

## Evaluating Indian Professionals Knowledge for Innovation and Need for Patent Education

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### ABSTRACT

The Patent system encourages invention, disclosure, and investment. Several patents are granted in medical sciences, but a misconception remains with health care professionals regarding criteria for patentability of their valuable invention. Though the Indian Patent system has promoted the progress of science and technology, its scope has not been extended to treatment procedures in medical and dental sciences. This research was conducted to assess the knowledge and awareness of health care professionals about the Indian patent system. The study was conducted to assess the awareness and knowledge of the Indian patent system and the need for patent education among professionals of different streams. This cross-sectional study was carried out among private practitioners of different streams (medical and dental, ayurvedic, and homeopathic). Results made a poor show of patent education and knowledge. Only 6% of participants had more than 50% knowledge regarding this topic. Since educational institutions are opting for accreditations. Research and innovation is an important criterion for that. This study highlighted that there is a great need for patent education for professional and institutional growth.

### 1. Introduction

Intellectual property (IP) has a remarkable role in the current economy. Intellectual labor along with innovation may benefit at the public level if given due significance. IP is a novel concept generated in the human mind or intellect, artistic, technical, scientific, or literary. Intellectual property right (IPR) is a legal right or exclusive right granted to the creator or inventor so that he/she can protect his/her invention for a definite period of time. IPR protects funds, investments, time spent in the invention, and cost utilized in addition to efforts. Similar to other properties, IPR can also be transferred or sold. (Saha & Bhattacharya, 2011) The patent is an intellectual property right. Its protection ensures a fair return for companies on their investment or the cost of making a product from an invention.

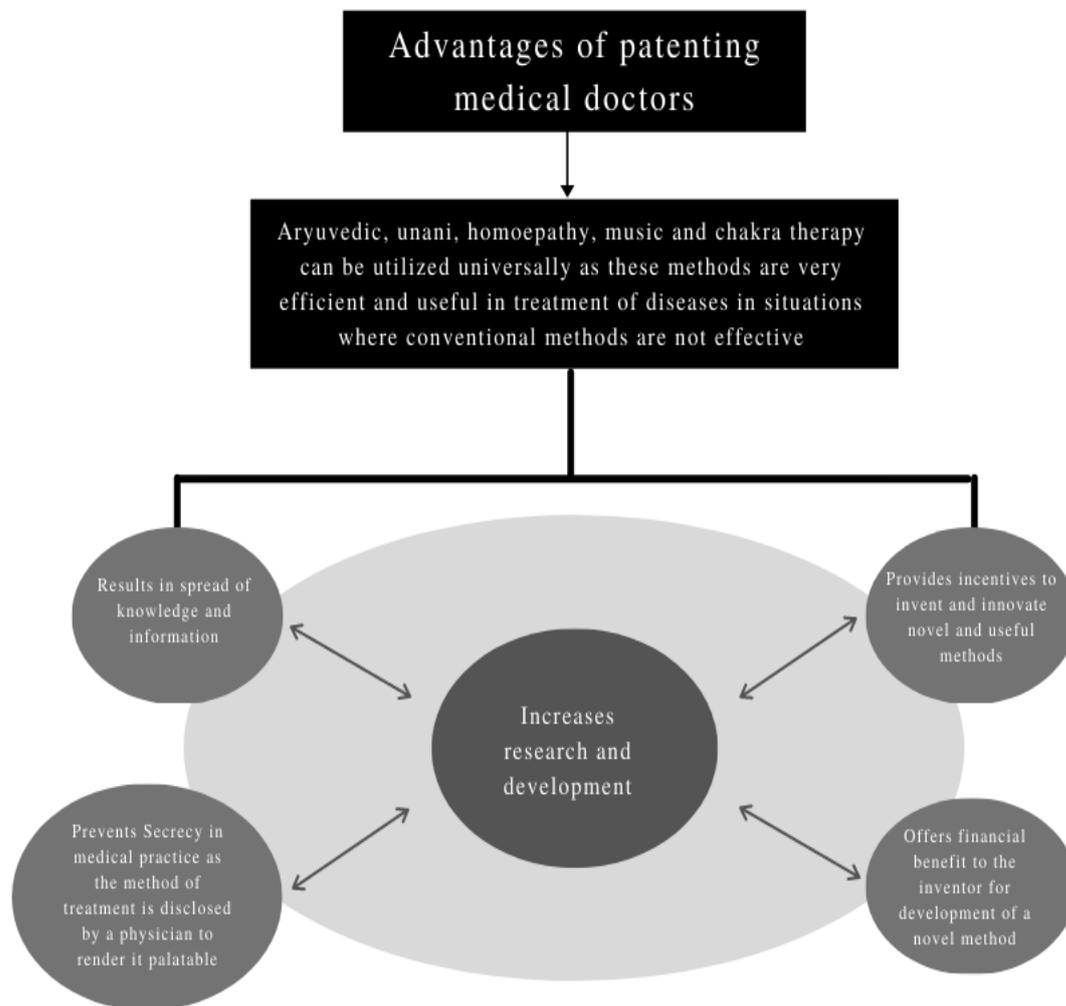
Patent rights are obtained by filing a patent application in the patent office. (Heus et al., 2017) Graduates, students in educational institutes, and universities are indulged in innovation. Hence projects and innovative work needs support which in turn adds to reputation (Kassiri, Corejova, 2015). The Patent system encourages progression in science & technology. It provides incentives for an invention, disclosure, and investment, which encourages

innovation and efficient use of that invention. Developing countries are taking remarkable inspiration from developed countries to efficiently use the patent system to improve the economy which is the most important aspect. In the era of evidence based medicine health care professionals are incorporating rigorous efforts for research and development. Medical methods are excluded from the scope of patentable subject matter in most of the countries on the grounds of ethical issues in medicine. (WMA Statement on Patenting Medical Procedures, 2019) Medical devices range from simple products i.e. disposable gloves to highly technical and complex products i.e. surgical implants. Diagnostic kits and drug delivery systems are also included in this category.

Devices are required to yield results equivalent to clinical trials of medicinal products to prove their safety and efficacy. Section 4A of the Patents Act 1977 (as amended by the Patents Act 2004) states that methods for treatment of the human body or animals by surgery or therapy and diagnostic methods are not patentable whereas patents for medical devices are possible (Intellectual property and access to medicines, 2012). Patent protection can be granted for surgical, diagnostic or therapeutic instruments or apparatus if they demonstrate novelty with regard to

the way to be used in surgery or therapy. Patent protection for a known medical device (e.g. an injector pen for injecting insulin) cannot be provided for supplementary use (same injector pen to deliver another drug for the treatment of a different illness). A few products fall on the margin between medical devices and medicinal products. (Fact Sheet Intellectual property considerations for medical devices, 2018). IPR management of medical devices, treatment, and diagnostics is very important (Dixit et

al., 2011). According to Section 4A, If medical methods are patented, they should have an industrial application, but they do not have any such effect (WMA Statement On Patenting Medical Procedures, 2019., Indian patent act 1970, 2015). If the Indian patent system permits patent of these methods, then it can serve several advantages, as shown in fig.1 (Gupta et al., 2018; Method of Treatment A Patent Perspective, 2017, Kassiri, Corejova, 2015).



**Figure 1.** Advantages of Patenting Medical Methods

As per Section 3(i), any process carried out for the prophylactic, curative, surgical, medicinal, or any other therapy for humans/animals/ plants to cure a

disease or money-making is non-patentable. (Indian patent act 1970, 2015). Examples of some methods are shown in table 1 and table 2.

**Table 1.** Method for treatment by surgery or therapy or medicinally and diagnostic and therapeutic method excluded from patentability (Examination Guidelines for Patent Applications relating to Medical Inventions in the Intellectual Property Office (2016)

Method for Treatment	Example
Surgery	<p>surgical treatment including incision, excision, injection and implant insertion, maintenance, operation, and extraction of a medical device like a catheter, endoscope inside the human body</p> <p>preparatory treatment for surgery- anesthesia for surgery and disinfection of skin before injection/incision</p> <p>cosmetic methods</p>
Therapy	<p>providing medicine or physical treatment to a patient - for disease cure or control</p> <p>implanting of a medical device or transplant of an organ –</p> <p>preventing a disease –e.g., tooth decay or influenza</p> <p>maintenance of physical health -e.g. massage or Yoga or Pranayama</p>
Curative and prophylactic	<p>treatment of a disease in general</p> <p>curative treatment and alleviation of the symptoms of pain and suffering</p>
Medicine	<p>administration of different drug forms –i.e., capsule, tablet, syrup, injection for the treatment</p> <p>dosing drugs at definite time interval treatment</p> <p>mixing two or more forms of the medicine for the treatment</p> <p>drug dose form</p>
Diagnostic	<p>Determination of diseases and physical health, the mental condition of a human body, or prescription or treatment/ surgery plans based on these conditions.</p> <p>(excluding determination by a device) determination any complication inpatient by observing the test result or imaging</p>

**Table 2.** Few Examples of Patent Applications in Medical and Dental Sciences

Patent application no.	Title	Specification (ref)
US20040167646A1	Methods for dental restoration	provides a method for preparing dental restorations (Methods for dental restoration)
US 8,759,391 B2	Topical anesthetic for rapid local Anesthesia	a drug is applied topically to an area for injection such that the dermatological procedure (cosmetic injections) can be performed in fifteen minutes (Topical Anesthetic For Rapid Local Anesthesia, n.d)
US 3,860,704	Dressing for dry tooth socket	the invention comprises a composition for relieving pain and promoting healing in the treatment of dry socket, following tooth extraction (Dressing for dry tooth socket, n.d)
US 7,021,932 B2	Device for tooth extraction	a tooth extraction device with a clamp assembly to clamp a tooth to be extracted, and a handle so that clamp assembly can be placed in the mouth of the patient (Tooth Extraction Device, n.d)
US 5,244,390	Dental scaling instrument	for scaling artificial dental abutments made of titanium and it is dilute alloys, which are softer than natural dentition without scratching the

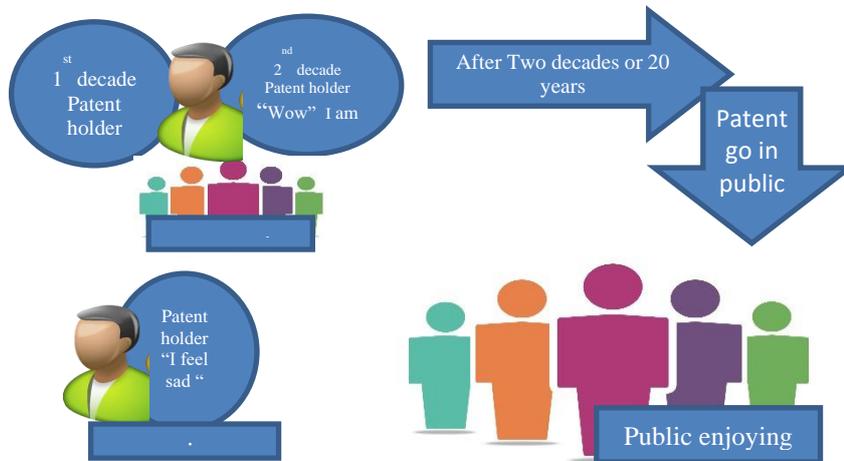
		abutment surface (Dental Scaling Instrument, n.d)
US 5,401,504	Use of turmeric in wound healing	method of promoting healing of a wound in a patient, which comprises administration of turmeric to the patient (Use of Turmeric In Wound Healing, n.d)
US 6,955,538 B1	Equipment for deposition of medicine in the mouth	the method is designed to place a slow-release supply of a substance in the oral cavity with a device designed to implement Equipment concerning the depot of medicament in the mouth, n.d.)
US OO5266330A	Method for treating pressure ulcers using calendula	method for treating human disease conditions and use of the plant extract calendula to treat ulcerative skin conditions (Method for treating pressure ulcers using calendula, n.d)
Indian Patent Application Number 1266/DELNP/2005	Dental care herbal formulation and it is preparation	a herbal formulation comprising a combination of active fractions from Citrullus colocynthis and neem for control of dental plaque and gingivitis (Dental Care Herbal Formulation and Its Preparation Thereof, n.d)
Indian Patent Application Number 2002/MUM/2011	Pharmaceutical combination	a combination containing Hydroxychloroquine and a DPP-IV inhibitor or their pharmaceutically acceptable salts for prevention, slowing the progress, improvement, treating a condition or a disease due to metabolic disorders (Pharmaceutical Combination, n.d)
Indian Patent Application Number 4803/KOLNP/2008	A device for Securing a dental implant in bone Tissue	Device for securing a dental implant in bone tissue, for example, the jawbone of a patient or the zygomatic bone of a patient. The application also relates to a method of making a surgical template and to a process of securing a dental implant in bone tissue (Device for Securing A Dental Implant In Bone Tissue, n.d)
US 2008/0209650 A1	Oral hygiene Device	devices employ an ultrasound transducer (Oral Hygiene Devices, n.d)

On the other hand, blanket prohibition has been laid by developing countries on medical procedures via statutory provisions. This dissimilarity between the developing and developed nations is raised due to social circumstances and national patent processes. (WMA Statement on Patenting Medical Procedures (MAY, 2019) In dentistry, various patents have been granted in foreign countries, which may be because of a better understanding of IPR. Patent grants and applications are very few in India. (Bijle, 2011) some of the patent applications are shown in table 2.

Intellectual property is the creation of the human mind (intellect) (Bijle, 2011), and the right

granted is termed an ‘Intellectual Property Right’ (IPR). (What is Intellectual property? 2020) A patent is granted for 20 years to an inventor, excluding others from using or making a particular invention. (Gupta et al., 2018) For that period, patent holders enjoy the benefits, and the public can not enjoy them freely (Gupta et al., 2018., Bronwyn, 2007).

Once the term of the granted patent is over, it can’t be patented again, and the patent goes into the public domain, i.e., it becomes public property (Gupta et al., 2018), as shown in Figure 2.



**Figure 2.** Term of Patent

Indian Patent Act, 1970 allows patentability of pharmaceuticals or medical devices such as scalpels, surgical sutures, staplers, stents, diagnostic kits, and reagents. (Indian patent act 1970, 2015) There has been so much research and development in medical

science. However, medical methods are still non-patentable in the Indian patent system with issues and reasons (Table no.3) (WMA Statement on Patenting Medical Procedures, 2019).

**Table 3.** Reasons on the grounds of which medical methods are not subject to patentability (WMA Statement on Patenting Medical Procedures, 2019)

Reasons
Ethics intrinsic in the medicine practice
Unbalancing of health care by economic benefit, raised financial load as well as damage to privacy and confidentiality of patient
Access to that medical method will be decreased for the patient due to provisions of the license
Physicians might prefer an inferior method instead of licensing the patented method, thus compromising safety
The threat of infringement will prevent advanced medical methods be adopted
Decreased peer review of the method with a resultant decline in safety and quality of novel methods
In some countries use of a patented invention is not allowed for academic and research purposes
The exploitation of privacy of the patient after examining the patient record for evaluating if a physician has performed patented method

Today research and innovation is an observed phenomenon but not every research is patentable. In recent years there has been a remarkable increase in Patents in dentistry. Dental professionals are concerned with practical problems of patent processing to manufacture equipment used to diagnose, prevent, and treat disease. Inventions are there in dentistry, but knowledge about IPR and its

substantial value in society are questionable. (Bijle, 2011). The present study was conducted among healthcare professionals of different streams, i.e., dental, medical, ayurvedic, and homeopathic, to assess knowledge and awareness of health care professionals about the Indian patent system and evaluate barriers in IPR i.e., Paten History of patents is too long. Patent granting was initiated in the

fourteenth century. The first Indian Patent application was made in 1856 based on the British patent system, and it has provided a patent term of 14 years. Several acts and amendments followed it. ( Saha et al., 2011)

shown in table 4. ( What is Intellectual property? 2020; Manual of patent practice and procedure the patent office, India, 2008; Ahmed & Kumar 2017). It is briefed in table 1.

**Table 4.** History of Intellectual Property Right in India

Year	Legislation	Salient features	Objective
1856	Act VI of 1856	first patent application in India was made	to promote novel and useful invention encouragement of disclosing their inventions
1856	Patents Act i.e., Act VI	Indian Government promulgated legislation to grant "exclusive privileges	to encourage inventions of new manufactures
1859	Act XV of 1859	modification from <i>grant of exclusive privileges to useful inventions</i> and priority period extended from six to twelve months.	Protection of only inventions and <i>not meant for designs.</i>
1872	Patterns and Designs Protection Act' (Act XIII) Of 1872	to include novel & unique pattern or design or the application of such pattern to an article of manufacture under 'new manufacture.'	to amend 1859 act <i>to protect designs</i>
1883	Act (XVI of 1883)	provision for novelty of the invention	to amend the 1972 act
1911	(Act II of 1911) Indian Patents and Designs Act	patent administration brought under the management of Controller of Patents	Replacing all previous legislation on patents and designs.
1920	amendment	reciprocal arrangements with the UK and other countries for securing priority.	to amend 1911 act
1930	amendment	grant of secret patents, use of an invention by Government, powers of the Controller to rectify patent register and term of the patent increased from 14 years to 16 years of addition	
1945	amendment	filing provisional specification and submission of complete specification within a period of 9 months	to amend 1911 act
1949	By Government of India	under the Chairmanship of Justice (Dr.) Bakshi Tek Chand, a committee was constituted	to ensure that the patent system is conducive to the national interest.  prevention of misuse or abuse of patent right in India
1950	(Act XXXII of 1950)	Ensure the working of inventions and compulsory license/revocation.	to amend 1911 act
1952	Act LXX of 1952	compulsory license in  for the patent in case of food, medicines, insecticide, germicide or fungicide or an invention for surgical or curative devices	The next step to amend the 1911 act
1957	By the Government of India	Justice N. Rajagopala Ayyangar Committee was appointed	To amend the 1911 act, which was not fulfilling its objective.  To examine the question of revision of the Patent Law and advise the government accordingly.
1965-1967	Patents Bill, 1965	an amended bill referred to a Joint Parliamentary Committee was introduced	significant changes in the patent law to purpose patent act 1970
1970-	the Patents Act, 1970	on 20th April, most provisions of the 1970 Act	Based on the result of the final

1972	Patent Rules, 1972.	were active	recommendation of the Committee replaced 1911 act
1999	the Patents (Amendment) Act, 1999	The amended Act that was brought into force from 1st January 1995	To amend the patent act 1970, provided applications for product patents in drugs, pharmaceuticals, and agrochemicals.  Allowed Exclusive Marketing Rights (EMR) to sell these products in India, subject to fulfillment of certain conditions, etc
2002-2003	the Patents (Amendment) Act, 2002 (Act 38 Of 2002).	replaced the earlier Patents Rules, 1972 introduction of the new Patent Rules, 2003.	the second amendment to the 1970 Act 20 years term of the patent for all technology. Mandatory publication of applications after 18 months from the date of Filing etc
2004-2005	Patents (Amendment) Ordinance, 2004 later replaced by the Patents (Amendment) Act 2005 (Act 15 Of 2005 )	active from 1st January 2005.	the third amendment to the Patents Act 1970, deletion of the provisions relating to Exclusive Marketing Rights (EMRs).  Extension of product patents to food, drugs, chemicals, and microorganisms. Grant of a compulsory license for the export of medicines to countries with limited capacity to meet emergency public health circumstances.
2005-2006	the Patents (Amendment) Rules, 2005 and the Patents (Amendment) Rules, 2006	last amendments made effective from 5th May 2006	

**1.2 Gaps of the study**

Research studies from the past evaluated IPR among other professionals except for medical professionals. In literature, no study has been found related to this topic. There is a wide gap in the survey of the need for patent education. Only a few studies in India have focused on other IPRs, not on the patents like in our research.

**1.3 Rationale of the study**

Mere evaluation of knowledge does not provide information. There is a stringent need to assess the barriers among Indian professionals and pitfalls in the education system.

**1.4 Significant contribution and the novelty from this present study**

Present study will contribute to new gaps in patent education since this type of study was not conducted among medical professionals before. It will encourage other authors to conduct more research on this topic and strengthen patent education.

**2. Method**

This cross-sectional study was conducted from a period of May 2017 to January 2018. A convenience sampling method was used. A well-designed study questionnaire (offline) was used, which was divided in 7 parts. The first part consisted of 3 questions (1-3) ; demographic information, Part two consisted of 3 questions containing basic knowledge about Patent, part 3 consisted of 2 questions (4-5) regarding attitude towards patent, part 4 consisted of 2 questions (6-8); regarding knowledge about the patent procedure and grant, part 5 consisted of question (9) about knowledge of patentability of treatment methods part 6 consisted of 2 questions (10-11); for barriers in the patent knowledge, part 7 consisted of 2 questions (12-13); for participant’s enthusiasm towards the patent. Participation in the research was voluntary. Only those participants who were interested and willing to participants enrolled in the study. The confidentiality of research participants was kept throughout the study. 175 private practitioners and academicians were approached from different streams i.e. (dental, medical, ayurvedic, and homeopathic). Out of these, 22 participants refused to participate in the study, and 15 questionnaires were found incomplete, so we excluded them from the final analysis, so we had 138

questionnaires for final analysis. Data was fed in an excel sheet and analyzed for percentage, correct responses, mean, p-values, and ANOVA followed by a post hoc test using SPSS version 20, IBM SPSS Statistics for Windows, Version 20.0. IBM Corp., Armonk, NY, USA.

The present study was conducted to gather knowledge for innovation and patent education among professionals from different streams. The response rate in the present study was good i.e. 138/175 (78.8%).

### 3. Findings

**Table 5.** Gender Wise Distribution Study Participants

Gender	Number	Percentage
Male	71	51.4%
Female	67	48.5%

Gender-wise distribution comprised of 71/138 (51.4%) male participants and 67/138 (48.5%) female participants shown in table no.2. Out of 138 participants, medical professionals were 56/138

(40.5%), dentists were 25/138 (18.1%), 29/138 (21.0%) participants were from ayurvedic practice, and 28/138 (20.2%) participants were from homeopathic.

**Table 6.** Age and Profession Wise Distribution of Study Participants

Age	Number	Percentage
22 -30	15	11.0%
30-40	34	25.0%
40 -50	26	19.0%
50-60	42	30.0%
60 & above	21	15.0%
Profession	Number	Percentage
Medical	56	40.5%
Dental	25	18.1%
Ayurvedic	29	21.0%
Homeopathic	28	20.2%

In our study, 15 participants were in the age group of 22-30 yrs, 34 participants were in the age group of 30-40 yrs, 26 participants were in the age group of 40-50 yrs, 42 participants were in the age group of 50-60 yrs, 21 participants were in the age group of 60 and above. Professions distribution include 56, 25, 29, and 28 professionals from medical, dental, ayurvedic, and homeopathic.

#### 3.1 Basic knowledge of Indian professionals about the patent system

Our study indicated a poor basic knowledge about the Indian patent system, and there was no statistically significant difference in the understanding among various groups. The patent is an intellectual property

right, and it is a technical document that requires inputs from technical and legal experts for protection. (Gupta et al., 2018) In our study, 94% of participants had less than 50% knowledge, and 6% had more than 50% knowledge about this statement.

#### 3.2 The attitude of Indian professionals towards patent

In our study, none of the participants had any previous experience with the patent application. On further exploration, it was found that they did not file a patent for an invention before because 99/138 (72%) did not have time, 10/138 (7%) were not interested in a patent application, and 29/138 (21%) possessed a

lack of awareness regarding this topic but were interested in applying.

### 3.3 Knowledge of Indian professionals about patent protection and grant procedure

Patent protection can be applied for products as well as processes. (Gupta et al., 2018) In our study, only 3% of participants correctly responded to this statement. The patent is a right granted by the government to an inventor excluding others from making, using, or selling a particular invention. (Gupta et al., 2018) Our 93% of participants responded correctly, and 7% did not know. A patent is a territorial right i.e. patent granted once in a country is valid only in the country where the application has been applied, and it is not a worldwide grant. (Gupta et al., 2018) In our study, 74% of participants did not know about this statement, and 26% responded incorrectly.

### 3.4 Knowledge of Indian professionals about the term of the patent for an invention

Once granted a patent for an invention its term is 20 years after applying to the patent office (Gupta et al., 2018), so an investor can enjoy their right for 20 years. A patent allows an inventor to disclose an invention publically rather than secrecy. (Gupta et al., 2018) None of the participants were aware of the statement. Once the term of the granted patent is over, it cannot be patented again, and the patent goes in the public domain i.e. it becomes public property. (Gupta et al., 2018) A large majority i.e. 96% participants, did not respond, and a very few i.e. only 4%, responded incorrectly that it can be patented again.

### 3.5 Knowledge of Indian professionals about patentability of medical and dental treatment methods

Medical and dental treatment or surgical procedures are not patentable in India. (WMA Statement On Patenting Medical Procedures, 2019; Gupta et al., 2018) In our study 2% participants responded that these methods are not patentable while 34% participants were having misconception that these methods are patentable and 64% did not give any response i.e. did not attempt question.

### 3.6 Barriers in the knowledge of patent among Indian professionals

Participants accepted that they were not acquainted with patent knowledge. Since they were never taught patent in their educational curriculum. Lack of topic in educational curriculum was found a barrier in patent knowledge. All participants responded that this topic was never discussed in continuing education programs, seminars, conferences attended by them.

### 3.7 Enthusiasm towards patent among Indian professionals

In our study, 99% of the study population did not explore the patent search engine, a structure-based search in the patent database. (Gupta et al., 2018) Due to lack of time, inadequate knowledge, and lack of interest. Only 1% of study participants showed interest in exploring and increase their knowledge.

As the knowledge was found very poor concerning the Indian patent system among participants, analysis of our study data was not presentable through mean, p-values, and ANOVA followed by a post hoc test, so results were presented only in percentage form.

## 4. Discussion

Our study was conducted to evaluate Indian professionals' knowledge for innovation and the need for patent education. Education of patent is an important aspect of faculty development programs. The findings from our study indicated a poor show of patent education. Traditional medicine serves as an important element of human health care with added commercial value. Researchers or companies may also claim IPR over biological resources and traditional knowledge after making slight modifications in the existing invention. The patent applications in the case of traditional medicine, natural products, and herbal medicinal products possess their IPR policies showing a rapid growth in herbal medicine. (Saha, 2011) In our study, only 3% of participants responded about the need for patent protection, in contrast to Ahmed et al., where 57% of respondents were aware of the need to protect IPR. (Ahmed & Kumar, 2017) This indicates a lack of knowledge. In our study, 94% of participants had less than 50% knowledge, and 6% had more than 50% knowledge.

Further, in one study carried in Lucknow, 50% of research scholars were aware of patent. (Ahmed & Kumar, 2017) In our study, results showed a lack of experience in patent application. Large numbers of respondents were not aware of the laws relating to patent protection in contrast to the findings of a study carried by Ahmed et al. where 50% of respondents were aware of IPR protection laws. (Ahmed & Kumar, 2017) Researchers in the academic field are deficient in awareness of IP-related issues to proceed with patent application procedures for their invention and publication. Once the public disclosure of research findings happens, the invention is not considered to novel anymore. (Intellectual property and access to medicines, 2012).

Universities and academic hospitals generate revenue from clinical care and teaching costs to capture business operations and cost of employees,

leaving minimum residual finances for further development of product and clinical trials. On patent expiry, generic pharmaceutical companies replicate drugs spending only a part of the original costs of drug development, reducing the original cost of the drug (Taylor D, 2015). They have to verify only bioequivalence and the quality of the drug in terms of pharmaceuticals. Literature review suggests that barriers among health care inventors are limited knowledge of complicated international patent laws with inadequate access to qualified IP lawyers. In addition, increased price (price of filing, legal counseling, and maintenance of patent) increases the product price, time, and logistics resisting them from patent procedure. (Chao & Mody, 2015). In our study, all participants accepted that they were not acquainted with patent law. They have never been taught about patent in their curriculum, and the topic was never discussed in workshops, continuing education programs, seminars, conferences. This lack of topic in the curriculum was found a major barrier, Whereas in one study among library professionals in domains of medical sciences, the source of awareness were found books, the internet, friends, formal courses. (Gnanasekaran D, 2014) In our study, 93% of participants responded that patent is a right in contrast to the findings (60%) of the study carried by Ahmed et al. (Ahmed & Kumar, 2017). Curricular adequacy among professionals is also found to be deficient (Gupta, 2019). motivation level was also found inadequate. (Bansal & Meenakshi, 2016). Our study found no significant difference in knowledge among participants, but it does not mean there is no difference clinically. (Prasad, 2019).

A large majority (99%) did not explore patent databases due to a lack of time and knowledge. In one study, 23.6% of participants visited sites to be informed about technological innovations. (Metallidou, 2020) Research advances in science and medicine provide the latest interpretations of already existing facts. Research is the activity of human origin that utilizes intellect to investigate and interpret. There arises a need for greater participation in research by the physicians as well as clinicians and patients. (Gupta et al., 2019) Since intellectual property (IP) is an original creation of the human mind. In our study, only 1% of the participant showed interest in exploring and increasing their knowledge as a part of the research. In a study carried out by Ahmed et al in Lucknow, only 40% of the respondents were aware of the contribution of IPR in research and innovation. (Ahmed & Kumar, 2017) None of the participants had any previous patent application experience indicating weak research activity among participants, lack of interest. They did not file a patent

for an invention. This is again because of lack of time, awareness, and absence of interest in the research area. In a study carried in Greece, only 18.3% of participants had consideration for an innovation. (Metallidou, 2020) This study will contribute to filling existing gaps in the field of IPR among Indian professionals. Findings from this study will reveal new gaps in the literature that had not been previously exposed or adequately described by others. Our study necessitates strengthening patent education with a weak backbone.

## 5. Conclusions

The findings of the study revealed poor knowledge of patents due to the flawed system in our country. Developing countries like India are in extreme demand for improvement or amendments in existing patent law. In addition to improvements in the Indian patent system, there is a stringent need to promote progress and development of medical sciences in India. Research and innovation is an important criterion for application and approval of such activities.

The major implication of our study was the weakened backbone of Indian patent education among medical professionals. Patent education is not given due importance among them. In past, no such research has been carried out among medical professionals, but some studies among engineering and pharmacy professionals have been conducted. Medical sciences pay consideration to this topic only for smoothening of accreditation procedure, not for educational and professional upliftment. Medical education emphasizes only research but not on IPR, which is the next step to research. We conclude that there is a great need for patent education for professional and institutional growth. Dental, Medical, and other associations should include IPR in their workshops, conferences as a significant part of the continued education program. Accreditation bodies necessitate educational institutions to have completed research projects and filed patent applications. There arises a stringent need for medical bodies to encourage affiliated institutions, universities to teach IPR.

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