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Assessment of knowledge and awareness regarding intellectual property rights among the health-care professionals in Belagavi city: A cross-sectional study

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Abstract:

BACKGROUND: Intellectual property rights (IPRs) are increasingly becoming significant for sustainable growth of today's knowledge-based society. An inappropriate knowledge regarding IPR can fail to reserve rights for one's intellectual creation. Hence this study was planned with an aim to assess knowledge, awareness, and practices regarding intellectual property rights in India amongst the health-care professionals in Belagavi city.

MATERIALS AND METHODS: A descriptive cross-sectional study was conducted among the postgraduate students and faculty of six health-care professional institutions in Belagavi, Karnataka. A total of 724 responses were recorded using convenient sampling. Data was collected using self-administered validated questionnaire which included demographic details and total 20 questions pertaining to knowledge, awareness, and practices regarding IPR. Two-point Likert scale was used. Descriptive statistics, Mann–Whitney *U*-test, and Chi-square test were applied.

RESULTS: A total of 724 responses were recorded, 411 from postgraduate students and 313 from faculty of 6 health-care professional institutions. It was observed that 24.3% and 39.3% of postgraduate students and faculty participants, respectively, had maximum knowledge while 35.5% of faculty and 27.5% of postgraduate students had maximum awareness regarding IPR in India. Only 17.6% and 10.2% of faculty and postgraduate students had previously attended workshops on IPR.

CONCLUSION: The present study identified that both faculty and postgraduate students of health-care profession have less knowledge and awareness regarding IPR. However, both knowledge and awareness regarding IPR were better among faculty when compared to postgraduate students. Thus, the academic community requires a higher level of sensitization and exposure to IPR in India.

Keywords:

Awareness, copyright, faculty, intellectual property, patent, students

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Introduction

With the ever-changing advancements in technology and diminishing world boundaries, the term "Intellectual Property" is trending more often than ever. From tech and software firms such as Microsoft and Google to biomedical and genomic industries, everyone is vigil about protecting their brand and innovation. That's where knowledge regarding intellectual property rights (IPRs) plays a significant role. IPRs can be defined as "the rights given to people over the creation of their minds." It is "a generic legal term for patents, copyrights, and trademarks, which provide legal rights

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to protect the ideas, the expression of ideas, and the inventors and creators of such ideas."[1-5] Intellectual achievement ownership is another term used for intellectual property (IP).[6,7]

All the laws and administrative procedures pertaining to IPR have their origin in Europe. The first Indian laws related to IPR were promulgated in 1856 which was based on British patent system. These were altered from time to time with the most recent amendment made in 2019, which was preceded by the amendments in 2000, 2003, and 2005.[1,8-10]

IP is broadly divided into two categories that are "Industrial Property" and "Copyright." Industrial property is inclusive of inventions (patents), trademarks, trade secret, industrial designs, and geographic indications while copyright includes literary and artistic work such as novels, poems and plays, films, musical work, and artistic work.[8-12]

One of the most important components of IP that health-care profession must be aware of is "Patent." The term for a standard patent in India, the United States of America, Europe, and China is 20 years from the filing date of the patent application. In India, the grant of patents is governed by the Patents Act, 1970.[7] Any idea or creation is patentable if it is useful, novel, and nonobvious.[13,14]

Patents can provide great value and returns to individuals on the investment made in introducing new technology and innovation. Inappropriate knowledge could hamper the entire process resulting in failure to specifically define the innovation.[12,13]

Health-care profession is one among the major developing units with significant contribution in innovation and research. Awareness and knowledge of IPR and its related laws are of utmost importance for protecting and managing research results so that no one can infringe or steal someone's novel creation or idea. Hence, this study was planned with an aim to assess and compare knowledge, awareness, and practices regarding "Intellectual Property Rights" among the health-care professionals in Belagavi city, India, with an objective to assess and compare knowledge, awareness, and practices regarding IPR among the postgraduate students and faculty of health-care professions.

Materials and Methods

Study design and setting

This was a descriptive cross-sectional study conducted between December 15, 2020, and February 16, 2021, on 724 health-care professionals from dental, medical, pharmacy, nursing, ayurveda, and physiotherapy colleges in Belagavi, Karnataka.

Study participants and sampling

Study population comprised postgraduate students and faculty of dental, medical, pharmacy, nursing, ayurveda, and physiotherapy colleges in Belagavi, Karnataka, who wished to participate in the study. A pilot study was conducted among 40 participants to check flaw and feasibility. The sample size was calculated using the following formula:

$$n = Z^2 P (1 - p)/d^2$$

where n is the sample size, P is the prevalence of knowledge score of the health-care professionals obtained from pilot study (68%), and d is the permissible error in the estimation of $P = 0.05$.

$$n = (1.96)^2 \times 0.68 \times (1 - 0.68)/(5/100 \times 0.68)^2$$

Thus, the estimated sample size was 724. Of the nine health-care professional institutions in Belagavi, three institutions were outside the city limits and were inaccessible due to the prevailing COVID-19 pandemic situation, hence the remainder of six institutions were chosen conveniently.

Data collection tool and technique

Self-administered questionnaire was used for the study. The reliability of the questionnaire was assessed using Cronbach's alpha and was found to be 0.84. Content validity ratio was found to be 0.82. The questionnaire had two sections. Section 1 documented the participants' sociodemographic characteristics while section 2 recorded participants' knowledge, awareness, and practices regarding IPRs. There were seven questions pertaining to knowledge, ten questions pertaining to awareness, and three questions related to practices with respect to IPRs in India. All the participants were approached on the scheduled date, the purpose of the study was explained to them, and hard copy of the questionnaire was distributed. Face-to-face interview was used for the collection of the data. They were instructed to fill the questionnaire which was collected after 10 min. The response rate was 100% and informed consent was obtained from all the respondents.

Ethical consideration

This study was carried out in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines to collect data from postgraduate students and faculty from six health-care professional colleges in Belagavi, India.[15] Ethical approval was obtained from the Institutional Ethics and Research Committee and has been assigned No: IL0219003-1425 as ethical code number.

Statistical analysis

The total knowledge and awareness score was derived based on the total sum of appropriate responses. Data analysis was carried out using the Statistical Package for the Social Sciences version 25. Descriptive statistics was used for categorical variables that were expressed as frequencies and percentages. MannWhitney *U*-test was used to compare the differences of knowledge and awareness regarding IPRs between faculty and postgraduate students. Differences between categorical variables were compared using the Chi-square test wherever indicated. For all the tests, a *P* value of 0.05 or less was set for statistical significance, and a *P* value of 0.001 or less represents a very highly significant relation.

Results

Demographic characteristics

A total of 724 responses were recorded, 411 from postgraduate students and 313 from faculty of 6 constituent health professional colleges in Belagavi. The mean age of the postgraduates and faculty was 25 ± 1.71 and 38.28 ± 7.64, respectively. Majority (64%) of the postgraduate respondents were in their final year while majority of the faculty participants (61%) had 5–15 years of teaching experience. Among the faculty participants, 61.85% were males and 38.15% were females whereas postgraduate students had 19.66% of male and 80.34% of female participants. There were 204, 168, 79, 71, 69, and 133 participants from dental, medical, nursing, pharmacy, physiotherapy, and ayurveda profession, respectively.

Knowledge of intellectual property rights among the postgraduate students and faculty

Table 1 shows the responses to the questions pertaining to knowledge regarding IPRs in India with statistically significant differences. 36.4% of faculty members knew that copyright and industrial property are the two main components of IPR ($P = 0.000$). 20.2% of postgraduate students had knowledge regarding plant, design, and utility patent ($P = 0.009$). 79.9% of faculty participants knew that trademark is the full form of TM in relation to IPR ($P < 0.001$). 19.7% of postgraduate students had an idea that the headquarters of Indian Patent Office is situated in Kolkata. 52.1% of postgraduate students knew that trademark is used to represent a business or its product ($P = 0.016$). 19.8% of the faculty were familiar with the term intellectual achievement ownership being synonymous to IPRs ($P = 0.009$). 5.8% of the faculty knew that 8–15 years is the time period to use TM symbol on their business or products after the registration [Table 1].

Awareness of intellectual property rights among the postgraduate students and faculty

44.5% of postgraduate students were aware of the term IPR ($P = 0.003$) and 75.2% were familiar with its meaning ($P = 0.001$). 22% of the faculty were aware that patent becomes a public domain after 20 years postregistration. 19.8% of the faculty participants knew what can be patented ($P < 0.001$) and 43.1% were aware that patent search is the first step when someone plans for a patent ($P < 0.001$). 66.2% of postgraduate students were aware that government patent authority, inventor himself, and private patent agent can apply for patent ($P = 0.017$). 21.9% of the postgraduate students were aware of regional branches of Indian Patent Office ($P < 0.001$). 72.7% of postgraduate students were aware of various databases used to retrieve patent information. 16% of faculty were cognizant of the fact that trademark and patents are not synonymous ($P < 0.001$). 33.3% of the postgraduate students were aware that one cannot patent a product after publishing an article related to the same product ($P < 0.001$) [Table 2].

Table 1: Responses of postgraduate students and faculty on knowledge component regarding intellectual property rights

Question	Responses	Postgraduates, *n* (%)	Faculty, *n* (%)	*Z*	*P*
1. What are the two components of IPR?	Wrong response	340 (82.7)	199 (63.6)	−5.848	<0.001*
	Right response	71 (17.3)	114 (36.4)		
2. What are the three types of patents?	Wrong response	328 (79.8)	273 (87.2)	−2.630	0.009*
	Right response	83 (20.2)	40 (12.8)		
3. What is the full form of TM in relation with IPR?	Wrong response	175 (42.6)	63 (20.1)	−6.366	<0.001*
	Right response	236 (57.4)	250 (79.9)		
4. Headquarters of Indian Patent Office	Wrong response	330 (80.3)	260 (83.1)	−0.952	0.341
	Right response	81 (19.7)	53 (16.9)		
5. What is used to represent a business or its product?	Wrong response	197 (47.9)	122 (39)	−2.403	0.016*
	Right response	214 (52.1)	191 (61)		
6. Synonym of intellectual property	Wrong response	340 (82.7)	251 (80.2)	−0.871	0.384
	Right response	71 (17.3)	62 (19.8)		
7. Time period to use TM on products after registration	Wrong response	393 (95.6)	295 (94.2)	−0.840	0.401
	Right response	18 (4.4)	18 (5.8)		

Mann-Whitney *U*-test applied, *statistically significant difference ($P<0.05$), *n*=Total respondents, IPR=Intellectual property right, TM=Trademark

Table 2: Responses of postgraduate students and faculty on awareness component regarding intellectual property rights

Question	Responses	Postgraduates, *n* (%)	Faculty, *n* (%)	*Z*	*P*
1. Are you aware of the term IPR?	No	228 (55.5)	208 (66.5)	−2.988	0.003*
	Yes	183 (44.5)	105 (33.5)		
2. What does the term IPR mean?	Wrong response	102 (24.8)	112 (35.8)	−3.201	0.001*
	Right response	309 (75.2)	201 (64.2)		
3. When does patent become public domain?	Wrong response	335 (81.5)	244 (78.0)	−1.183	0.237
	Right response	76 (18.5)	69 (22.0)		
4. What can be patented?	Wrong response	375 (91.2)	251 (80.2)	−4.302	<0.001*
	Right response	36 (8.8)	62 (19.8)		
5. What is the 1st step when you plan for a patent?	Wrong response	324 (78.8)	178 (56.9)	−6.345	<0.001*
	Right response	87 (21.2)	135 (43.1)		
6. Who can apply for patent?	Wrong response	139 (33.8)	133 (42.5)	−2.385	0.017*
	Right response	272 (66.2)	180 (57.5)		
7. Awareness regarding regional branches of Indian Patent Office	No	321 (78.1)	299 (95.5)	−6.618	<0.001*
	Yes	90 (21.9)	14 (4.5)		
8. Awareness regarding various databases	No	112 (27.3)	69 (22)	−1.601	0.109
	Yes	299 (72.7)	244 (78)		
9. Are trademarks and patent same?	Wrong response	393 (95.6)	263 (84.0)	−5.294	<0.001*
	Right response	18 (4.4)	50 (16.0)		
10. Can you patent a product after publishing an article related to same product?	Wrong response	274 (66.7)	246 (78.6)	−3.532	<0.001*
	Right response	137 (33.3)	67 (21.4)		

Mann-Whitney *U*-test applied, *statistically significant difference (P<0.05), *n*=Total respondents, IPR=Intellectual property right

Association between affiliation with knowledge and awareness regarding intellectual property rights

Tables 3 and 4 demonstrate the association between faculty and postgraduate students with knowledge and awareness of IPRs. The total sum of correct responses per person was analyzed and converted into percentages. It was observed that 24.3% and 39.3% of postgraduate students and faculty participants, respectively, had maximum knowledge regarding IPRs (Chi-square value = 78.34; $P < 0.001$) [Table 3]. Furthermore, 35.5% of faculty and 27.5% of postgraduate students had maximum awareness regarding IPRs in India (Chi-square value = 50. 26; $P < 0.001$) [Table 4].

Responses regarding the practice component of intellectual property rights

Majority of the postgraduate students (41.35%) did not use any database to search patent information, however 29.6% of postgraduate students employed Google search to retrieve patent information. On the contrary, majority of faculty employed various databases such as Google Patents (35.8%), USPTO (20%), and Patentscope (12.82%) to retrieve patent information [Figure 1].

Around 10.2% of postgraduate students and 17.6% of faculty participants revealed that they have attended workshops on IPRs in India. 82.7% of faculty and 66.2% of postgraduate students wished to attend extensive workshop on IPRs in India.

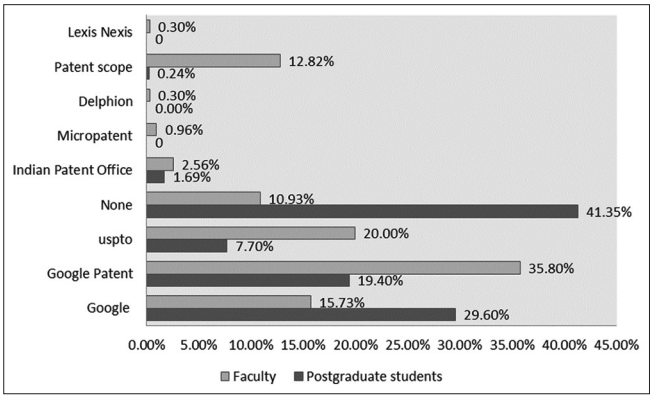

Figure 1: Most common databases used to retrieve patent information by faculty and postgraduate students

Discussion

2013–2017 was considered to be the most productive period in the Indian research scenario with 9% increase in annual growth rate in research output. In 2019, India's position rose to 36 from 44 (2018) in the International IP Index.[16]

IP is a subject matter of huge amount of litigation lately. The reason being, it is relatively easy to steal ones idea or infringe upon someone's novel creation in this globalized world. Hence, it is important that the inventor has sufficient knowledge of IPRs so that adequate care is taken to protect his IP.[17-19] With the drastic increasing focus on innovations and research, need to learn about IPRs to protect their creation is the need of the hour.

Table 3: Association between affiliation and knowledge regarding intellectual property rights

Sum of correct responses	Postgraduate students, *n* (%)	Faculty, *n* (%)	Total, *n* (%)	χ^2	*P*
0	81 (19.7)	6 (1.9)	87 (12.0)	78.34	<0.001*
1	89 (21.7)	70 (22.4)	159 (22.0)		
2	100 (24.3)	90 (28.8)	190 (26.2)		
3	90 (21.9)	123 (39.3)	213 (29.4)		
4	40 (9.7)	15 (4.8)	55 (7.6)		
5	11 (2.7)	5 (1.6)	16 (2.2)		
6	0	4 (1.3)	4 (0.6)		
7	0	0	0		
Total	411 (100)	313 (100)	724 (100)		

Chi-square test applied, * statistically significant difference (*P*<0.05)

Table 4: Association between affiliation and awareness regarding intellectual property rights

Sum of correct responses	Postgraduate students, *n* (%)	Faculty, *n* (%)	Total, *n* (%)	χ^2	*P*
0	1 (0.2)	7 (2.2)	8 (1.1)	51.264	<0.001*
1	55 (13.4)	15 (4.8)	70 (9.7)		
2	113 (27.5)	82 (26.2)	195 (26.9)		
3	94 (22.9)	111 (35.5)	205 (28.3)		
4	66 (16.1)	57 (18.2)	123 (17.0)		
5	39 (9.5)	35 (11.2)	74 (10.2)		
6	21 (5.1)	5 (1.6)	26 (3.6)		
7	22 (5.4)	1 (0.3)	23 (3.2)		
8	0	0	0		
9	0	0	0		
10	0	0	0		
Total	411 (100)	313 (100)	724 (100)		

Chi-square test applied, * statistically significant difference (*P*<0.05)

This study sought to provide an overview of postgraduate students' and faculty's knowledge and awareness toward IPRs, which could provide basis for sensitization programs and workshops on IPRs. Knowledge of faculty plays a significant role in modeling and shaping students' performance. A study conducted by Ahmed and Varun portrayed that awareness of IPRs was very poor among the law students and faculty.[20]

Considering the fact of increased research output and innovation from health-care sector, it was surprising to note that only 33.5% of faculty and 44.5% of postgraduate students were aware of the term IPR. Only 18.5% of postgraduate students and 22% of faculty participants were aware that patent becomes a public domain after 20 years of registration. 8.8% of postgraduate students and 19.8% of faculty did not have any idea of what can be patented. 78.8% of postgraduate students and 56.9% of faculty participants did not know that patent search is the prerequisite step before commencing with any idea or research. 95.6% of postgraduate students and 84% of faculty did not know the difference between trademark and patent. These findings highlight that very meager portion of faculty and postgraduate students are sensitized to IPRs.

Majority of the postgraduate students and faculty participants were incognizant of the fact that patent will not be granted if any article related to the same is already published. However, one's creation can be still considered if it is applied within 1 year of publication.[21] Majority of the researchers are unaware of this, and it can significantly affect one's novel creation.

In this study, only 21.9% of postgraduate students and 4.5% of faculty participants were aware that New Delhi, Chennai, and Mumbai are regional branches of Indian Patent Office with its headquarters in Kolkata. New Delhi branch deals with patent applications from northern states of India, Mumbai branch deals with patent application from states such as Maharashtra, Goa, Gujarat, and Madhya Pradesh, Chennai branch assists patent appliers from Karnataka, Tamil Nadu, and Kerala, while Kolkata assists patent appliers from the rest of the states including union territories.

Various free and paid databases are available to retrieve patent information. Google, Google Patents search, USPTO, Patentscope, and Indian Patent Office are examples of free databases while Micropatent, LexisNexis, Delphion, and Derwent are few examples of paid databases available for patent search.[8] Majority of the faculty and postgraduate students were aware of the different databases. However, it was observed that most of the postgraduate students made the use of only Google search to retrieve patent information. On the contrary, faculty participants utilized few other databases such as Google Patents, Patentscope, USPTO, and Indian Patent Office for retrieving patent information. Due to the years of experience of the faculty and their long standing association in the field of research, it is probable that they are aware of various existing databases which are used to retrieve patent information. However, no participants made the use of any paid databases to acquire patent information.

The greater percentage (82.7% and 63.6%) of postgraduate students and faculty, respectively, were not familiar with copyright and industrial property which are the major components of IPRs. Major portion (79.8% and 87.2%) of postgraduate students and faculty, respectively, had no idea about the types of patents. Utility, design, and plant are three types of patents. Utility patents are related to machine, article of manufacture, and composition of matter, design patents are related to the ornamental design for an article of manufacture, while plant patents are related to inventing or discovering any distinct and new variety of plants. Only 19.7% and 16.9% of postgraduate students and faculty participants

knew the headquarters of Indian Patent Office. This may be attributed to the fact that very few faculty and postgraduate students of health-care profession have applied or filed patents. Majority of them do not have adequate knowledge about the filing procedures.

It was surprising to note that 52.1% of postgraduate students and 61% of faculty members had knowledge regarding trademarks. A lot of established commercial companies and food outlets make the use of trademarks on their products which may be the reason for major portion of the participants being aware about it. However, 95.6% and 94.2% of postgraduate and faculty participants, respectively did not know about the time period to use trademark on products or business after registration.

The present study revealed that both postgraduate students and faculty had less knowledge and awareness regarding IPRs. It was shocking to know that maximum correct responses from postgraduate students regarding knowledge of IPRs were 2 (24.3%), whereas from faculty, the maximum right responses were 3 (39.3%). A maximum of 3 appropriate responses regarding awareness of IPRs were observed among faculty (35.5%) while 2 appropriate responses were obtained from postgraduate students (27.5%). Lack of knowledge and awareness may be attributed to the fact that only 17.6% and 10.2% of faculty and postgraduate students respectively attended workshops on IPRs. These findings highlight the need for sensitization of postgraduate students and faculty to IPRs so that they grow on to get into the professional world where they will develop, prosper, and exercise IP.

The findings of our study delineated the fact that faculty have significantly more knowledge and awareness regarding IPRs than postgraduate students. Faculty are the powerhouse of any institution. Their knowledge and awareness regarding IPRs would provide other benefits beyond protection of novel creation, such as licensing, better collaboration, and funding opportunities. It was noted that 82.7% of faculty and 66.2% of postgraduate students desired to attend extensive workshop on IPRs. This validates that both faculty and postgraduate students are keen to acquire knowledge on IPRs and its associated laws. Our findings are consistent with a study conducted by Kumar *et al*. where knowledge, attitude, and practices regarding IPRs were assessed among the dental task force in Navi Mumbai.[22]

To the best of our knowledge, this study is first of its kind which gauged the knowledge and awareness regarding IPRs among the faculty and students of the health-care profession. The results of the study revealed the need for inclusion of IPR sensitization sessions as a part of academic curriculum at institutional and university level. Training modules and workshops, conventions, and conferences can be taken into consideration to sensitize health-care task force regarding various constructs of IPR.

Limitation and recommendation

Although this study attempted to assess and compare knowledge and awareness regarding IPRs among the health-care professionals, it had its own limitation for being a cross-sectional study. We have conducted the study on population that was chosen based on convenient sampling and hence the results should be carefully interpreted. Future studies should focus more on pre- and posteducational interventional studies where impact of education regarding IPR can be analyzed. Moreover, probability sampling should be taken into consideration for better generalizability of the study.

Conclusion

With increasing demand for "intellectual property," the ever-evolving sphere of research is gaining more popularity in all health-care sectors globally. Foundational awareness and knowledge regarding the rights of a creator are essential to safeguard their innovations.

The present study identified that both faculty and postgraduate students from health-care profession have less knowledge and awareness regarding IPRs. However, both knowledge and awareness were more among the faculty participants when compared to the postgraduate students. It is the need of the hour that IPRs are incorporated into basic education system at institutional level to improve its awareness.

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Conflicts of interest

There are no conflicts of interest.

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