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### RESEARCH ARTICLE

#### AWARENESS & KNOWLEDGE REGARDING RESEARCH SKILLS AMONG POST GRADUATE TRAINEE DOCTORS IN TEACHING HOSPITALS IN INDIA

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##### Manuscript History

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#### Abstract

**Introduction:** Medical research is conducted to aid and support the knowledge in Health and Medicine. This is the era of evidence-based medicine. Research experience is essential for emergency physicians, in order to provide the best possible care for their patients. Research is a creative systemic activity undertaken to increase the knowledge of man, society and the use of this knowledge to utilize new medical advancement applications. It is also used to establish a fact and reaffirm the results of previous work, solving new or existing problems and to develop physician research skills.

**Aims and Objectives:** The aim of this study is to assess the awareness and knowledge of research skills among Emergency medicine post graduate trainee doctors in India and to identify any further scope to inculcate research skills of emergency medicine residents leading to contribution in health research.

**Methodology:** It is a multicentre, prospective, survey among Emergency post graduate trainee doctors in teaching hospitals in India. The sample size was 150 done over a period of 1 year.

The inclusion criteria for the study are Master in Emergency medicine Post graduate trainee doctors from teaching hospitals in India.

The exclusion criteria is Non-Emergency post graduate trainee in teaching hospitals in India.

**Results:** It is seen that 53.3% were more than the age of 29, 34.7% were between the age of 26-28 and 12.0% were among the age group of 23-25. It is found that we had male predominant in our study population with 66%. Majority of the participants are in their final year of post-graduation programs with 53.3%. Regarding knowledge 91.3% were able to define research hypothesis. 72.7% believes that research methodology should be made compulsory for postgraduate students. 94% felt that separate time should be allotted during postgraduate course for research with attractive stipend. In regards to practice, it is found that 80% were willing to participate in a workshop methodology to improve their knowledge in research programme. Hence steps should be taken to improve research among postgraduate residents in emergency medicine as doing quality research and publishing is now not only a criterion for career advancement but also for the quality of health care delivery by the physicians and for the outcome of the

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Patients. Similarly, developing a research culture in our medical institutions would ensure that trend setting quality research will emerge from our country.

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### **Introduction:-**

Research is a process used to collect and analyse information to increase our understanding of a topic or issue. It is a creative systematic activity undertaken in order to increase the knowledge of man, society and the use of this knowledge to utilize new applications. It is also used to establish confirm facts, solve new or existing problem and to develop new theories.

Health research is an essential component of medical education to help develop physician research skills. Medical research is conducted to aid and support the knowledge in the field of health and medicine. Every medical practitioner should strive to contribute to the generation of evidence by conducting research[1].According to ACEP, “Evidence based medicine” is the investigation of best scientific evidence, clinical experience and a consideration of preferences, rights and values into clinical decision making. Evidence based medicine (EBM) advocates the use of up to date best scientific evidence from healthcare research as the basic for making clinical decisions. It is widely accepted that evidence-based medicine has significantly contributed to the practice of medicine [2].

In today’s world the importance of medical research cannot be overemphasized. The goal of medical research is to improve healthcare. A literature review shows that data regarding knowledge, attitude, and practices towards medical research among resident doctors in India is still lacking. As per the data till 2008, India holds the twelfth rank among the developing countries in medicine research with a global publication share of 1.59% [1]. There is a need to improve the existing medical research education system in India. It is seen that research programs in medical institutes get the lowest priority due to lack of funding, inadequate facilities for research, inadequate support, poor orientation in research programs and other personal commitment issues .As per the medical council of India (MCI) postgraduate students have to carry out a dissertation project as part of their Doctor of Medicine/Master of Surgery (MD/MS) curriculum [3]. Existing research shows that doctors are not involved in research to the extent that they should be and their involvement in research is on a decline[4].It is observed that majority of postgraduate students conduct research projects during the second or third year of residency. In order to encourage research orientation in resident doctors, MCI has made it mandatory to not only attend one international/national conference, but also give and oral/poster presentation and send the article for publication [6].

An understanding of statistical methods and basic epidemiology are crucial for the practice of modern medicine [5].while the technological advances appear stupendous and attractive, one must not forget that their root are embedded in the knowledge gained through basic research. It is the duty of every doctor to care and provide the best available treatment for his patients, which requires to keep their medical knowledge and training up to date. Therefore, the purpose of this study was to assess and evaluate awareness regarding research skills and knowledge including barriers and obstacles faced bypostgraduate doctors in teaching hospitals in India.

### **Aim and Objectives of the Study:-**

The aim of this study is to assess the awareness and knowledge of research skills among Emergency medicine post graduate trainee doctors in India and to identify any further scope to inculcate research skills of emergency medicine residents leading to contribution in health research.

### **Research Questions:**

1. What is the level of awareness and knowledge of research amongEmergency medicine post graduate trainee doctors in teaching hospitals in India?
2. What are the factors that prevent Emergency post graduate trainee doctors in contributing to medical research in India?
3. What are the measures that can be taken in order to assist post graduate emergency doctors in conducting research?

**Literature review:**

A cross-sectional study done by Chibi RVairamani et al in 2015, on knowledge, attitude and perceived barriers towards conducting research among students in a medical college, revealed inadequate knowledge but a positive attitude towards research. Sufficient training in research methods, skills and institution of mentorship program can boost participation in research [7].

In a cross-sectional study done by Zehra N et al in 2015, on research amongst junior and senior medical students revealed that a working scientific forum should be established in the college with introduction of student mentor link. Students should be guided on how to carry out a research and how to make a good research question, how to develop skills for paper writing and evaluating the data collected [8].

A cross-sectional survey done by Purushottam A et al, concluded that postgraduate students have inadequate knowledge, but have positive attitudes towards health research. Research facilities at the institution need to undergo major transformation in order to encourage meaningful research by postgraduate trainees [3].

In a study done by Dattatray B et al on awareness about medical research among resident doctors in a tertiary care hospital showed that although resident doctors demonstrated a good knowledge and positive attitude toward research, it did not translate into practice for most of them. There is a need to improve existing medical education system to foster research culture among resident doctors [1]. However the study did not give any suggestions on how it can be done or to improve research among resident doctors.

A study done by NahlaKhamis R. Ibrahim et al, on assessment of the research-oriented knowledge, attitude and practice of medical students and interns showed that low knowledge, positive attitudes and fair practice prevailed from the cross-sectional part. Intervention program was successful in improving research knowledge [9].

A survey done by Fatima Mehr et al, on awareness regarding research skills among clinical and academic post graduate doctors in teaching hospitals of Karachi found that post-graduate medical doctors did have positive attitude towards research, but they lacked research skills. They needed in all aspects of research skills [4].

According to a study by Memarpour.M et al, on evaluation of attitude to knowledge of and barriers toward research among medical science students concluded that students showed favourable knowledge of research, but their attitude to the field was inadequate. More attention must be placed on these parameters to improve student interest in health research. The impact of barriers and obstacles on research shows that there is a need for greater availability of ideas and solution in order to solve the problems and change strategies for research [10].

A survey on the attitudes toward clinical research among physicians at Kyoto University Hospital conducted by Sumi E et al, found that the quality of clinical research could be improved if training in clinical research methodology and biostatistics were provided, and if greater assistance in the preparation of study documents requested by the institutional Independent Ethics Committee were available [11].

In a study done by Silcox LC et al, on attitudes toward research, concluded that Residents regard the time needed to learn clinical anaesthesia, schedule conflicts, inadequate faculty support, and a lack of protected research time as the top barriers to undertaking a research project [12].

As per a survey of the attitude and practice of research among doctors done by Saad H, it was found that many GPs had a positive attitude toward research, but had no publications or plan for new research. Lack of time, support, and money were the main constraints for carrying out research [13].

In a survey done by Jonathan L et al, on factors associated with research interest and activity found that exposure to skilled and knowledgeable faculty researchers may stimulate topics, and providing research forums, especially early in residency, may promote research activity. Dedicated time for research and availability of resource personnel will enhance this activity [14].

A study done by Pallampathy S et al on knowledge, attitudes, practices, and barriers towards research among medical students showed that the knowledge score regarding the concept of research and its methodology was 2405/3458 (70%). 60% strongly agreed to include research in undergraduate curriculum, 57% believed that it would facilitate

better understanding of the subject and clinical practice. Nearly 56% opted that research was not waste of time and does not interfere in studies. Barriers for research were lack of awareness (53%), interest (54%), funds (62%), time (59%), and difficulty in follow-up of patients (67%). Almost 59% of students disagreed to lack of encouragement by faculty. Most of the participants had knowledge regarding research and expressed positive attitude toward involvement in research activity. Some of the barriers were lack of awareness, time, funds, and difficulty in patient follow-up [15]. However the study did not suggest any measures on how to solve the problems faced by the residents in conducting research.

In a cross-sectional study done by Sabzwari S et al, on experiences, attitudes and barriers towards medical research, it was found that less than half of the study participants were currently involved in research. Research output may be improved if identified barriers are rectified. Further studies were recommended in this area [16].

A study done by Vinoth Gnana Chellaiyan et al on the perception and barriers to practice of medical research among medical school students of Chennai, showed that Adequate knowledge and positive attitude were lacking in majority of students. Barriers could be addressed by support programs and sensitization towards research [17].

In a survey done by NoorelahiMM et al, to assess perceptions, barriers, and practices of medical research among students, it was found that the most important obstacle predictors that prevent students from conducting a research were inadequate facility for research, lack of interest by faculty or guide, and unavailability of the samples or patients. The students in the study showed a moderately high positive attitude toward medical research. Approaching and solving a students' barriers by faculty staff and administrators are essential in order to ensure an improvement in research activities among medical students [18].

In 2018, a cross sectional study done by Abdul Qadeer et al, on knowledge and attitude of medical students towards research found that most (65%) of the students only new about research and its uses. The rest of 35% had no knowledge or awareness of what research is about and what is the process. Among those 65% who had knowledge, 39% students have conducted research, 16% have previous exposure of conducting research and 23% have done it as a part of mandatory training at medical college(RIHS). The most important finding in this research was suggestion of enforcement of research project in the curriculum and as a part of their assessment. The preponderance of participating students considered it difficult to conduct research, with the most common barrier being lack of time, research training, schooling background, and the lack of motivation. [19]

Another study in 2018 done by Manisha Shrivastava et al, on the assessment of change in knowledge about research methods among delegates attending research methodology workshop, revealed that the medical professionals and students from the field of health care delivery have interest in research methodology and a workshops can play a significant role in teaching research to medical personnel as well in creating enhancement of knowledge among the participants. Assessment tools for studying the long-term effects of such workshops need to be developed to evaluate the results of educational workshops more scientifically. [20]

As per the study done by Bilal et al, on knowledge, attitudes, and barriers toward research among medical students of Karachi, it was reported that apart from medical students, even a students from dentistry, and pharmacy had adequate knowledge of research, which did not improve with the year of training, although their attitude toward the research process was below average. The results of this study have been able to deduce that medical students require motivation and financial support to get involved in research projects. Attention should be also be directed toward research as a part of undergraduate student curriculum and to make available incentives, information, and mentors in order to solve the problems most students face in the field of research. [21]

Some studies were identified that evaluated the knowledge among post graduate trainees but no studies suggested manners to improve research skills among the residents and to solve the problems faced by many in the field of research.

Some studies showed that postgraduate residents have positive attitudes towards research. Due to insufficient training, lack of research curriculum activity and mentor support, it hampers the skills of research among the resident doctors.

Not many studies suggested ways to develop and improve research skills among postgraduate resident doctors in teaching hospitals.

No study were done to evaluate the awareness and knowledge regarding research skills among postgraduate trainee doctors in India, especially emergency medicine residents.

No study done suggested whether research should be part of postgraduate curriculum.

### **Materials and Methodology:-**

This section deals with research methods that will be used in this study to survey the awareness and research skills among post graduate emergency medicine trainee doctors in teaching hospitals of India. The study was conducted in all teaching hospitals India. The study duration was approximately 1 year between 01/01/2018-31/12/2019.

#### **Study Design:**

Author conducted a multicentre, prospective, cross-sectional survey and a pre-validated questionnaire in the form of emails among post graduate emergency medicine residents of teaching hospitals India.

#### **Study Population:**

**Study Sample:** For the purpose of this proposal, data was collected, from all participants fulfilling the inclusion criteria. The expected sample size that was recruited for this study is calculated with the help of "Raosoft" sample Size calculation. The following data were entered:

Population Size: 250

Confidence Level: 99%

Margin of Error: 5%

Response of Distribution: 50%

**The sample size required for this survey was calculated as 152, rounded to 150 with the following formula:**

Sample size n and margin of error E are given by,

$$x = z(c/100)^2 r(100 - r)$$

$$n = Nx / ((N - n) E^2 + x)$$

$$E = \text{sqrt}[(N - n)x / n(N - 1)]$$

Where N is the population size, r is the fraction of responses that you are interested in, and z(c/100) is the critical value for the confidence level c.

#### **Eligibility criteria:**

##### **Inclusion criteria:**

Master in Emergency medicine Post graduate trainee doctors from teaching hospitals in India during the period of study.

##### **Exclusion criteria:**

Non-Emergency post graduate trainee in teaching hospitals in India.

#### **Data Collection:**

The questionnaire was designed based on guidelines of knowledge of research methodology and drafted in English language. It consisted of approximately twenty five standardized questions divided into four sections.

##### **Section A:**

Demographics of post graduate emergency medicine residents.

##### **Section B:**

Assessment of knowledge, attitude and practices.

##### **Section C:**

Obstacles preventing residents from doing medical research.

##### **Section D:**

Suggestions and measures that can be implemented to promote research.

Though taken and based on standardized format, the questions were further validated via pilot testing with a group of post graduate resident emergency medicine doctors.

### The Survey:

The author proposes to carry out a questionnaire based survey among Emergency post graduate residents from teaching Hospitals in India and an electronic survey using the web based software “survey monkey” (<http://www.surveymonkey.com>) which will allow secure , anonymous distribution of questionnaire via the internet. An Excel containing the aims and objective of the study with a link to the survey will be distributed among Emergency post graduated resident doctors. After initial e-mailing, 2 reminders sent out approximately every 3 weeks to physicians who had not responded to the survey. There is no incentive for participation and physicians who do not want to take part in the study, they do not have to and that non participation will have no effect on their professional careers since questionnaires are anonymous.

### Statistical Analysis:

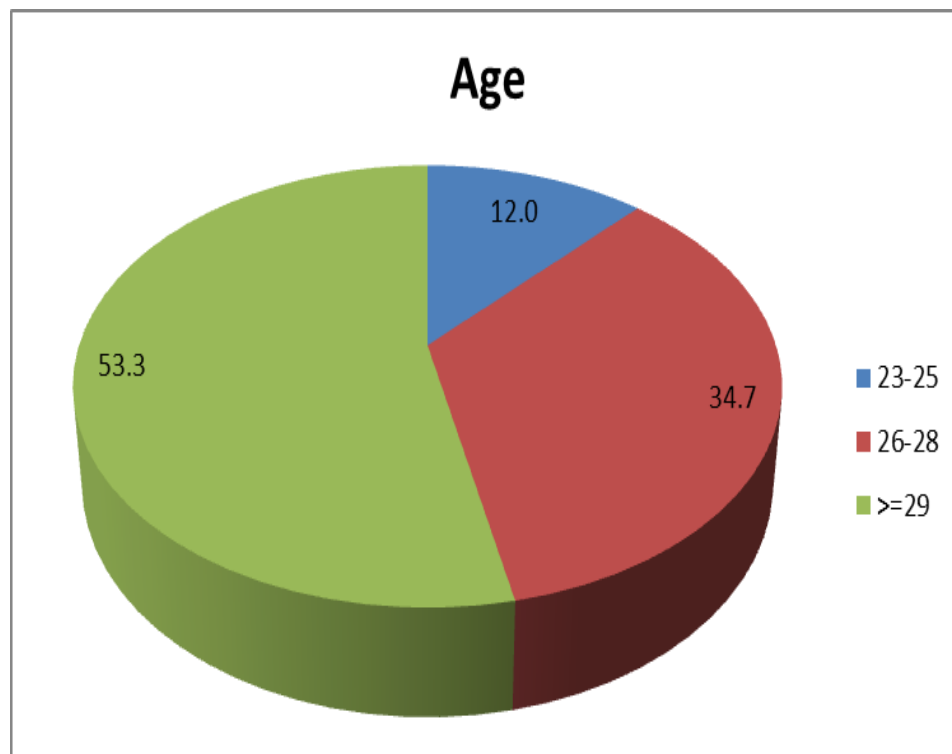
For statistical analysis, data were entered into a Microsoft excel spreadsheet and then categorical variables were expressed as Number of participants and percentage of participants. The statistical software SPSS version 20 has been used for the analysis. Microsoft Excel 2007 have been used to make the diagrams.

### Result and Analysis:-

#### Age:

**Table 1:-** Distribution of age in years.

AGE	Frequency	Percent
23-25	18	12.0
26-28	52	34.7
>=29	80	53.3
Total	150	100.0



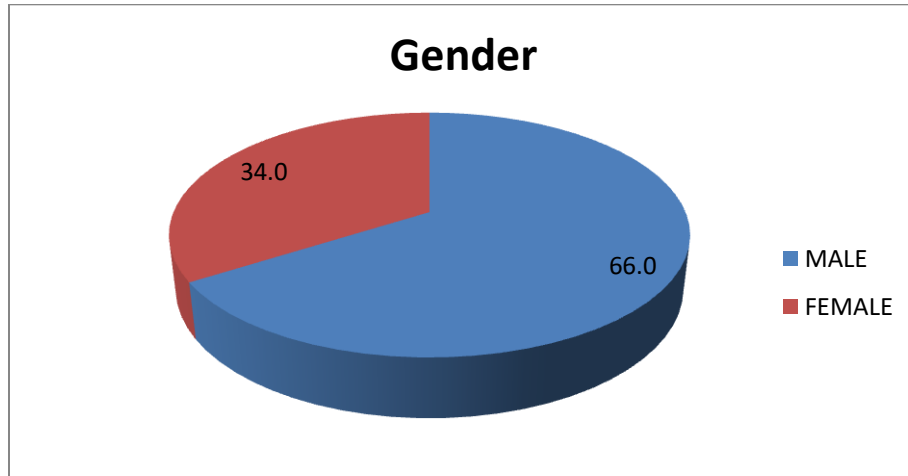
**Figure 1:** Pie chart depicting age wise distribution of participants.

The above diagram shows majority of the participants (53.3%) belonged to the age group of more than 29 years, 34.7% of them were between the age of 26 -28 and 12% were between the age of 23-25.

**Table 2:-** Distribution of gender.

**Gender:**

GENDER	Frequency	Percent
MALE	99	66.0
FEMALE	51	34.0
Total	150	100.0



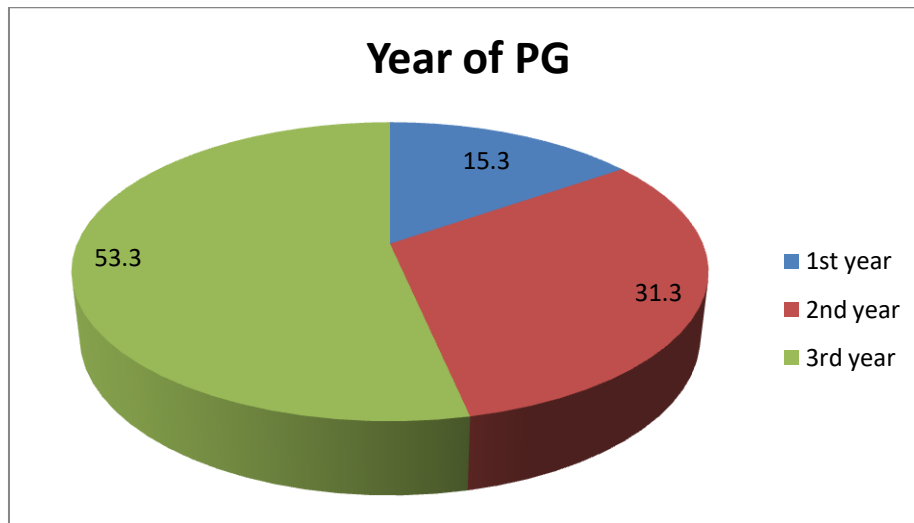
**Figure 2:-** Pie chart depicts the gender distribution of participants.

66.0% residents were male and 34.0% were female participants.

**Table 3:-** year of residency of postgraduate residents.

**Year of residency:**

YEAR	Frequency	Percent
1 <sup>st</sup> year	23	15.3
2 <sup>nd</sup> year	47	31.3
3 <sup>rd</sup> year	80	53.3
Total	150	100.0



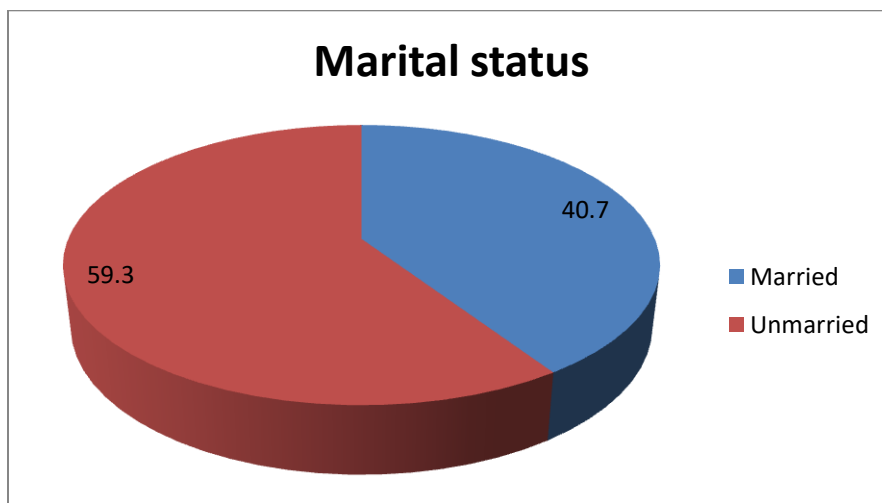
**Figure 3:-** Pie chart depicts the distribution of year of residency.

53.3% of them were in final year, 31.3% were in 2<sup>nd</sup> year and 15.3% were in 1<sup>st</sup> year.

**Table 4:-** Distribution of marital status.

**Marital status:**

Marital status	Frequency	Percent
Married	61	40.7
Unmarried	89	59.3
Total	150	100.0

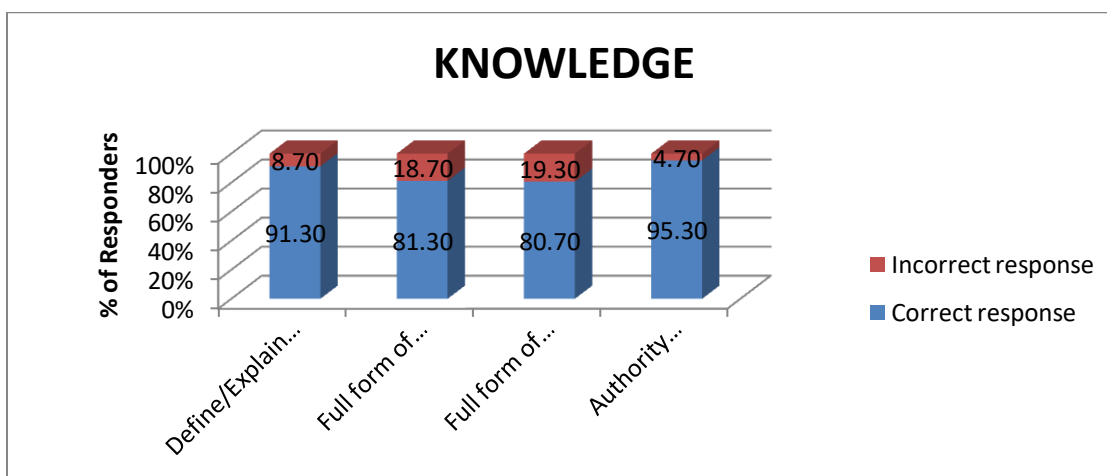


**Figure 4:-** Pie chart depicts the distribution of marital status of participants.

Among the participants, 59.3% of them were married and 40.7% were unmarried.

**Table 5:-** Assessment of knowledge and awareness about medical research.

Statement	Correct response Number (%)	Incorrect response Number (%)
1. Define/Explain research hypothesis	137(91.3)	13(8.7)
2. Full form of MEDLINE	122(81.3)	28(18.7)
3. Full form of MEDLARS	121(80.7)	29(19.3)
4. Authority responsible for approval of new drug trials in India	143(95.3)	7(4.7)

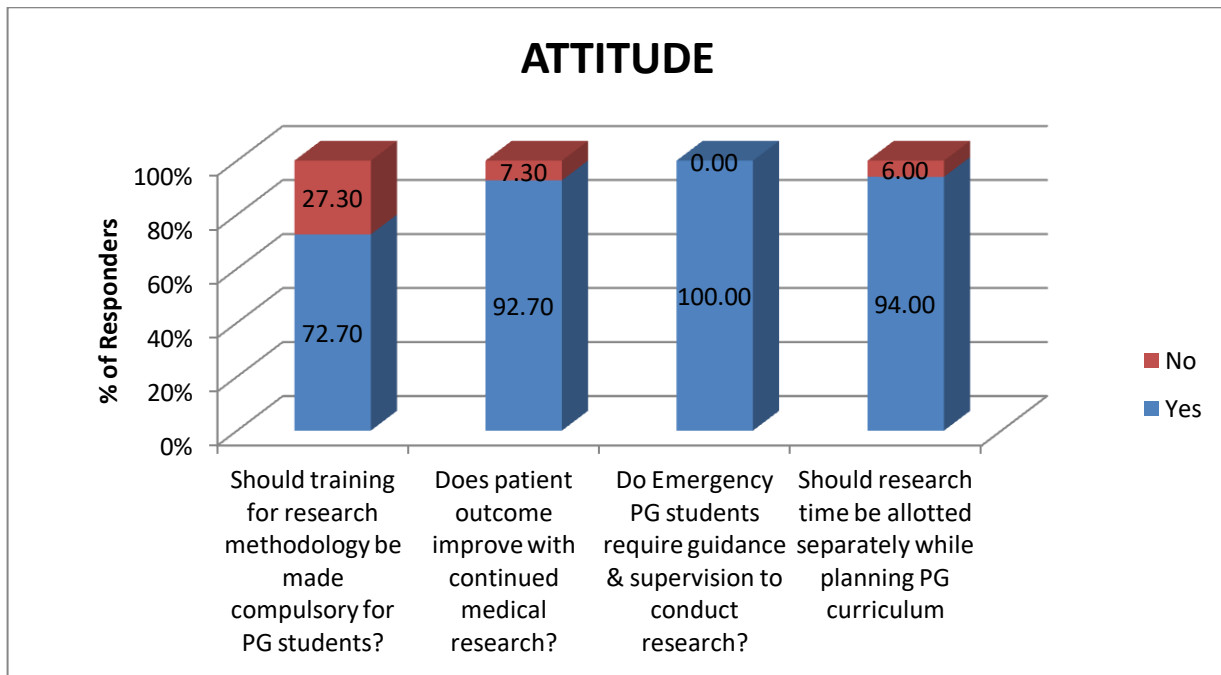


**Figure 5:-** Bar diagram depicts about the knowledge and awareness among the residents.

91.30% were able to define hypothesis.81.30% had knowledge about the medical data base for research. More than 90% answer correctly for the authority responsible for approval of new drug trials in India.

**Table 6:-** Responses given by residents doctors related attitude.

Attitude	Yes n (%)	No n (%)
Should training for research methodology be made compulsory for PG students?	109(72.7)	41(27.3)
Does patient outcome improve with continued medical research?	139(92.7)	11(7.3)
Do Emergency PG students require guidance & supervision to conduct research?	150(100)	0(0)
Should research time be allotted separately while planning PG curriculum ?	141(94)	9(6)



**Figure 6:-** Bar diagram depicts about the attitude of residents towards medical research.

72.70% had an opinion that research methodology should be included in PG students. More than 90% had positive attitude regarding patient outcome. Morethan 90% had an opinion that separate time should be allotted for research.

**Table 7:-** Responses given by residents regarding research practices.

Practices	Yes n (%)	No n (%)
Are you willing to participate in workshop on Research methodology?	121(80.7)	29(19.3)
Do you have publication in journals?	14(9.3)	136(90.7)
Have you presented poster/research paper in a state/national conference?	31(20.7)	119(79.3)
Do you have experience of writing research paper/case report	75(50)	75(50)

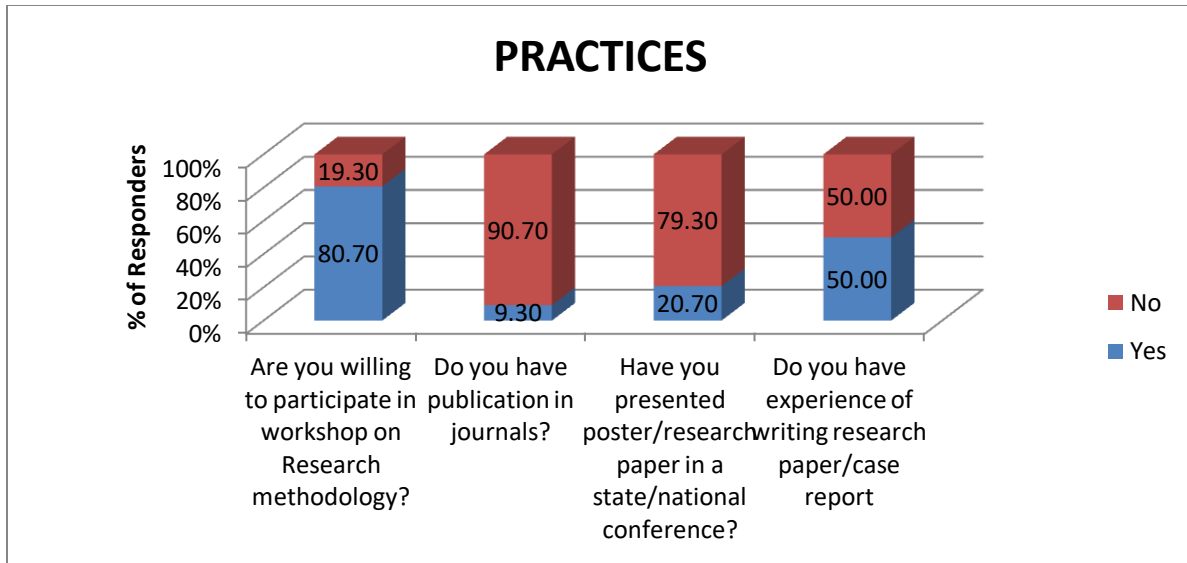


Figure 7:- Bar diagram depicts the practices of residents towards research.

80.70% residents were willing to participate in workshop. Only 9.30% have journal publications. 20.70% had presented a research paper and 50% have experience in writing a research paper.

Table 8:- Reason among PG students for not conducting medical research.

Personal reasons:	Frequency	Percent
Lack of interest	15	10.0
Lack of time due to vast curriculum of PG subjects	72	48.0
Inadequate facilities for research	44	29.3
Other personal commitments like marriage/family etc.	19	12.7
Total	150	100.0

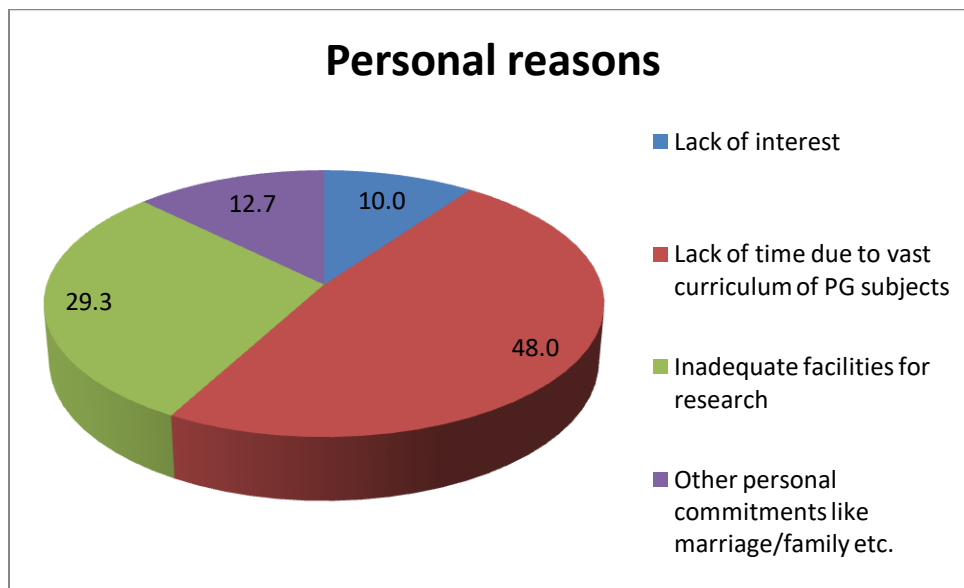
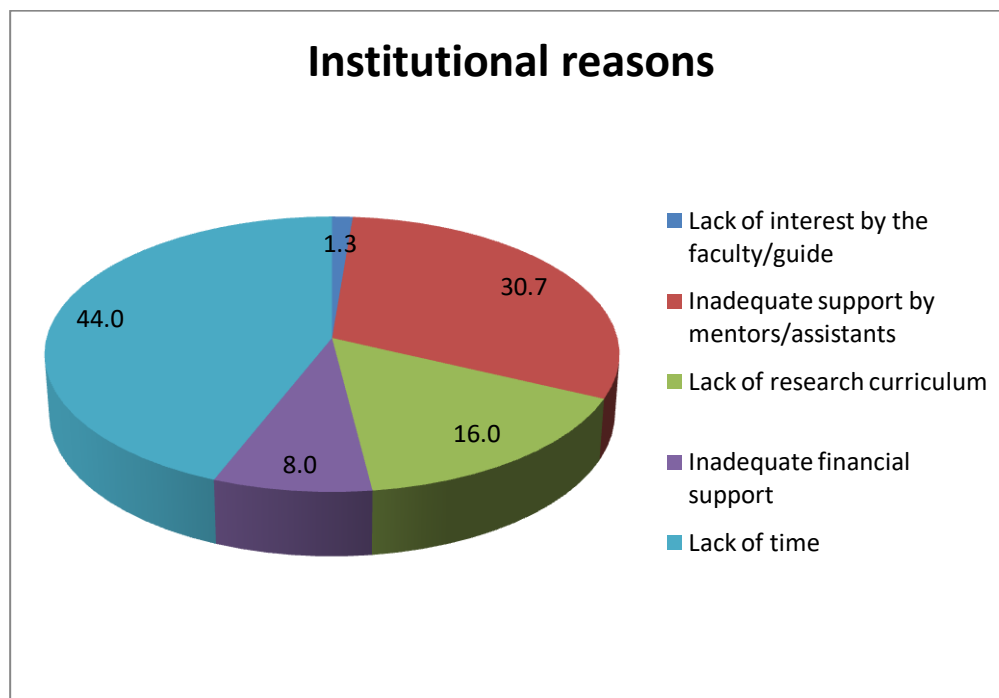


Figure 8.1:- Pie chart diagram depicts personal reasons for not conducting a research.

48% were giving reason due to lack of time and vast curriculum of PG subjects. 29.3% gave reason due to inadequate facilities for research, 12.7% had other personal commitments like marriage/family and 10% due to lack of interest.

**Table 8.2:-** Institutional reasons.

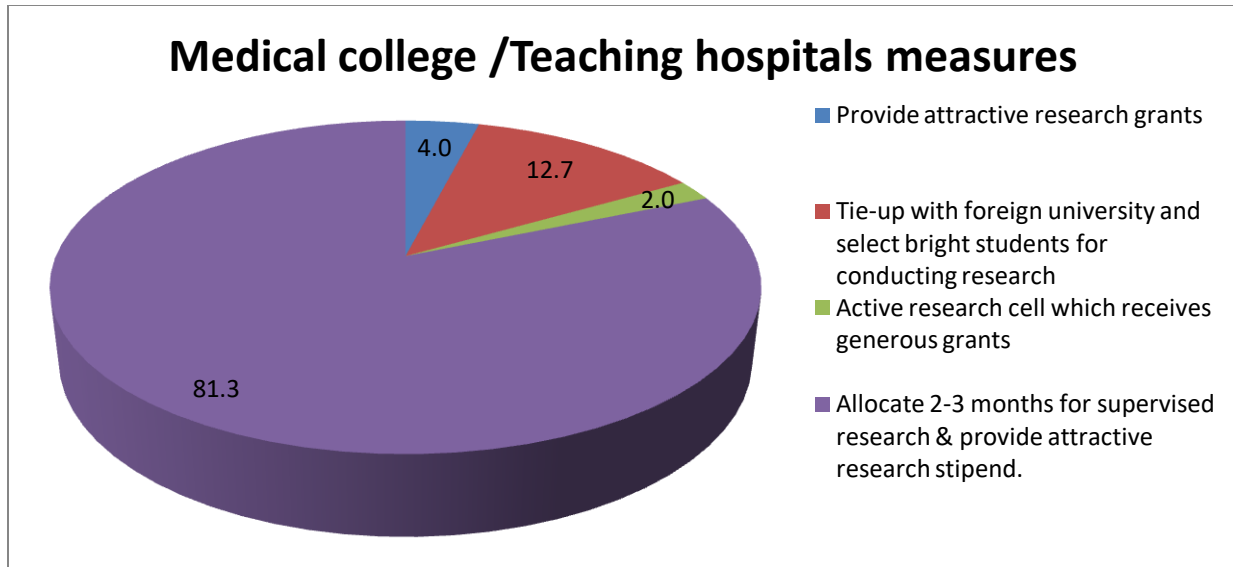
Institutional reasons	Frequency	Percent (%)
Lack of interest by the faculty/guide	2	1.3
Inadequate support by mentors/assistants	46	30.7
Lack of research curriculum	24	16.0
Inadequate financial support	12	8.0
Lack of time	66	44.0
Total	150	100.0

**Figure 8.2:-** Pie chart diagram depicts an institutional reasons.

44% of the residents gave reason due to lack of time, 30.7% answer due to inadequate support by mentors/assistants, 16% of the residents answer due to lack of research curriculum and 1.3% answer due to lack of interest by the faculty/guide.

**Table 9:-** Response given by PG residents for promoting research in medical college.

Medical college /Teaching hospitals measures	Frequency	Percent
Provide attractive research grants	6	4.0
Tie-up with foreign university and select bright students for conducting research	19	12.7
Active research cell which receives generous grants	3	2.0
Allocate 2-3 months for supervised research & provide attractive research stipend.	122	81.3
Total	150	100.0



**Figure 9:-** Pie chart diagram depicts measures to improve medical research.

81.3% of the residents chooses to allocate 2-3 months for supervised research, 12.7% chooses a tie-up with foreign university, 4% chooses to provide attractive research and 2% for active research cell.

### Discussion:-

Medicine is an ever-changing science and mandates on-going research. Whereas we in India only start our research during postgraduate programmes. At present, it has become mandatory to do research or thesis as per MCI. In our studies we tried to find the level of knowledge and awareness regarding research skills among postgraduate doctors in India and whether the current infrastructure is adequate to develop interest among the residents to do a research.

In our study, out of 150 postgraduate residents, 53.3% were more than 29 years of age and 34.7% were among the age of 26-28 years as compared to few studies done by Purushottam A et al (3), Mehr Fatima et al (4). We had male predominant in our study population with 66%. Among the study group, 53.3% residents were in their 3<sup>rd</sup> year of postgraduate programme while 31.3% were in their 2<sup>nd</sup> year and 15.3% were in their 1<sup>st</sup> year of postgraduate programme.

In our population we found that the responses given by the participants regarding knowledge, attitude and practice towards research, 91.3% were able to define research hypothesis, whereas 81.3% and 80.7% knew the full form MEDLINE and MEDLARS respectively. Majority of the residents 92.7% believed that patient outcome improves with continued medical research. Among 150 students, 72.7% of them agreed that training for research methodology should be made compulsory for postgraduate students. 94% strongly believed that separate time should be allotted for doing their thesis or research projects and that 100% required guidance and supervision to conduct their research. In regards to practices, we found that 80% of them were willing to participate in workshop on research methodology, whereas 50% of them had experience in writing research paper/case report. 20.7% had presented a poster/research paper in a state/national level and 9.3% had publications in journals.

In our study, residents reported significant barriers and obstacles for poor research which were lack of time due to vast curriculum of postgraduate subjects (48%), inadequate facilities for research (29.3%), other personal commitments like marriage/family (12.7%) and lack of interest (10%). Other than personal reasons, it was found that the residents also faced some barriers from the institution such as inadequate support by mentors/assistants (30.7%), inadequate financial support (8%) and lack of interest by the faculty (1.3%). Similar obstacles for research among residents have been reported in a study done by Pallampathy S et al. [15]

A question was asked to the participants on what can be done to improve research in medical institution and it was found that 81.3% of them strongly believed that at least 2-3 months should be allocated for supervised research and to provide attractive research stipend. 12.7% of them gave an answer that selection of a bright student for conducting

research and a tie-up with foreign university could improve research in an institutions whereas 4% and 2% wanted attractive research grant and active research cell respectively.

During our study period we do have few limitations. We found that we have taken only emergency medicine speciality which shows the data of one speciality and does not involve other clinical or Para clinical. We could not include the questions that involve a broad range of topics for research methodology. Total sampling size was 150 and we received a total of 150 responses from the participants and adequate data collections were entered.

### **Conclusion:-**

Health research training is important in medical education to promote health and patient outcome. In our study population we found that 92.7% have agreed that patient outcome improve with continued medical research. Most of the participants however agreed that research methodology should be made mandatory in postgraduate programme. 94% felt that separate time should be allotted during postgraduate course for research with attractive stipend. In regards to practice, it is found that 80% were willing to participate in a workshop methodology to improve their knowledge in research programme. There are several significant barriers and obstacles faced by the residents during their postgraduate curriculum. To overcome these barriers, proper guidance and assistance from the institutions is recommended. Hence steps should be taken to improve research among postgraduate residents in emergency medicine by providing adequate assistants or mentors from the institution, adequate facilities for research as doing quality research and publishing is now not only a criterion for career advancement but also for the quality of health care delivery by the physicians and for the outcome of the patients. Similarly, developing a research culture in our medical institutions would ensure that trend setting quality research will emerge from our country.

### **Limitations of the study:**

1. The study does not do any training in research methodology.
2. The study is based on the sampling method including 150 residents.
3. The study will only involve the teaching hospitals in India.

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