of published articles was observed 2018 onwards. Articles describing surgical skills training, case-based reasoning, physicians' role in the evolving scenario, and the attitudes of medical students towards AI in radiology were cited frequently. Of the 50 top-cited papers, 16 (32%) were 'commentary' articles, 13 (26%) review articles, 13 (26%) articles correlated usefulness of ML and AI with human performance, whereas 8 (16%) assessed the perceptions of students toward the integration of AI in medical practice.

Conclusion: AI should be taught in medical curricula to prepare doctors for tomorrow, and at the same time, could be used for teaching, assessment, and providing feedback in various disciplines.

Keywords: *Artificial Intelligence, Citation Analysis, Medical Education, Systematic Review*

Introduction

Medical practice is evolving rapidly. Increasing ease of access to knowledge, informed patients, societal pressures, and increased litigations have resulted in transformation of clinical medicine practice.[1, 2] In addition to doctors and patients, other healthcare professionals and machines are now play an integral part in the management of patients.[3, 4] The main driver of the evolution of health care over the last few years is digital technology, often referred to as the "Fourth Industrial Revolution (4IR)".[5, 6] Integration of technology in healthcare has been regarded to have the "potential to improve the quality of life for populations around the world".[7, 8]

While AI has brought a revolution in the automotive industry and search engines, it is no longer a futuristic vision for the healthcare industry either.[9] Healthcare industry has traditionally been slow to realize the potential benefits. Despite the slow take-off, AI application in medicine is becoming a topic of keen interest; however, traditional medical education lags behind. Significant reforms, including teaching AI, are needed in medical education to prepare future physicians.[10]

Over the last few years, literature has begun to emerge on the integration of AI in teaching, assessment and

provision of feedback to students. Excellent reviews have been published on the use of simulators,[11, 12] use of gaming techniques for education,[13] and crowdsourcing, to improve health.[14] Masters[15] reviewed the impact of AI on medical educators and its impact on medical education methodology and content. However, only a few bibliographic reviews reported trends of integration of AI.[16, 17] Guimarães, Dourado[16] reviewed advantages of introduction and diversification of pedagogical approaches specifically in anatomy education, whereas Chan and Zary[17] reviewed 37 articles related to the application and challenges of implementing AI in medical education.

The aim of this study were to review the existing data on the integration of AI in medical education, the areas of medical education where the AI is being integrated, the primary uses of AI, and identify areas where AI may be of help. Moreover, the study provides conceptual and social structures using network analysis.

Methodology

A citation-based systematic review of peer-reviewed literature was carried out to identify current patterns of research on the use of AI in structured medical education programs. Relevant articles were searched using the SCOPUS database. SCOPUS is commonly used to carry out citation-based systematic literature reviews.[18-23] There are several advantages of using SCOPUS compared to other databases, such as, Web of Science, ProQuest, as SCOPUS includes the widest range of articles with complete reference sets in a consistent and reliable form.[24]

The initial search was done on October 15, 2020, using the terms “artificial intelligence” OR “machine learning” AND “medical curriculum”, OR “medical student”, OR “medical education”, OR “medical school”, OR “medical college” in the title, abstract, and keywords of all documents.

A total of 1020 documents were retrieved published over a period of 40 years (1979-October 15, 2020). Forty-one articles written in languages other than English were excluded. The search was then restricted to articles published in peer-reviewed journals. At this stage, the title and abstract of the selected documents were skimmed manually to remove irrelevant articles. ‘Relevant’ articles were defined as articles describing integration of AI or ML in undergraduate medical curricula or structured postgraduate residency training programs. Medical education is a continuum of curriculum-based undergraduate medical education, through curriculum and training-based postgraduate programs, to practice-based continuing medical education. Whereas, the former two programs are structured, the latter is opportunistic. Since the aim of the review was to identify what and how much of AI is being integrated into medical curricula, we chose to exclude articles which dealt with practice-based CME programs only. Articles describing AI or ML, but not directly related to teaching and training in structured programs were also excluded. Also, articles related to the use of AI in clinical practice for diagnosis or treatment, nursing practice, continuing medical education, and articles describing the technical aspects of developing AI engines were excluded. Furthermore, articles on the use of technology only, such as, distance learning, e-learning and online learning were also excluded. A second set of analysis was carried out reviewing all abstracts or the whole text, and another 543 articles were excluded. A total of 186 articles were evaluable at this stage.

In order to ensure that relevant articles were not excluded, we compared all cited relevant articles from the reference list of the following studies: Masters (15), Sit, Srinivasan,[25] McCoy, Nagaraj,[26] Briganti and Le Moine,[27] Winkler-Schwartz, Bissonnette,[28] Monlezun, Dart,[29] Bichindaritz and Marling,[30] Lillehaug and Lajoie.[31] Another 32 articles were identified and added to the list. Hence, the final sample consisted of 218 articles published between 1979 and October 15, 2020 in 142 journals.

Mixed-method design of bibliometric analysis and content analysis was carried out. The top 50 most-cited articles were identified using the citation index, defined as number of citations divided by the number of years since published. These articles were reviewed in full to extract information, such as, level of training (undergraduate education versus postgraduate programs, or both), area of study (medical education, radiology, surgery, anesthesia, dermatology etc), publication type (commentary, review article or original study), study design (correlation of AI technique with conventional methods of teaching, or assessment). Finally, the main objectives of the study were identified, and grouped in to 4 main categories.

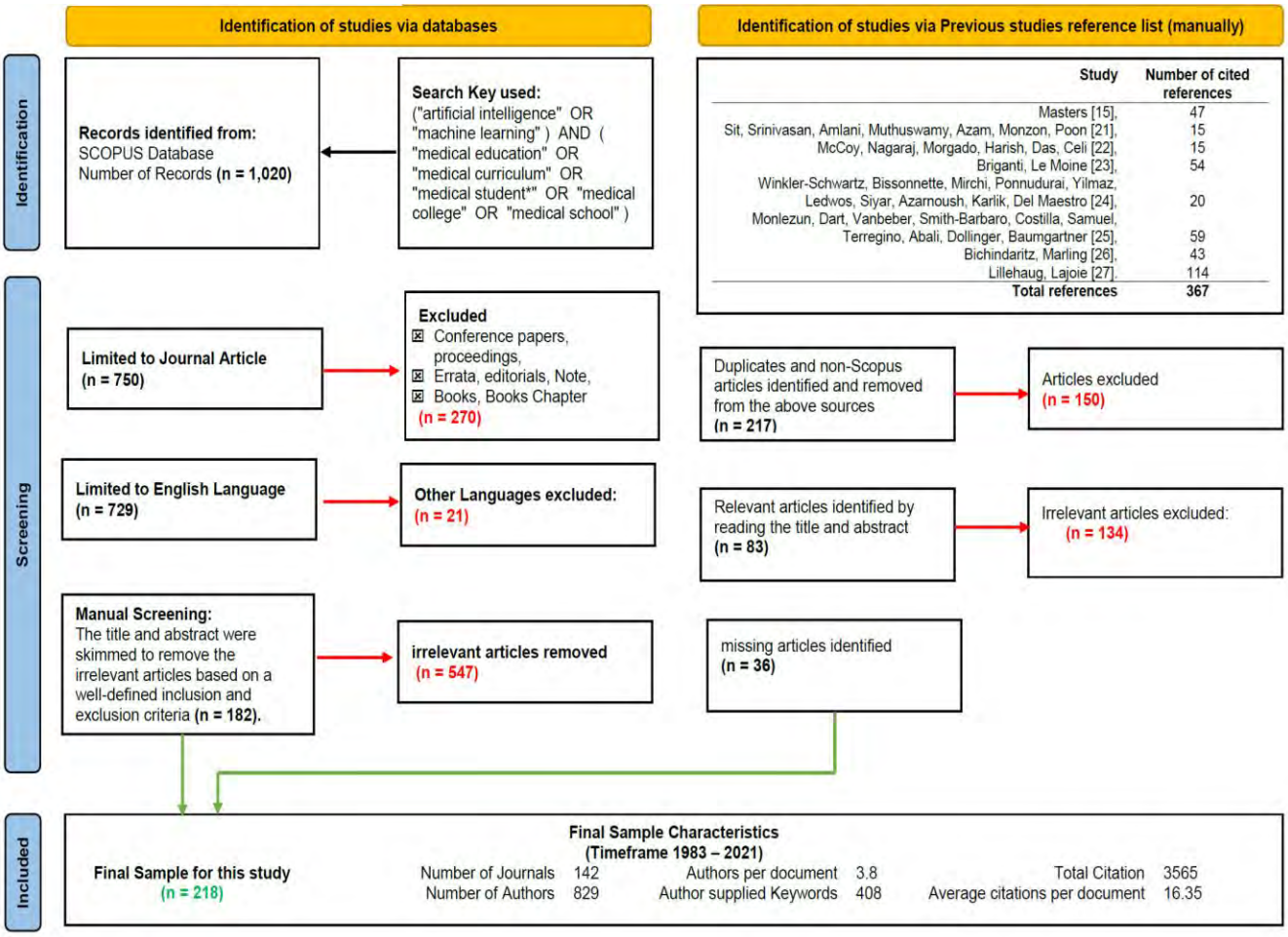


Figure 1: Article Selection Flow Chart (PRISMA)

The data were then plotted over time (number of publications or citations), or analyzed using the Bradford's law, Lotka's law, wordcloud, or the co-word analysis, using "bibliometrix package" developed in "R-language".[18]

Results

The results of the citation and content analysis are presented below:

Publication and Citation Trends

The trends of publication and citations over the study period are shown in figure 2A. A rapid increase in the number of published articles was observed only after 2018, and the number continues to increase.

The data from 2020 are not complete as the literature search was performed on October 15, 2020. The number of citations increased continuously over the years,

the articles on surgical skills training,[32-34] case-based reasoning,[30, 35] role of physicians in the future[36], and the attitudes of students towards AI in radiology[37] were cited more frequently (Figure 2B). The most frequently cited article was that of Gallagher et al published in 2005 reviewing the information on the use of technology to teach minimally invasive surgery. The authors argued for a gradual introduction and integration of virtual reality into education and training program together with skills assessment.

Content Analysis of the most cited papers

Abstract of 50 most-cited articles were identified and reviewed to study the contents. If abstracts were not informative, entire manuscript was reviewed. There were 16 (32%) 'commentary' articles (commentary, perspective, editorial etc.), and 13 (26%) review articles (Figure 3). A total of 13 (26%) articles looked at the usefulness of AI

engines using correlation with human performance, whereas, 8 (16%) articles assessed the awareness or perceptions of medical students or residents toward the integration of ML and AI in medical practice.

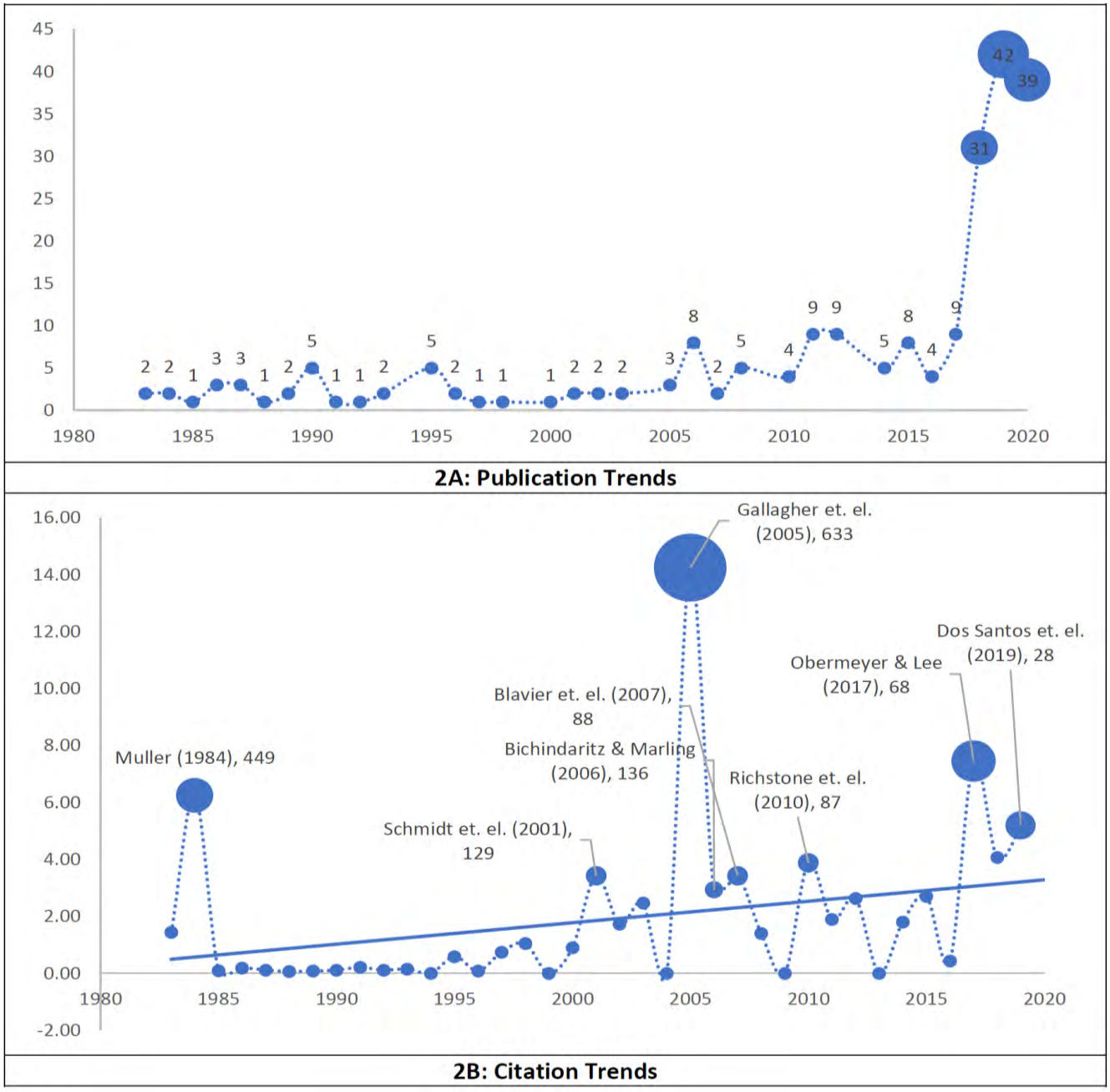


Figure 2: 2A and 2B Publication and Citation Trends

We also studied the scope of studies. Nineteen studies discussed the role of AI in undergraduate studies, 18 in postgraduate and 3 described the role in both. Whereas 19 (38%) studies were related to medical education methods, 11 (22%) and 10 (20%) described the integration of AI in surgery and radiology respectively. Other areas included anatomy, physiology, dental medicine, prescription writing, otorhinolaryngology, anesthesia, acute care and pathology (1-2 studies). A total of 21 (42%) studies were related to teaching, assessment and providing feedback to junior doctors in residency training programs. Overall, the results suggest that there is an increasing recognition to use AI

tools in medical education, surgical and radiology training, however, in some other areas, AI needs to be incorporated further in teaching and learning.

Table 1 details the primary objectives of top-cited studies. The vast majority of publications described integration of AI in medical education or the correlation of ML and AI in teaching and assessment of clinical skills. A significant number of articles related to the current practice of integration were either review or commentary articles, including an AMEE guide.[15] An integrative review of 37 studies was also identified,[17] which described 3 primary uses of AI in medical education including learning support (n=32), assessment of students' learning (n=4), and curriculum review (n=1). Also, main challenges of AI implementation in medical education were identified as difficulty in assessing the effectiveness of AI and technical challenges developing AI applications.

Table 1: Primary objective and types of publication

	Type publication				Total
Main Objectives	Commentary	Correlation Analysis	Survey	Review	
The need for integration of AI in medical education	11	1	-	7	19
Correlation of AI/ML in skills training, assessment, and giving feedback.	3	10	-	5	18
Attitude, perception, knowledge of students and residents towards AI	-	-	7	-	7
Application of AI/ML in teaching, learning and clinical reasoning	2	2	1	1	6
Total	16	13	8	13	50

At least 7 articles assessed perceptions and awareness of medical students and residents about the use of AI in medical practice, and whether, they were 'concerned' that their job would be taken over. Most (6/7) of the articles were published in 2018-2020. The overall impression was that the medical students were aware of the potential applications and implications of AI, although there was some degree of anxiety amongst the radiology residents, they did not worry that AI would replace the need for the physicians. Almost all agreed that AI should be included in medical training.[37]

The sections below present results based on all 218 relevant publications.

Core Journals

We applied 'Bradford's law', which classifies journals in a field of study to 'zones' based on total number of articles published in that field. Bradford's law states that "If journals were arranged in order of decreasing productivity of articles on a given subject, they may be divided into a nucleus, particularly devoted to the subject, and several zones containing the same number of articles as the nucleus".[38]

In the current study, the journals were divided into three zones with an almost equal number of publications, (Figure 3A). A total of 11 core journals published 72 articles; another 60 and 71 articles appeared in 2nd and the 3rd zones, respectively. Figure 3 also shows the distribution of citations received by each zone. Zone 1 journals received 26% of all citations. This shows that Zone 1 journals are much more frequently cited than the journals included in zone 2 and zone 3.

We then looked at the source dynamics. Figure 3B shows, that although a significant number of articles describing the technical details continue to be published, more recently, there is a surge in publications in journals like Academic Radiology, Academic Medicine, Medical Teacher, and Journal of American College of Radiology.

Authors Productivity

To describe the productivity of authors and the development of a particular field, Lotka[39] described the frequency of appearance of authors. According to the Lotka's law, the relative frequency distribution of author productivity is predicted to be hyperbolic inverse square function. It means that a small number of authors in a field publish the majority of articles.[40] Also, authors publishing 'n' number of articles is approximately $1/n^2$ of those publishing one: and the proportion of all authors who

publish once only is about 60% (39). We observed that more than 90% of authors had one publication so far (data not shown). It may be argued that AI in medical education is an emerging field, and Lotka's law may not depict actual picture at this stage.

Conceptual Structure:

Main Themes and Trends

Conceptual structure can be extracted using authors-supplied keywords. Here, we present the authors' keyword cloud, dynamics, and co-word analysis with the aim to explore the overall conceptual structure of published articles in AI and medical education.

Most frequently used keywords

Figures 4A shows the trends of annual occurrence of the most frequently used author supplied keywords as word-cloud. The figure shows that the most frequent keyword is the term "artificial intelligence" with 20 occurrences, followed by the terms "education" (18 occurrences), "medical education" (16 occurrences), "machine learning" (15 occurrences), and so on.

Keywords Growth/Trend

Following the trends of keywords allows observation about the evolution of terminology. This provides us with an overview of changes in the conceptual structure of research over time as shown in figure 4B. It is interesting to note that whereas, keywords 'machine learning', 'education', 'medical education' and 'medical students' continue to be used increasingly frequently, the term 'artificial intelligence' increased in medical education literature only recently and was the most frequently used keyword by the year 2020.

Co-word analysis

We next looked at keyword clusters. Thematic clusters are arrays of terms or combinations of words used in publications on a given topic. This analysis is also called a "co-words network" Callon, Rip.[41] Co-word analysis helps in understanding the main themes. The co-word occurrences reveal the three main clusters; "artificial intelligence", "machine learning" and "medical education" (Figure 4C). "Artificial intelligence" is used more commonly in connection with "radiology", "intelligent tutoring systems", and "medical decision making". The other main cluster combines "machine learning" with "objective skill assessment", "surgical skill assessment ", "radiology education", "behavioral and performance pattern", and "motion analysis". The third main theme of "medical education" co-occurs with "artificial intelligence", "machine learning" "medical informatics", "case-based reasoning", "intelligent tutoring systems", "patient simulation", "surgical training", and "robotic surgery". The overlap across the three clusters is natural, as these are closely interrelated. For example, patient simulation and e-learning were used commonly together with medical education and artificial intelligence.

Figure 3: Distributions of Journals according to Bradford Law and Source Growth

Figure 3A: Bradford's Law: Distribution of Journals in different Zones

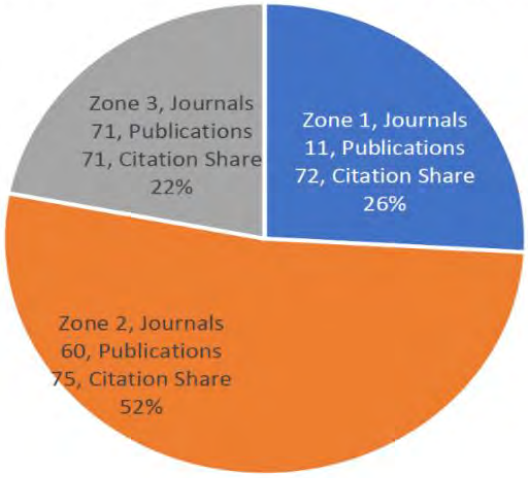
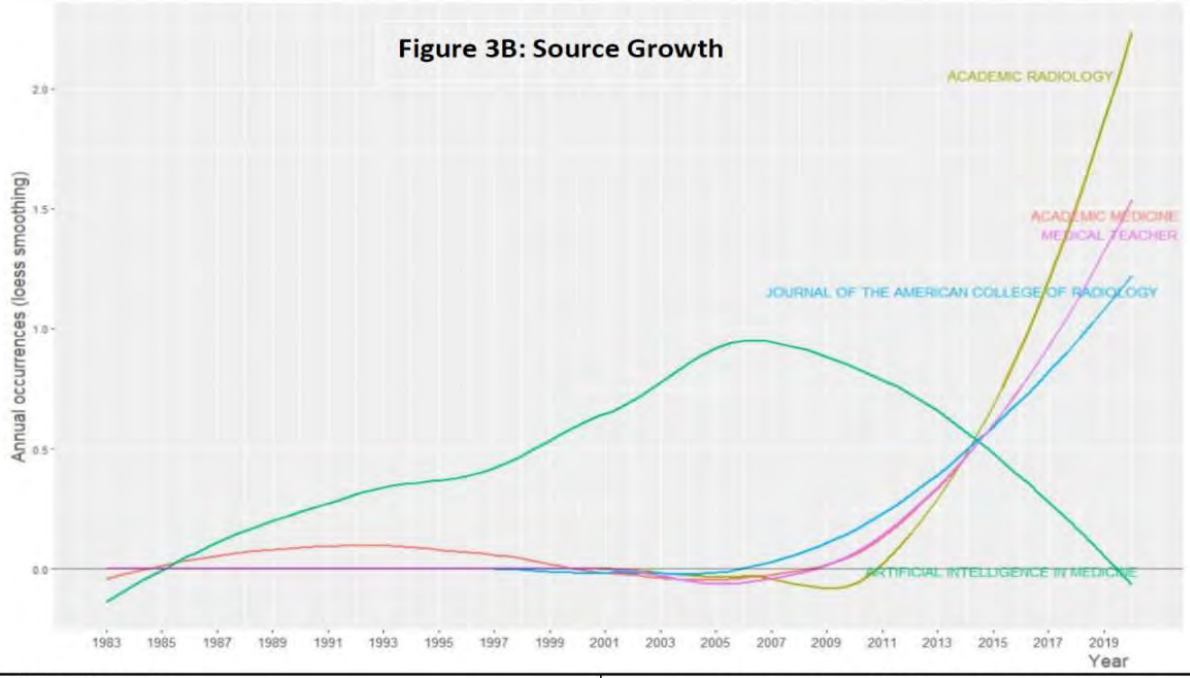


Figure 3B: Source Growth



List of Core Journals

1. Artificial Intelligence in Medicine
2. Academic Medicine
3. Academic Radiology
4. Journal of the American College of Radiology
5. Medical Teacher
6. Computer Methods and Programs in Biomedicine
7. Journal of Medical Internet Research
8. Journal of Surgical Education
9. Medical Education
10. International Journal of Computer Assisted Radiology and Surgery

Figure 3 A and 3B: Distribution of Journals according to Bradford Law and Source Growth

Figure 4: **4A author's keyword** cloud, 4**B author's keyword dynamic, 4**C supplied based Keywords

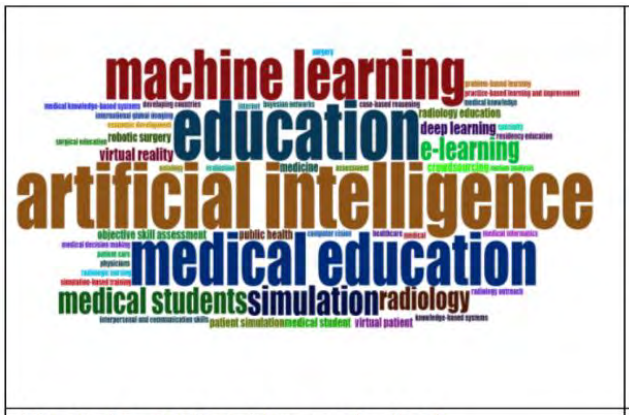


Figure 4A: Authors' keywords cloud

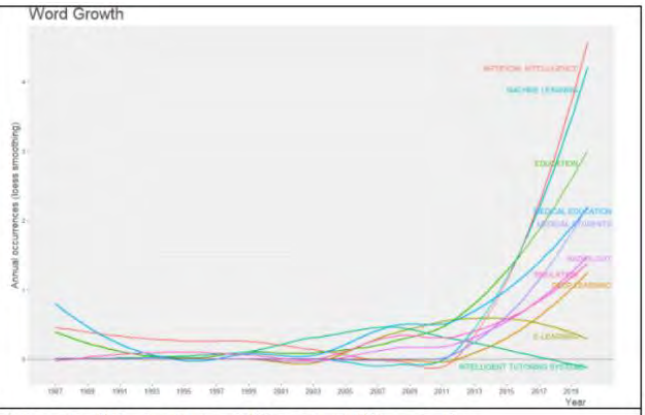


Figure 4B: Authors' Keyword Dynamics

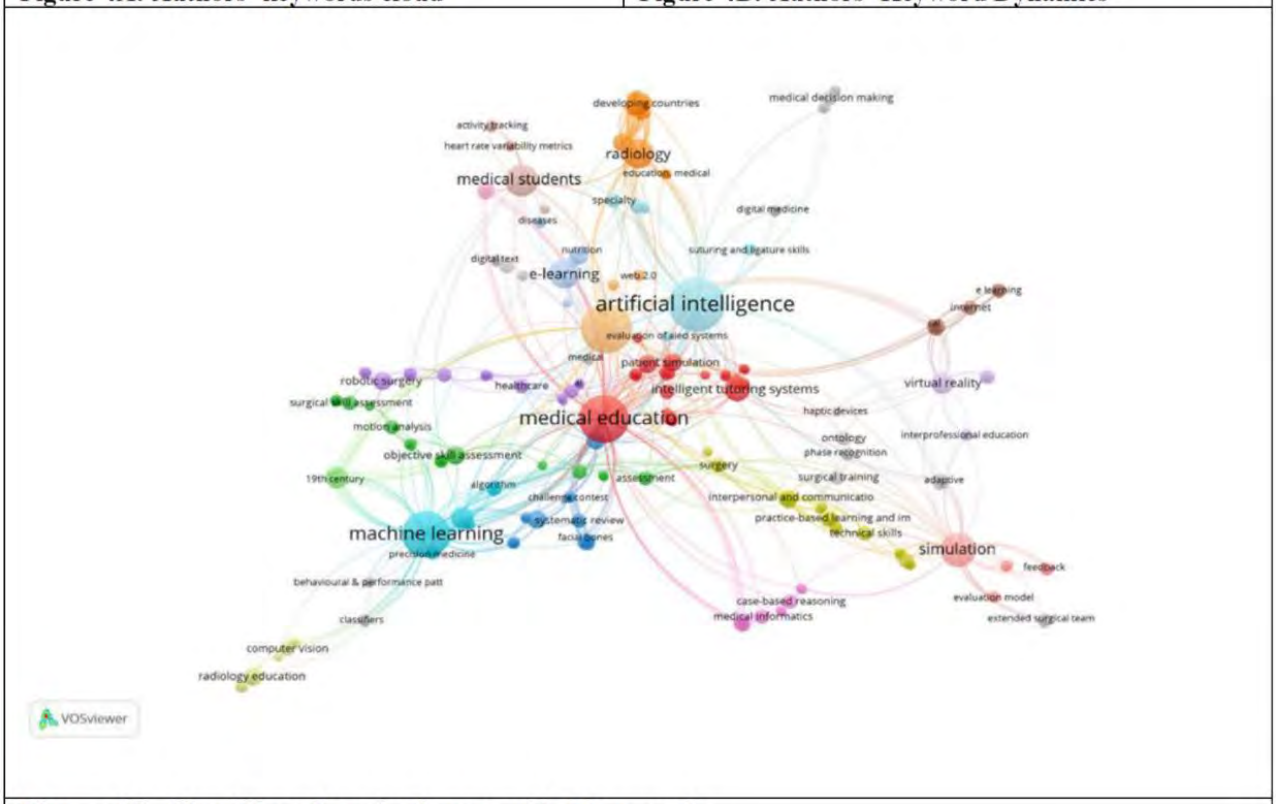


Figure 4C: Cloud based on Author supplied keywords

Discussion

The aims of this study were to review the existing information on the use of AI in medical education, the areas of teaching/learning and training where AI is being used currently, and the areas where AI is beginning to emerge. Moreover, the study was designed to study conceptual and social structure of AI in medical education using network analysis. We restricted our search to structured teaching and training programs. A sharp increase in the number of published articles was observed 2018 onwards. A significant number of articles reported the correlation of AI engines and machine learning with human performance. The publication trend was consistent with Bradford's law, but did not support Lotka's law. Keyword analysis revealed "artificial intelligence" as the most rapidly emerging

keyword over the last 3 years. Co-word analysis revealed "artificial intelligence", "machine learning" and "medical education" to be the main clusters.

We used a mixed design of citation-based review and content analysis, as it provides a more comprehensive picture. Citation-based systematic literature review was employed to study the pattern of publications, citation trends, identification of core authors, journals, keywords, co-words, and the temporal pattern of key words. Content analysis provides a quantitative approach to produce information from open-ended data of each paper that is explored, categorized, and evaluated.[42]

Reasons for the sudden and sharp surge in the number of published articles since 2018 remain speculative, but could be attributed to the fact that there were several reports calling for major reforms in medical education between 2000 and 2015.[43,10] In 2016, AI came to limelight when the World Economic Forum adopted a resolution to embrace Fourth Industrial Revolution (4IR) as a common and urgent priority (World Economic Forum Annual Meeting 2016, Mastering the Fourth Industrial Revolution). 4IR is defined as the "wave of technological advances that are changing the way we live, work, stay alive and interact with each other and machines" to meet the global challenges. The fundamentals of 4IR are AI, cloud computing, internet of things (IoT), and big data analysis.[6] AI has been hailed to have the potential to augment human intelligence, and has been hailed to have an impact on the processes and outcomes of healthcare as machines had on physical capabilities.[8]

Several recent articles have described attempts to develop, validate and correlate AI/ML tools to assess and provide feedback across a range of skills, including surgical skills, clinical reasoning skills and assessments of written material. For example, automated surgical skills assessment using accelerometer data was correlated with video analysis and shown to be superior in assessing surgical skills of suturing and knot-tying.[44] At the same time, automated systems were shown to save experts time and improve training efficiency. Another example is the assessment of clinical reasoning skills. Automated essay scoring (AES) system was used to assess constructed-response tasks ranging from short-answer tests to essay questions.[45] AES was shown to complement the use of selected response testing and provide medical students detailed feedback as part of formative assessment process. Yet, another example of studying correlation of ML with practice was the application Machine Learning to Assess Surgical Expertise (MLASE) checklist, to review manuscripts related to surgical expertise.[28] Differences were reported between medical (stronger in discussion quality) and computer science journals (better in study design).

The terms AI and ML are often used synonymously and interchangeably in literature, possibly because of an overlap.[46] AI has a wide range of scope, and can perform various complex tasks. ML on the other hand, has a limited scope, and can perform only those specific tasks for which the machines are trained. Strictly speaking ML produces predictions based on what it learnt from the past data, and AI enables a machine to simulate human behavior.[47] Since ML has paved the way for accurate predictions, and it is now possible to use those predictions in medical science, the phrase AI uses probabilistic methods and ML to categorize knowledge and logic together with embodied intelligence to perform human tasks.[48] Despite the distinctions, the two terms are used interchangeably in fields even where ML has become mainstay, such as, google search algorithms and Facebook auto-friend tagging suggestions. It is interesting that since the introduction of the term AI, more than 60 years back, it caught the attention of medical practice only in the last few years. The use of AI in medical field, especially medical education is in its infancy, and it is not surprising to see that the two terms are used interchangeably, and more recently AI has surpassed ML as the dominant keyword.

In summary, the practice of medicine is rapidly evolving from information age to the age of artificial intelligence. Machines have become an integral part of medical practice. The doctors of tomorrow need to be experts not only in the biomedical and clinical sciences, but also be able to deal with the interface between medicine and machines. Medical education needs to keep pace with changes in medical practice. To better integrate AI into the medical profession, measures should be taken to introduce AI into the medical school curricula, so that both medical professionals as well as the medical students understand the concept and applications of AI to maximize its use. The medical students not only need to be educated about AI tools, but also should develop skills to effectively use

advances in technology. We hope that the curriculum developers, deans and principals of medical schools, and the residency program directors will get a clear overview of the current status of research, teaching and the application of AI in medical education through this overview.

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REVIEW ARTICLE

A Review on Alzheimer's disease and mesenchymal stem cell therapy

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A B S T R A C T

Alzheimer's disease (AD) is a progressive neurological ailment that manifests as difficulties in completing everyday activities, disorientation, and memory loss. Several innovative drug therapies have failed in clinical trials because they cannot stop or encourage the regeneration of injured brain cells. Furthermore, many medications only give symptomatic alleviation. As a result, a better knowledge of stem cell therapy's process might lead to new and effective treatments for this severe disease. Recent preclinical evidence suggests that stem cells can be used to treat or model AD. The mechanisms of stem cell based therapies for AD include stem cell mediated neuroprotection and trophic actions, antiamyloidogenesis, beneficial immune modulation, and the replacement of the lost neurons. This study examined the present status of many Mesenchymal stem cell-based therapeutics in AD pathogenesis. Furthermore, we have emphasized current clinical research that may be useful in treating Alzheimer's disease.

Keywords: *Alzheimer's disease, Beta amyloid, Neuroinflammation, Stem cells*

Introduction

Alzheimer's disease (AD) is one of the leading cause of age-related dementia, which is characterized by gradual loss of memory and inability to learn. AD is caused by the accumulation of β-amyloid (Aβ) peptides, leading to loss of functioning neurons and decreased synaptic activity.[1, 2] The World Health Organization adopted a global action plan on dementia and intimated societies regarding the increase in its prevalence.[3] According to WHO, the number of patients with dementia has increased to 50 million,[3] worldwide, and this number is believed to double by 2040.[4] AD is a neurodegenerative disease, causing more significant memory impairment and having a higher disability rate than aging, putting an increased burden on the healthcare system and caregivers.[5, 6] AD is also associated with higher mortality due to the number of causes, including neuronal death and cerebral atrophy.

Mesenchymal stem cells (MSCs), also known as mesenchymal stromal cells, are multipotent stem cells that can self-replicate and undergo multiline-age differentiation.[7, 8] Due to this reason, MSCs are considered

to be one of the most promising aspects to treat neurodegeneration.[9] Moreover, other properties of MSCs, such as immunomodulation, high biosafety, and role in stimulation of endogenous neural precursors, make them ideal candidates for treating neurodegenerative diseases, including AD.[9] Moreover, MSCs can be easily derived from a variety of sources in humans, such as adipose tissue, bone marrow, umbilical cord or amniotic fluid. Previous attempts of treatment with stem cells in AD mainly focused on replacing impaired neurons.[8] MSCs have the potential to slow down neurodegeneration and repair damaged neural tissue, which makes them an alternative approach to treat AD.[8] These roles are accomplished by the secretion of neurotrophins and regulatory factors involved in angiogenesis.[10-12] The role of MSCs in immunomodulation, migratory capability and regeneration has been confirmed in various disease models, including diabetic nephropathy, myocardial infarction, brain injury and dermatitis.[13-16] In recent years, several *in-vivo* studies on AD animal models have showed that MSCs were effective in altering disease pathology and improving cognitive function.[17-18]

Pathogenesis of Alzheimer's disease

The pathology of AD is very complex. The cholinergic theory, the amyloid cascade hypothesis, and the tau propagation hypothesis have all been presented to characterize the genesis of AD based on observable clinical and neuropathological symptoms.[19-20] However, an accumulation of phosphorylated tau aggregation and neuroinflammation is AD's most notable and distinguishing characteristic.[21, 22] The amyloid cascade theory states that AD development's most critical triggering events are A precursor protein (APP) metabolism and A42 buildup.[23] According to this theory, the buildup of A peptide is to blame for the loss of synapses and neuronal cell death.[24, 25] Furthermore, A may lodge around the brain's tiny blood vessels, leading to the formation of cerebral amyloid angiopathy (CAA), a prevalent neuropathological disorder that most often affects AD patients and is thought to be caused by a failure of A clearance.[26] All other reasons, such as tau pathology and neuroinflammation, have been proven to eventually lead to a buildup.[27] Figure 1 shows how the tau hypothesis links AD pathology to hyper phosphorylation and intracellular deposition of NFTs of the micro tubular protein tau.[28] It also shows that the illness may be accelerated by spreading the abnormal type of tau protein from one cell to the next. Few studies connecting both concepts show that amyloid plaque aggregation causes the activation of different kinases, resulting in hyper phosphorylation of the tau protein.[29]

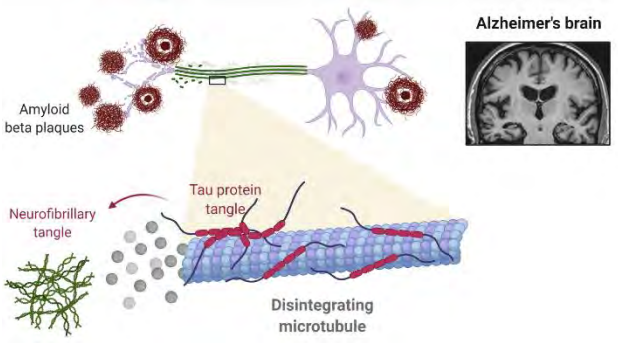

Figure 1: Pathophysiology of Alzheimer's Current treatment of AD

One of the characteristic features of AD is loss of functional neurons and synaptic activity, leading to memory impairment, loss of motor control, and dementia.[30] One practical approach to treat this is by increasing the concentration of acetylcholine (Ach) in the synaptic cleft, which is possible by inhibition of the Acetylcholinesterase (AChE) enzyme.[31] Based on this mechanism, four drugs are currently used for the treatment of AD, including rivastigmine, donepezil galantamine and memantine.

The treatment of AD capable of curing underlying pathology has not been developed, which results in an inevitable increase in the number of AD patients. Both preclinical and clinical studies have provided a great deal of evidence that the accumulation of Aβ controls many downstream processes of AD.[32-35] Therefore, most studies on drug development in AD targeted decreased Aβ production or enhanced clearance. However, thus far, these approaches have failed in later phases of almost all clinical trials. Therefore, the hour needs to develop effective AD therapies to tackle this global health problem.

Pre-clinical studies

We summarized preclinical studies in Table 1 and possible mechanism of actions shown in Figure 2. Research found that treating APP/PS 1 transgenic mice with human amniotic mesenchymal stem cells (hAM-MSCs) reduced deposition and improved memory and that these benefits were linked to an increase of activated

microglia and control of neuroinflammation as shown in Table 1.[36] The stimulation of the cell survival signaling system by bone marrow-derived mesenchymal stem (BM-MSCs) reduced A-induced apoptotic cell death in primary cultured hippocampus neurons. These anti-apoptotic properties of BM-MSCs were also shown in an acutely generated Alzheimer's disease mouse model created by administering A intrahippocampal. Furthermore, in the *in-vivo* model, BM-MSCs reduced A-induced oxidative stress and spatial memory impairment, indicating that BM-MSCs mitigate A-induced neurotoxicity and cognitive decline by decreasing apoptotic cell death and oxidative stress in the hippocampus.[37] Another research found that BM-MSCs may find their way into wounded brains and increase the number of positive cells for choline acetyltransferase (ChAT), survivin, and selective AD indicator-1 (seladin-1) nestin gene expression. According to histopathological analysis, BM-MSCs may eliminate beta-amyloid plaques from the hippocampus.[38] According to research, Engrafted MSCs expressing exogenous (C-X3-C motif) ligand 1 (CX3CL1) decreased the production of the inflammatory cytokine TNF- and enhanced synapse-related protein expression. Compared to a control group, transplantation of MSCs containing CX3CL1 and Wnt3a (CX3CL1-Wnt3a-MSC) dramatically reduced learning and memory deficits. The prevention of microglial neurotoxicity and stimulation of hippocampus neurogenesis were linked to improved neurobehavioral capabilities in APP/PS1 mice treated with CX3CL1-Wnt3a-MSC. Transplantation of CX3CL1-Wnt3a-MSC also inhibited the activity of glycogen synthase kinase 3 beta through regulating phosphoinositide 3-kinase/activated protein kinase B (PI3K/AKT) signaling (GSK3b).[39] Ding, M., et al. demonstrated that injecting human umbilical cord mesenchymal stem cells (hucMSC-exosomes) into these mice might help remove A deposition and cure cognitive dysfunctions. Furthermore, it was shown that injecting hucMSC-exosomes into mice's brains might control microglia activity, reducing neuroinflammation. Pro-inflammatory cytokines were higher in mice's peripheral blood and brains, whereas anti-inflammatory cytokines were lower.[40] Research found that transplanting amyloid precursor protein (APP) and presenilin1 (PS1) double-transgenic mice with human umbilical cord blood-derived mesenchymal stem cells (hUCB-MSC) dramatically enhanced spatial learning and memory deterioration. Furthermore, in hUCB-MSC transplanted APP/PS1 animals, amyloid-peptide (A) deposition, -secretase 1 (BACE-1) levels, and tau hyper-phosphorylation were significantly decreased.[18] Another research found that conditioned medium from adipose tissue mesenchymal stem cells (ATSC-CM) lowered the inflammatory markers IL-1 and TNF-. By lowering TLR expression, ATSC-CM alleviated memory deficits, decreased beta amyloid production, boosted neuron survival, and reduced inflammation. [41] MSC transplantation successfully alleviates learning impairments in the 5xFAD mouse model, according to the findings of the research, and MSCs have a clear influence on Ab42 levels in the brains of 5xFAD mice.[42] Behavioral modifications decreased the expression of APP, BACE1, and Ab and the activity of b-secretase and c-secretase, according to the findings of research in which placenta-derived mesenchymal stem cells (PD-MSCs) were transplanted into Ab1–42-infused mice. Furthermore, the transplantation of PD-MSCs reduced the activation of glial cells and the production of inducible nitric oxide synthase (iNOS) and cyclooxygenase-2 (COX-2). Furthermore, we discovered that in Ab1–42-infused animals, PD-MSCs inhibited the production of inflammatory cytokines, reduced neuronal cell death, and enhanced neuronal cell development from neural progenitor cells.[43] Glycoprotein of the rabies virus (RVG-tagged) after being delivered intravenously, exosomes generated from mesenchymal stem cells showed enhanced targeting to the cortex and hippocampus, reduced plaque formation and A levels, and reduced astrocyte activation. According to the Morris water maze test, brain focused exosomes produced from MSCs were superior than unmodified exosomes in improving cognitive performance in APP/PS1 mice.[44] Human placenta amniotic membrane-derived mesenchymal stem cells (hAMMSCs) were administered intravenously into C57BL/6J-APP transgenic mice in another investigation. hAMMSCs improved spatial learning and memory function and were linked to a reduction in the number of amyloid plaques in the brain.[45] According to previous studies research, intracerebral transplantation of human menstrual blood-derived stem cells (MenSCs) significantly enhanced the spatial learning and memory of APP/PS1 mice. In APP/PS1 mice, MenSCs also dramatically decreased amyloid plaques and reduced tau hyper-phosphorylation.

Surprisingly, intracerebral transplantation of MenSCs enhanced multiple A degrading enzymes and controlled a panel of proinflammatory cytokines associated with an altered microglial phenotype, suggesting that MenSCs in the brains of APP/PS1 mice had an anti-inflammatory and degrading effect.[46] Several studies we found that showed significant results to attenuates Alzheimer's disease by several mechanisms like decrease Aβ deposition, decrease oxidative stress and inflammatory mediators and also improve cognitive decline as shown in Figure 2. These stem cell may be a therapeutic agent for treatment of Alzheimer's disease.

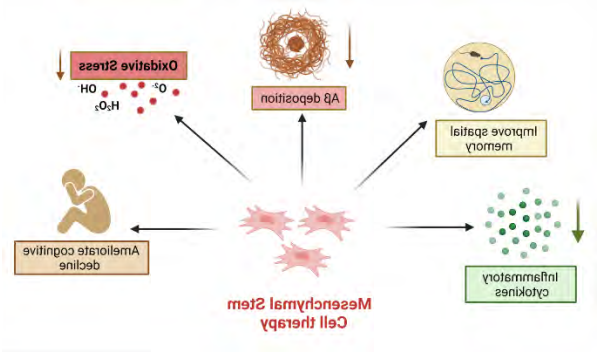

Figure 2: Effects of Mesenchymal stem cells

Table 1: Preclinical studies

Stem cells	Study model	Mechanism	Reference
Human amniotic mesenchymal stem cells	APP/PS 1 transgenic mice	Decrease Aβ deposition and improve memory	[36]
Bone marrow-derived mesenchymal stem cells	Primary cultured hippocampal neurons	Ameliorate Aβ-induced apoptotic cell death.	[37]
Bone marrow-derived mesenchymal stem cells	Sprague–Dawley rats	Remove beta-amyloid plaques from hippocampus	[38]
Engrafted MSCs carrying exogenous ligand 1	APP/PS1 mice	Transplantation of MSCs carrying CX3CL1 significantly improve the learning and memory impairment	[39]
Human umbilical cord mesenchymal stem cells containing exosomes	AβPPswe/PS1dE9 double-transgenic mice	Improved cognitive dysfunction and help to clear Aβ deposition in these mice	[40]
Human umbilical cord blood-derived mesenchymal stem cells	APP and (PS1) double-transgenic mice	hUCB-MSC improved spatial learning and memory decline	[18]
Adipose tissue mesenchymal stem cells conditioned medium (ATSC-CM)	Wistar rats	ATSC-CM) reduced IL-1β and TNF-α as inflammation markers	[41]
Adult mesenchymal cells	5xFAD mouse model	The results indicate that MSC transplants effectively reduce learning deficits in the 5xFAD mouse model and demonstrate a clear impact of MSCs on the levels of Ab42 in the brains of 5xFAD mice	[42]
placenta derived mesenchymal stem cells	Ab1–42-infused mice	Attenuated the expression of APP, BACE1, and Ab, as well as the activity of b-secretase and c-secretase	[43]
RVG-tagged Mesenchymal stem cells derived exosomes	APP/PS1 double transgenic mice	RVG-tagged Mesenchymal stem cells derived exosomes decrease Aβ levels, and activation of astrocytes was reduced.	[44]

Clinical studies

To date, many clinical studies have been conducted to study the safety, clinical efficacy, and tolerability of MSCs in patients with AD. However, most of the trials are ongoing with no published results. A systematic search was performed to identify the clinical trials, both completed and ongoing. 16 clinical trials, registered on Clinical Trials.gov, were retrieved, which are summarized in Table 2.

Table 2: Characteristics of clinical trials conducted on mesenchymal stem cells therapy in Alzheimer's disease

NCT, *status*	Country, year	Study design	Study phase	Stem cell type	No. of participants (n)	Follow up period	Interventions	Study outcomes
NCT01297218 & NCT01696591 (extended follow-up study), *completed*	Republic of Korea, 2011	Open label, single center, single arm	1	hUCB-MSCs	9	Initial: 12 weeks Extended: 24 months	Low dose: 2.5 × 10^5 cells/5 µL per entry site High dose: 5.0 × 10^5 cells/5 µL per entry site	The administration of hUCB-MSCs into hippocampi showed no serious ADEs during 24-month follow-up period. Moreover, administration was feasible and well tolerated among AD patients [49]
NCT02054208, *completed*	Republic of Korea, 2014	Double-blind, Single-center, two arm	1/2a	hUCB-MSCs	45 Stage 1: 9 Stage 2: 36	24 weeks	Low dose: Intraventricular administration of 1 x 10^7cells/2mL. High dose: Intraventricular administration of 3 x 10^7cells/2mL. Placebo: 2ml normal saline	Repeated administrations of hUCB-MSCs were well tolerated and feasible among AD patients. However, three serious ADEs, including fever, nausea and vomiting were seen in two participants that required extended hospitalization [52]
NCT03117738, *completed*	USA, 2017	Randomized, double-blind, placebo-controlled, two arm	1/2	Autologous AD-MSCs	21	30 weeks 52 weeks	Drug: AstroStem Dose: 2 × 108 AD-MSCs Placebo: Saline with 30% auto-serum	Not yet published results [53]
NCT02600130, *completed*	USA, 2016	Randomized, double-blinded, placebo-controlled, three arm	1	LMSCs	25	52 weeks	Cohort 1: Peripheral IV infusion of 20 million LMSCs Cohort 2: Peripheral IV infusion of 100 million LMSCs Cohort 3: Placebo (Plasmalyte A and 1% human serum albumin)	Not yet published results [56]
NCT03172117 (extended follow-up study for NCT02054208), *ongoing*	Republic of Korea, 2017	Double-blind, Single-center, two arm	1/2a	hUCB-MSCs	45 Stage 1: 9 Stage 2: 36	24 weeks	Low dose: Intraventricular administration of 1 x 10^7cells/2mL. High dose: Intraventricular administration of 3 x 10^7cells/2mL. Placebo: 2ml normal saline	Not yet published results [52]
NCT04228666, *withdrawn*	USA, 2020	Open label, non-randomized, single arm	1/2a	Autologous AD-MSCs	0	52 weeks	Intravenous administration of HB-adMSCs Dose: 2 x 10^8 cells.	Not available [58]
NCT04855955, *available*	USA, 2021	Single patient, clinical study	N/A	AD-MSCs	1	N/A	Drug: AD-MSCs	Not yet published results [55]

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NCT02833792, *ongoing*	USA, 2016	Randomized, single-blind, placebo-controlled, multi-center, crossover study	2a	hMSCs	40	18 months	Drug: hMSCs Placebo: Ringer lactate solution	Not yet published results [57]
NCT04040348, *ongoing*	USA, 2019	Open label, single center, single arm	1	hMSCs	6	52 weeks	100 million cells allogeneic hMSC	Not yet published results [58]
NCT04388982, *ongoing*	China, 2021	Open label, single center, single arm	1/2	Allogenic adipose MSCs-Exos	9	48 weeks	Low dose: 5μg MSCs-Exos Mild dose: 10μg MSCs-Exos High dose: 20μg MSCs-Exos	Not yet published results [59]
NCT02899091, *ongoing*	Republic of Korea, 2016	Randomized, Double-blind, Placebo-controlled, two arm	1/2a	CB-AC-02: A human placenta derived MSC candidate	24	48 weeks	CB-AC-02, 2.0 x 10^8 cells Placebo	Not yet published results [60]
NCT04684602, *ongoing*	USA, 2020	Non-randomized, open label, multicenter	1/2	hUCB-MSCs	5000	12 months	Drug: PrimePro™/ PrimeMSK™ injection	Not yet published results [61]
NCT04482413, *ongoing*		Randomized, double blind, active controlled, two arm	2b	AD-MSCs	80	28 weeks	Drug: IV AstroStem containing 2 x 10^8 cells/20 mL of saline with 30% auto-serum Placebo: 5 mg of Donepezil	Not yet published results [54]
NCT01547689, *unknown status*	China, 2012	Open label, single center, self-controlled single arm	1/2	hUCB-MSCs	30	10 weeks	IV infusion containing 20 million cells （0.5×10^6 UC-MSCs per kg ）	Not yet published results [50]
NCT02672306, *unknown status*	China, 2017	Randomized, double blind, two arm	1/2	hUCB-MSCs	16	48 weeks	hUC-MSCs 20 million cells per subject (0.5×10^6 UCMSCs per kg) Placebo: IV normal saline	Not yet published results [62]

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A two-staged, phase 1 clinical trial has been conducted on 9 patients with dementia associated with AD.[47] The trial evaluated the safety and tolerability of hUCB-MSCs, manufactured as NEUROTSTEM®-AD. During stage 1 of the trial, the patients were followed up for 12 weeks, post-hUCB-MSCs administration into the hippocampi to identify the acute adverse drug events (ADEs). Pain in the surgical site (n=9) and headache (n=4) were the most common ADEs found. Other common ADEs included headache (n=3) and dizziness (n=3). A stage 2, an extended follow-up study was performed on the patients who completed stage 1 of the trial. During the 24-month follow-up period, no patient reported any serious ADE. Hence, the trial showed that the hUMB-MSCs administration was safe and well-tolerated among patients with AD with no dose-limiting toxicity (DLT).[47-49] However, the efficacy of hUMB-MSCs had not been confirmed due to study limitations, including the limited number of participants and the absence of a control group.[47-49] Therefore, future clinical trials with active comparator or placebo-controlled group and extended follow-up are needed to establish the efficacy of this treatment.

To overcome the limitations of the previous trials,[47,48] another phase 1/2a trial was conducted in the Republic of Korea.[50] The primary purpose of this trial was to study DLT and exploratory efficacy of NEUROSTEM®-AD (hUCB-MSCs) in patients with mild to moderate AD. This two-arm trial studied the effect of repeated IV injections of hUCB-MSCs in the treatment group compared to the placebo-controlled group in two stages. The first stage of trial utilized hUCB-MSCs dose-escalation, followed by randomized and multiple-dose parallel design in the second stage. Fever was the most common ADE reported after IV administration of hUCB-MSCs. Other acute ADEs included headache, nausea and vomiting, which were all subsided within 2 days. However, three participants required extended hospitalization due to ADEs in the low dose group. Finally, five out of 9 participants completed 3-year comprehensive observational study with no other reported ADEs. According to Kim et al., the results of this trial were similar to the phase 1 study conducted in 2011 (NCT01297218,[49] and repeated hUCB-MSCs administrations into lateral ventricle were found safe and tolerated among patients with AD.[51, 52] The phase 2a trial is still ongoing and the clinical efficacy of hUCB-MSCs administration can only be established after extended follow-up and upon completion of this phase.[52]

A combined phase 1/2 clinical trial was conducted to study the safety, and clinical efficacy of adipose tissue-derived MSCs (AD-MSCs) manufactured as AstroStem.[53] 21 participants were included in the trial, which were randomly assigned to treatment and placebo group. Nine repeated IV administrations of AstroStem were given to the participants in the treatment group every 2 weeks. Later, the participants were followed up for 30 and 52 weeks to evaluate treatment-related ADEs and the clinical efficacy of the treatment. Pulmonary embolism, stage IV squamous cell carcinoma, and diarrhea were the most common reported ADEs. Other ADEs included fatigue, weight loss, dysphagia, glaucoma, and dehydration. The Alzheimer's disease assessment scale-cognitive subscale (ADAS-Cog) score of 5.9 (6.8) was reported in AstroStem group as compared to 3 (5.4) in the placebo group. [53] A similar randomized, 2-arm, phase 2b study using the same treatment (AstroStem) is undergoing. [54] This study is conducted with 2 treatment arms to evaluate the effectiveness of IV AstroStem compared to donepezil; a cholinesterase inhibitor used to improve mental function. The patients will be followed up at 28 and 40 weeks to study primary and secondary outcomes.[54] A single patient, clinical study focusing on assessing AD-MSCs therapy based on disease severity is registered on Clinical Trials.gov.[55]

To study the safety and clinical effectiveness of Longeveron MSCs (LMSCs), a phase 1, randomized, placebo-controlled clinical trial has been conducted among AD patients.[56] This 3-arm study recruited 25 participants, which were randomly assigned (2:2:1) to the low dose, high dose, and placebo groups. The participants were followed up at regular intervals up to 52 weeks. Although the study has been completed, the results are yet to be published.[56] A phase 2a clinical trial utilizing allogenic human MSCs is ongoing.[57] This study's primary and secondary objectives are to assess the safety and efficacy of hMSCs, respectively. A total of 40 participants will be recruited and randomly assigned to treatment and placebo cohorts (20 patients each). The treatment cohort will receive a drug containing hMSCs, while the placebo cohort will receive ringer lactate solution. Independent review boards will monitor the safety and efficacy.[57] Another phase 1 study,

started in 2019 on hMSCs treatment among AD patients is not yet completed.[58] To assess the effectiveness of hMSCs in the treatment of AD, the results of these ongoing studies will be vital.

Conclusion

Due to their easy isolation and better differentiation potential, MSCs are the most widely used stem cells in human clinical trials. However, the promising results of MSCs therapy in animal models have not yet been successfully translated in the human clinical trials. Although few clinical trials with published results demonstrated safety and tolerability of MSCs therapy in humans during the 24-month follow-up period, but the ADRs associated with this therapy are still a matter of question. Extended, large scale clinical trials are needed to further confirm the safety and feasibility of MSCs therapy. Moreover, the efficacy and therapeutic benefits of this therapy are still to be established. Most of the clinical trials were conducted in patients with mild to moderate AD and hence, the clear picture can only be obtained by the inclusion of patients with severe AD in the later phases of clinical trials. Having said that, it is evident that the MSCs therapy has a great potential to alter disease pathology, as shown during pre-clinical studies. As most of the clinical trials are in early phases, it is possible, with better and vigorous research, that MSCs can become the most effective therapy against AD..

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CASE REPORT

Mycotic tubercular abdominal aortic aneurysm: A case report

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[2] Data collection and editing
[3] literature Review and consent
[4] Referencing, review
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A B S T R A C T

The mycotic tuberculous aneurysm of the Abdominal Aorta is an extremely rare disease. An aortic mycotic aneurysm is a life-threatening condition caused by tuberculous infection. Tuberculous aneurysms of the aorta usually present as rapidly growing or ruptured pseudoaneurysms. Most of these aneurysms are of the pseudoaneurysm type. We presented a case of a 61-year-old man who was diagnosed with a tubercular abdominal aortic mycotic aneurysm associated with the posterior invasion of the vertebral body leading to discitis. The patient underwent a mycotic aneurysm repair with grafting. Even with a combination of surgical and medical treatment, a favorable outcome could not be achieved.

Keywords: *Aortic aneurysm, Tubercular Aneurysm, Mycotic aneurysm*

Introduction

Unlike what the name might suggest, mycotic aneurysms are predominantly bacterial and are referred to as mycotic due to their physical characteristics. According to a study published in 2001 out of the 2520 cases of thoracoabdominal aortic aneurysm reported, only 1.31% were mycotic in nature.[1, 2] Salmonella and Staphylococcus are the most commonly recognized organisms,[3] whereas, Tuberculous aneurysms are seen in extremely rare cases.[4] Currently, there are 2 recognized surgical approaches for the management of mycotic aneurysms of the abdominal aorta; in situ repair and endovascular repair, with preliminary data suggesting that in situ repair is associated with decreased incidence of graft infection but shows higher operative mortality compared to the endovascular approach.[5] However high-quality data is not available for the management of tuberculous mycotic aortic aneurysms.

Case report

The patient is a 61-year-old male with a history of untreated pulmonary tuberculosis. He presented at a local hospital with the complaint of lower back pain for 2 months which radiated to the right leg. There was an associated low-grade fever and a 17 kg weight loss. On examination, there was tenderness over the L3-L5 vertebrae. An MRI was done and the patient was diagnosed with a right-sided iliopsoas abscess and discitis of the L4 vertebrae and an incidental finding of a possible tuberculous mycotic aneurysm of the abdominal aorta just proximal to the aortic bifurcation. Ultrasound-guided drainage of the abscess was performed. The patient was started on Anti-Tuberculous therapy (ATT) and referred to a tertiary care center for elective aneurysm repair. A Computerized tomography study was conducted (Figure 1, *2* and *3*), suggesting a broad-based saccular aneurysm arising posteriorly from the aorta measuring 26 x 47 x 46 mm (AP x TR x CC), closely abutting the L4 vertebral body.

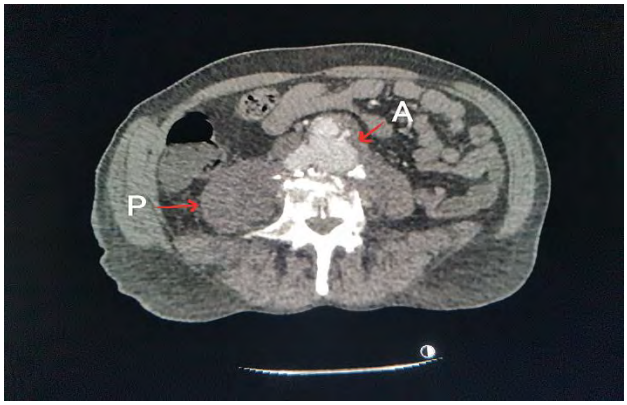

Figure 1: CT Angiogram

An edematous and heterogeneous right psoas muscle (P) is demonstrated due to the presence of the right-sided psoas abscess. Abdominal aortic aneurysm (A) originating from the posterior aspect of the vessel is also visible.

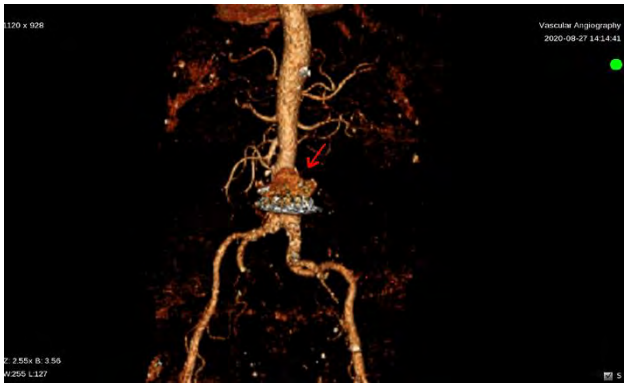

Figure 2: CT Angiogram

A broad-based saccular aneurysm arising posteriorly from the aorta is demonstrated. No active contrast extravasation visible.

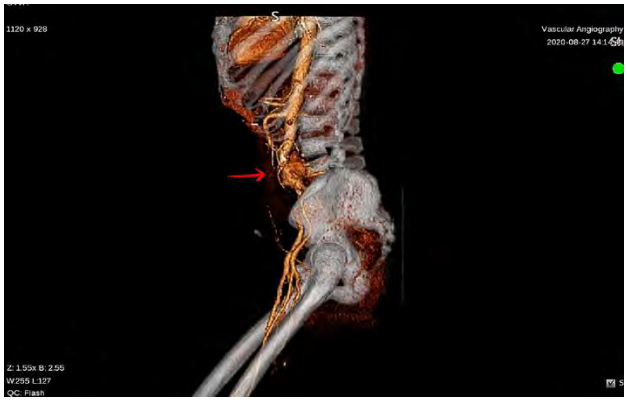

Figure 3: CT Angiogram

A broad-based saccular aneurysm measuring 26 x 47 x 46 mm (AP x TR x CC) is demonstrated.

The patient underwent open surgical repair under general anesthesia, Midline laparotomy was done, the aorta was exposed till the aortic bifurcation, the aneurysm was infrarenal. Proximal and distal control was obtained, and repair was done by resecting and then using a 16x08 Dacron graft. Omentum was packed and secured over the Dacron graft, and the aortic wall was sent for culture and Acid-fast bacteria.

The patient was extubated on postoperative day 1. He remained stable on postoperative days 1 and 2. He subsequently developed increasing abdominal distension and shortness of breath along with worsening renal function tests, hence there was a suspicion of abdominal compartment syndrome secondary to intraperitoneal hemorrhage or fluid overload. The patient and family were offered a re-laparotomy, but they refused. The patient subsequently expired on post-op day 6 due to cardiac arrest.

Discussion

Tuberculous aortitis was first described in 1882.[1] The transmural perforation induced by direct extension of a contiguous tuberculous focus to the vessel, most commonly lymphadenitis,[6] but also the pulmonary,[7] digestives,[8] or spinal TB, is the most common cause of tuberculous aneurysms. Other theories have been proposed, such as spread via blood through the vasa vasorum[9] or an autoimmune response to the tuberculosis.[10] The aorta is the most common site of involvement, affecting both the thoracic and abdominal aortas.[11]

Diagnosing tuberculosis can be difficult if not suspected initially. A preliminary diagnosis is often made based on the presence of A.F.B on microscopic examination of a medical specimen. Treatment may be continued to completion of a conventional course of anti-tubercular medication if Mycobacterium tuberculosis is isolated or confirmed via further testing.

Previously done studies show the evidence that in the tuberculous aneurysms which were treated with a combination of medical and surgical treatment such as periaortic tissue debridement and in situ or extra-anatomic reconstruction accompanied by anti-tuberculous drug therapy for a long time, the mortality rate was just 14%. [9]

Despite the effectiveness of suturing the false aneurysm primarily and its closure by synthetic patch, aortic replacement is recommended since determining the degree of damage to the wall of aorta intraoperatively is challenging.[9] According to a study the normal treatment for tuberculous aortic aneurysm includes graft placement (in situ) along with anti-tuberculosis medication in the majority of cases with long-term follow-up, which usually reveals no signs of future false aneurysms.[12]

Endovascular treatment of tuberculous aortic aneurysms has also been reported in a few places and is now an emerging new surgical option.[13] Endovascular repair may be linked with a significant risk of infection, recurrence and severe bleeding because it does not allow comprehensive debridement of infected periaortic tissues.[14] Furthermore, surgical repair of tubercular aortic aneurysm can have some serious complications such as life-threatening bleeding and prosthetic graft infection.

Conclusion

Tuberculous abdominal aortic aneurysms are extremely rare. However, in the Southeast Asia region where tuberculosis is endemic it is not uncommon and should be suspected highly. As surgical treatment alone cannot cure a tuberculous abdominal aortic aneurysm a prompt diagnosis of tuberculous involvement should be made with the initiation of ATT as soon as possible. The surgical treatment of aortic aneurysms is associated with certain complications, in our case, the patient developed a suspicion of abdominal compartment syndrome secondary to intraperitoneal hemorrhage or fluid overload for which he was offered re-laparotomy, but he refused, leading to ultimately the patient's unfortunate demise.

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All such articles should aim for development of medical concepts rather than mere recording of facts. Incomplete studies will be discouraged.

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1. To publish original, well documented, peer reviewed clinical, allied and basic health/medical sciences manuscripts.
2. To inculcate the habit of medical writing.
3. To enable medical professionals to remain informed in multiple areas of medical and health sciences, including developments in fields other than their own.
4. To share the experience and knowledge for benefit of patients in particular and humanity in general.
5. To document medical problems and challenges pertinent to community.
6. To achieve the highest level of ethical medical journalism and to produce a publication that is timely, credible, and authentic to read.

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2. Drafting the article or revising it critically for important intellectual content.
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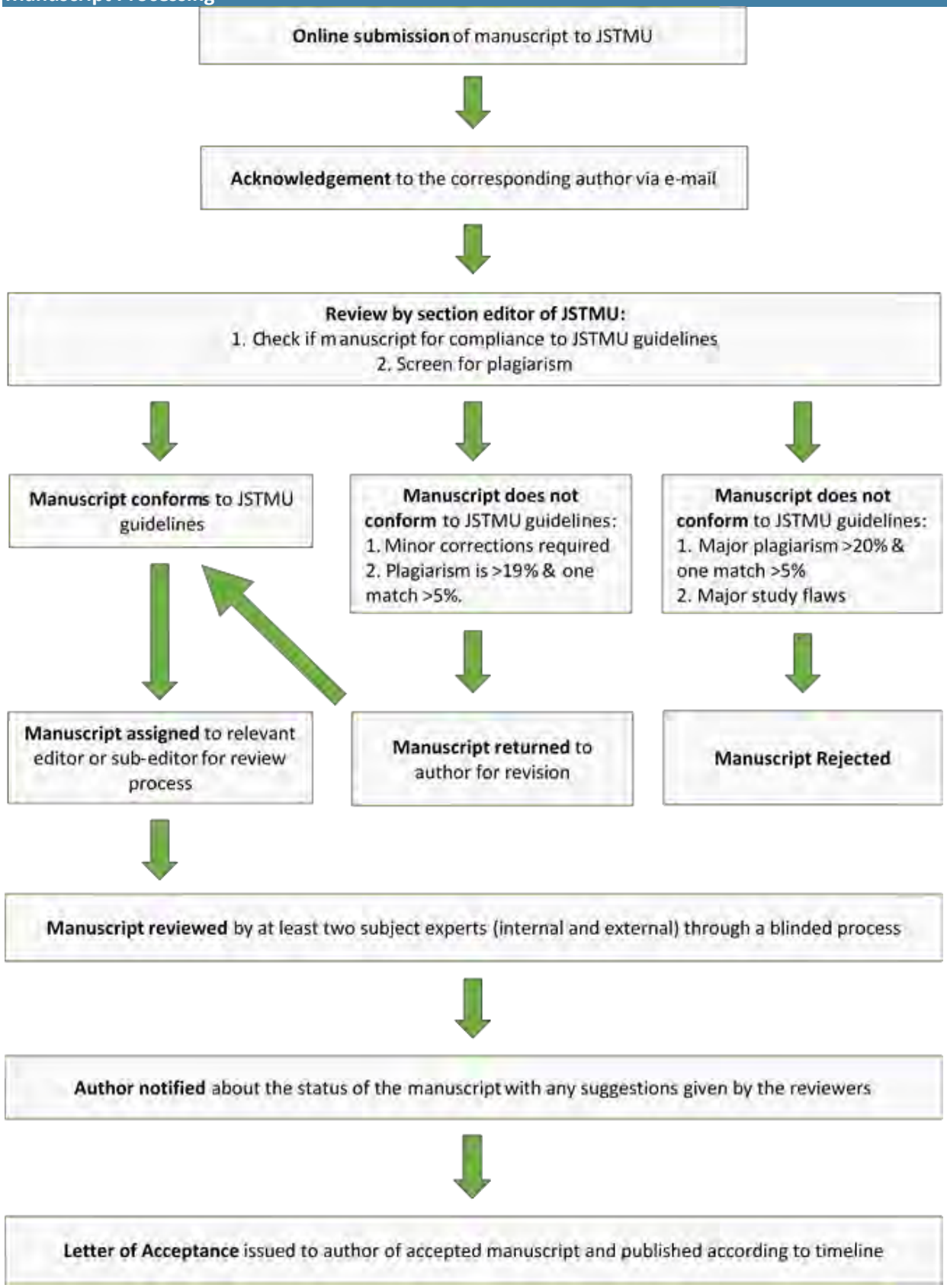

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The abstract should be structured and NOT more than 250 words. The abstract must be written under the following subheadings:

1. Introduction
2. Objectives
3. Methodology
4. Results
5. Conclusion

Text

Text must be arranged under the following headings:

1. Introduction
2. Methods
3. Results
4. Discussion
5. Conclusion(s)
6. Acknowledgements (if any)

Introduction: Should provide brief review of relevant literature in such a way that it highlights the importance of the study and that the purpose of the study should be clearly stated. The articles used in the review of literature should be properly referenced by Vancouver Style.

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No. 1, Figure No. 1) on separate pages. The write-up of results in the text should highlight the important findings without duplication of presentations displayed in the tables or figures. *Explanation of the findings should be reserved for the Discussion section.*

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Equal amounts of dietary carbohydrates have variable blood glucose response considerably as a function of specific food ingested.[1]

Bibliography/References Example:

1. Wolever TMS, Yang M, Zeng XY, Atkinson F, Brand-Miller JC. Food glycemic index, as given in Glycemic Index tables, is a significant determinant of glycemic responses elicited by composite breakfast meals. *Am J Clin Nutr* 2006; 83(6):1306–12.
   DOI: https://doi.org/10.1093/ajcn/83.6.1306

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1. Objectives
2. Methodology
3. Results
4. Conclusion

Text should be organized under the following headings:

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1. Rationale
2. Objectives
3. Research question

Methods:

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2. Participants, interventions, comparators
3. Systematic review protocol
4. Search strategy
5. Data sources, studies sections and data extraction
6. Data analysis

Results:

1. Provide a flow diagram of the studies retrieved for the review
2. Study selection and characteristics
3. Synthesized findings

Discussion:

1. Summary of main findings
2. Risk of bias
3. Limitations
4. Conclusions

** For all other information including title page, typing and reference style, please follow the original articles instructions.*

C. Systematic Review (without meta-analysis): Review articles

Systematic Reviews/ review article are critical evaluation and assessments of scientific literature and other sources of data relating to health sciences topics, emphasizing factors such as cause, diagnosis, prognosis, therapy, or prevention. Systematic Reviews without meta-analysis are published as Review articles; those with meta-analysis are published as Original Investigations.

Systematic Reviews should include the following:

1. Abstract (Unstructured abstract of no more than 350 words)
2. Introduction (150-250 words)
3. Methods (150-250 words)
4. Results (1000-1250 words)
5. Discussion (1000 words)
6. Conclusions (2-3 sentences)

Maximum length: **Should NOT exceed 3500 words of text** (not including abstract, tables, figures, acknowledgments, references), with no more than a total of 5 tables and/or figures and no more than 50-75 references.

** For all other information including title page, typing and reference style, please follow the original articles instructions.*

D. Case Reports/Case Series

The journal will consider only those case report/series that represent very rare case(s), or epidemic diseases that are new or emerging, or first observation(s) of some emerging phenomenon or disease. They should have clinical significance and may also include observation of new adverse effect(s) of a drug, vaccine, or procedure or other unique observations, etc. Informed written consent of the patient or next of kin (if patient is not alive or comatose/disabled) should be obtained before submission of the manuscript. A covering letter from the authors that convincingly describe the merits of the case in the light of the mentioned criteria and it's educational or scientific merits should be sent along with the manuscript.

Case Report /case series should contain a single paragraph abstract and text **should NOT exceed 1000 words** (excluding abstract, references, tables and figures) with maximum 10 bibliographic references and either three figures or three tables. Each case report must contain:

1. Abstract (unstructured - should not exceed 120 words)
2. Introduction
3. Case Presentation
4. Discussion
5. Conclusion
6. Competing interest
7. Patient consent

** For all other information including title page, typing and reference style, please follow the original articles instructions.*

E. Rapid/Special /Short Communications

Rapid/Special/Short communication should be complete work, such as COMPLETE results of a short RESEARCH study, NOT a preliminary report and **should NOT exceed 1500 words** with one figure and/or one table. An editorial decision will be provided rapidly without reviews.

F. Letters to Editor

Letters should only be written on a specific article in the most recent publication of journal. The letter should be objective and provide constructive opinions offer some academic or clinical interest to the readers.
Letters **should NOT exceed 400 words** of text and 5 references, 1 of which should be to the recent article. It should not have more than 3 authors. The text should include the full name, academic degrees, and institutional affiliation for author and the email address for the corresponding author. Letters considered for publication shall be forwarded to the author of the cited article for possible response. The editor reserves the right to shorten these letters, delete objectionable comments, make other changes, or take any other suitable decision to comply with the style and policies of the journal. For writing and references style, follow the same instructions listed above.

Letter in Reply

Replies by authors should not exceed 500 words of text and 6 references. They should have no more than 3 authors.

G. Editorial

The topics of the editorial are decided by editorial board and/or Editor-in-Chief. Editorial is written either by one member of the editorial board or some expert on that topic invited by the Editor-in-Chief. As a convention, the editorial addresses relevant areas of interest that may pertain to a range of areas influencing health and health care sciences.

** For all other information including title page, typing and reference style, please follow the original articles instructions.*

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