Trend Analysis of Chinese Medical Education System Based on the Formation of Medical Students' Professional Identity

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Abstract

The basic goal of medical education is to promote the professional identity formation (PIF) of medical students. The purpose of this study is to identify correlations between Chinese doctors and medical students through an analysis of trends in medical education in China, and to outline the underlying principles and key drivers of the process of professional identity formation (PIF) for medical students in support of compassionate and the existence, association and work of competent physicians. In addition, the study found challenges such as poor-quality standards, lack of student attraction, and lack of reform.

Keywords: Professional Identity, Medical Students , medical education system

***Tob Regul Sci.™ 2021;7(6-2):* 39-51**
DOI: doi.org/10.18001/TRS.7.6.2.5

INTRODUCTION

The education system of China has become a central attraction for students from all around the world. Like several major countries, international students opt for China in the context of a medical study. This study is going to address the current trend of students being admitted to medical colleges in China. Moreover, challenges in medical colleges experienced by students will also be highlighted in this study. Quantitative data of doctors and medical students in medical colleges in China will be discussed in this study. In addition, that this study will highlight the future scope of this study based on Chinese medical colleges.

BACKGROUND

Medical studies in China have gone through several reforms and become the largest medical education system all over the world. It has been found that the number of clinical graduates from Chinese medical colleges has dramatically risen between 1998 to 2018(Raju, 2021). The number of clinical graduates in the country was 51,800 in 2002, which rose to 182,900 in 2018 (Wang, 2021). Besides that, undergraduate institutions that offer medicine study have also increased in China, and in 2018 number of medical colleges was 420 (Raju, 2018).

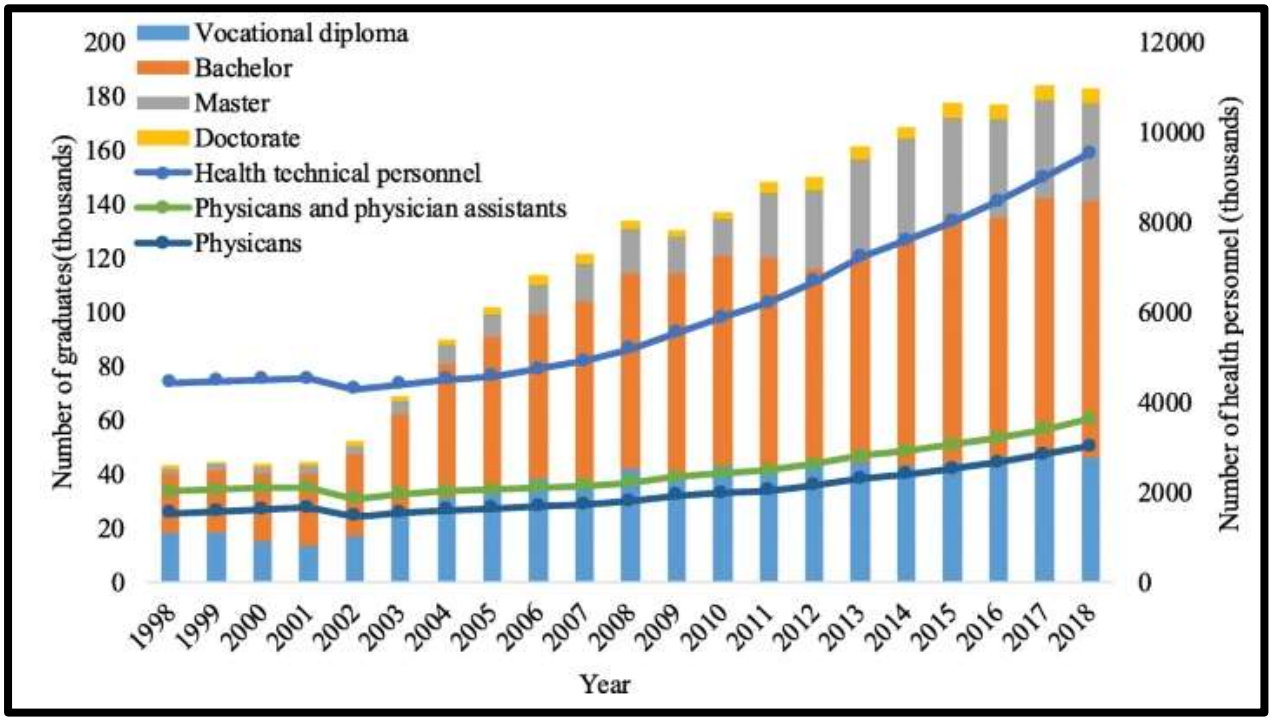

Figure 1: Clinical medical graduates and health technology professionals in China from 1998 to 2018

(Source: Wang, 2021)

Medical education in any country delivers effective support to the health demand of the population. At present, time number of health personnel in China per 1000 population is higher than in moderately developed countries (Raju & Phung, 2019). According to Xiang et al. (2020), healthcare workers play a crucial role in improving quality healthcare in the community. In addition to that number of healthcare providers, doctors, and nurses in the country per 1000 population has also dramatically increased. It has been found that the number of undergraduate students in China medical colleges is rising at a rate of ***7.3%*** (Wang, 2021). In 2019, there were ***12.9 million*** healthcare workers who continuously worked on developing health access and healthcare facilities in China (Wang, 2021). Moreover, there are ***3.2 nurses*** and ***2.8 doctors per 1000*** people in China (Raju et al., 2021).

AIM AND OBJECTIVES

Aim

The purpose of this study is to "analyze the trend of Chinese medical education system based on the formation of medical students' professional identity".

Objectives

RO1: To identify the growth of the medical education system in China

RO2: To analyse students being admitted and passing out as doctors from medical institutions in China

RO3: To identify and evaluate challenges in medical education in China

RO4: To conduct secondary research and recommend strategies that can help in further developing the medical education system in China

Outcomes assessment were challenging for this research. Descriptive, formative assessment using mixed methods to provide feedback, evaluate curricular programs, and guide theoretical development is recommended by the TIME task force. They note colleagues' recommendations of three general strategies for PIF assessment: observations as part of clinical assessments, developmental benchmarks, and assessment of learning environments as well as considering "aspirational" elements outside the arena of competencies.

LITERATURE REVIEW

Overview of the medical education system in China

Medical education in China is basically a five-year bachelor's degree with a one-year internship, and the educational background of Chinese medical students has continuously developed. According to (Hedy S. 2015), medical education in China has shown rapid growth in the context of meeting international standards. Most of the medical colleges in China today offer BDS, MBBS programmes that are taught in English languages. Between 2015 to 2018, China has observed a significant growth in terms of medical graduates, and bachelor's degrees in medicines in the country accounted for over 75% (Wang, 2021).

Figure 2: Density of physicians per 1000 people in different countries
(Source: Wes.org, 2018)

The number of doctors and healthcare workers passed out from higher medical education has also increased in the country in comparison to 2014. The above figure shows the number of physicians available in different countries per 1000 population, where China is in third place after Australia and Brazil (Wes.org, 2018). However, the quality of education in medical colleges is a challenge in these institutions.

Trend analysis of students in medical colleges in China

A clinical education system is gradually developed in China, which includes three stages such as medical school, graduate medical education and continuing education. Chen et al. (2018) mentioned that China had become one of the most powerful forces in the global market, and it is

considered the home of the finest medical universities all around the globe (Raju, 2021). Besides that, for international students, it has become a hot study destination for gaining ***Bachelor of Medicine and Bachelor of Surgery (MBBS)*** degrees.

YEAR	NUMBER OF MEDICAL PROGRAMS OFFERED BY CHINESE INSTITUTIONS APPROVED BY MCI	NUMBER OF STUDENT INTAKE
2007-2008	24	2,095
2008-2009	25	2,928
2009-2010	28	2,990
2010-2011	34	3,310
2011-2012	49	5,010
2012-2013	50	5,030
2013-2014	52	6,020
2015-2016	45	3,470
2016-2017	45	3,470
2017-2018	259	N/A

Figure 3: Number of Chinese medical institutions and student intake from 2008 to 2018
(Source: Wes.org, 2018)

The above figure shows growth in the number of medical institutions in China from 2008 to 2018, along with student enrollment in these institutions. It can be seen that the number of students intake in medical studies has increased from 2095 in 2007-08 to 3470 in 2016-17 (Wes.org, 2018). Nevertheless, disbalance in the economy of the country has become an issue for the students enrolled in medical higher education.

Challenges in Chinese medical education

Provincial and national education departments in China look after the graduates and undergraduates medical students. As per the opinion of Jia, Zeng and Zhang (2018), man inciting quality in education is one of the most significant parts in the context of a medical study. However, the Chinese government lack in managing coordination between the healthcare and education sector, which results in decreasing standards in MBBS degrees (Raju, 2021). In addition to that, the medical colleges in China lack in maintaining quality disciplines like top world universities, which is another issue in the medical education system in this country.

Role of different reforms in mitigating those challenges

Based on the issues identified in the medical education system in China, several reform strategies can be recommended to the Chinese government that can help in maintaining quality (Hedy S. 2015). The Medical Education Cooperation mechanism can be undertaken by the country at a level of China's cabinet and State Council as a reform for managing quality in medical education (Wang et al., 2021). Besides that, standardised residency training can also be implemented in the medical education system in China. They compel medical educators to ensure that lessons learned from contemplating medicine during the Third Reich be integrated into

current and future physicians' professional identities. Most health professions education programs, however, have not adopted this study (Raju & Poh, 2019)

METHODOLOGY

Research methodology is considered as the procedures and processes that are followed for collecting accurate data and analysing those (Saunders &Bezzina, 2015). This study has conducted a ***secondary data collection*** from ***Google Scholar, ProQuest*** and ***numerous authentic websites***. ***Quantitative data*** regarding the number of students enrolled in medical colleges in China walking with the number of students who are achieving MBBS degrees have been collected from ***Google*** in this study. Martins et al. (2018) opined that secondary data could be collected easily from prevailed sources over the internet that require less time, effort and money (Hedy S. 2015). Therefore, the growth of the medical education system, the number of abroad students coming to China for medical studies have been collected from internet sources in this study. Furthermore, a ***regression analysis*** has been done in this study based on ten years of student enrollment data in China.

FINDINGS AND ANALYSIS

The medical education system in China continues to be successful and produces skilled doctors due to the number of experienced and professional teachers. According to Hsieh and Tang (2019), medical education in China includes modern infrastructure and modern technology, which makes the medical education of this country the best among others. It has been found that most of the medical universities in China are recognised by World Health Organisation (WHO), and it is ranked 4 by a WHO survey. Moreover, medical degrees provided by the universities and colleges of China are accepted all around the world. These degrees help in pursuing minor and major medical specialists in any Medical college and University throughout the globe. The number of general physicians in China has been identified at 1.49 per 1000 people. Furthermore, the number of health workers and general practitioners are respectively 6.4 and 2.6 per 10,000 population (Wang, 2021). In the context of international students admitted to Chinese medical colleges, examples of India can be highlighted. It has been identified that the number of Indian students with an MBBS degree in China increased from 765 in 2005 to 16,694 in 2015 (Wes.org, 2018).

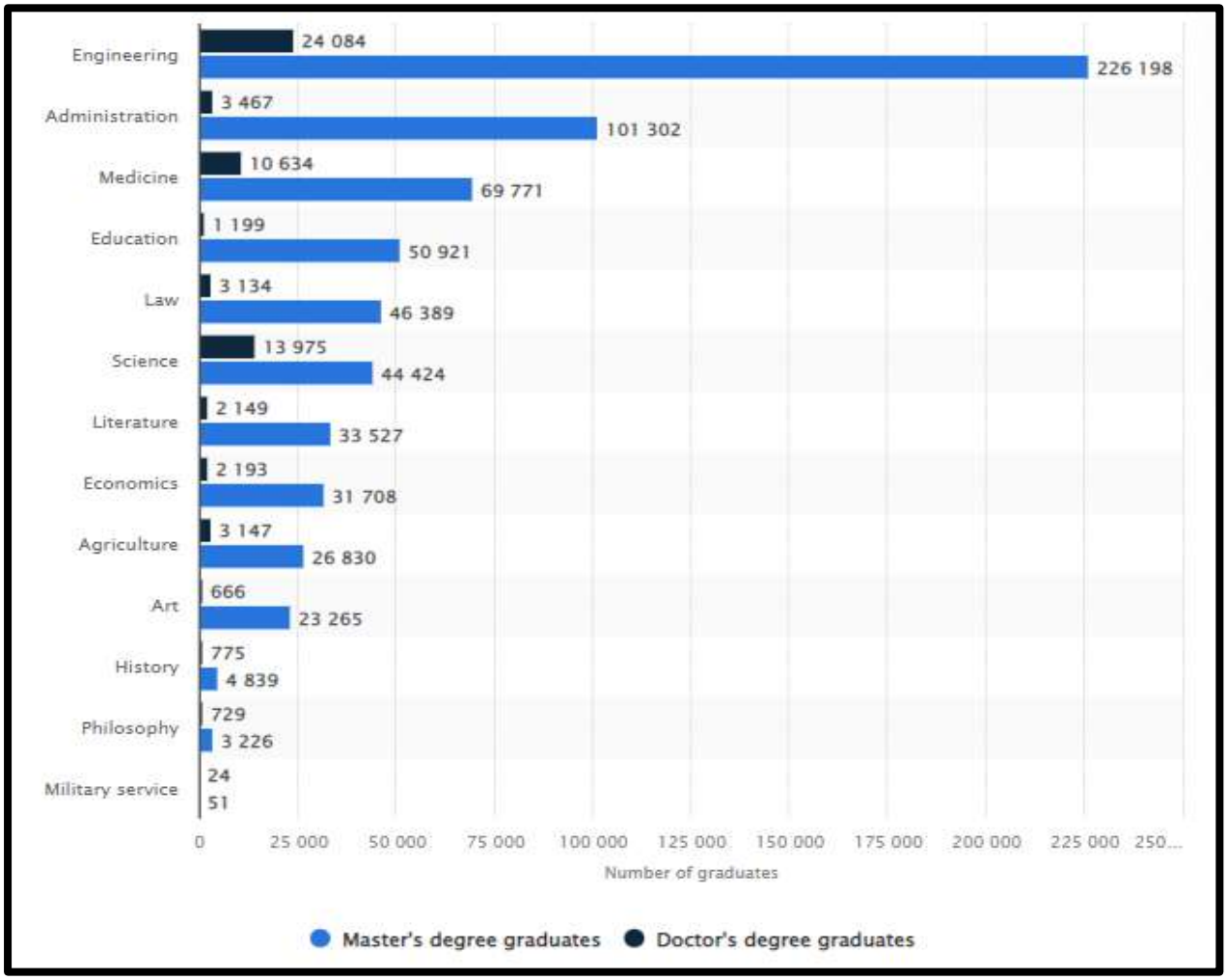

Figure 4: Number of students in doctor's degree and master's degree programmes at public universities in China

(Source: Statista, 2021)

The above figure highlights the number of students enrolled in master's and doctor's degrees programs in government-run colleges and universities in China. From the figure, it can be seen that about 729 thousand students had been graduated from the public colleges of China in 2020, among which 66,200 were alone with doctor's degrees (Statista, 2021). The Ministry of Education in China award the medical universities of the country on the basis of different parameters, which include quality of faculty and education, student-teacher ratio and infrastructure. The reason behind China becoming one of the most attractive options for medical education is government expenditure and investment in the MBBS programme (Ha-asia, 2019). Nevertheless, expansion in school enrolment in China has resulted in declining quality of education among health professionals.

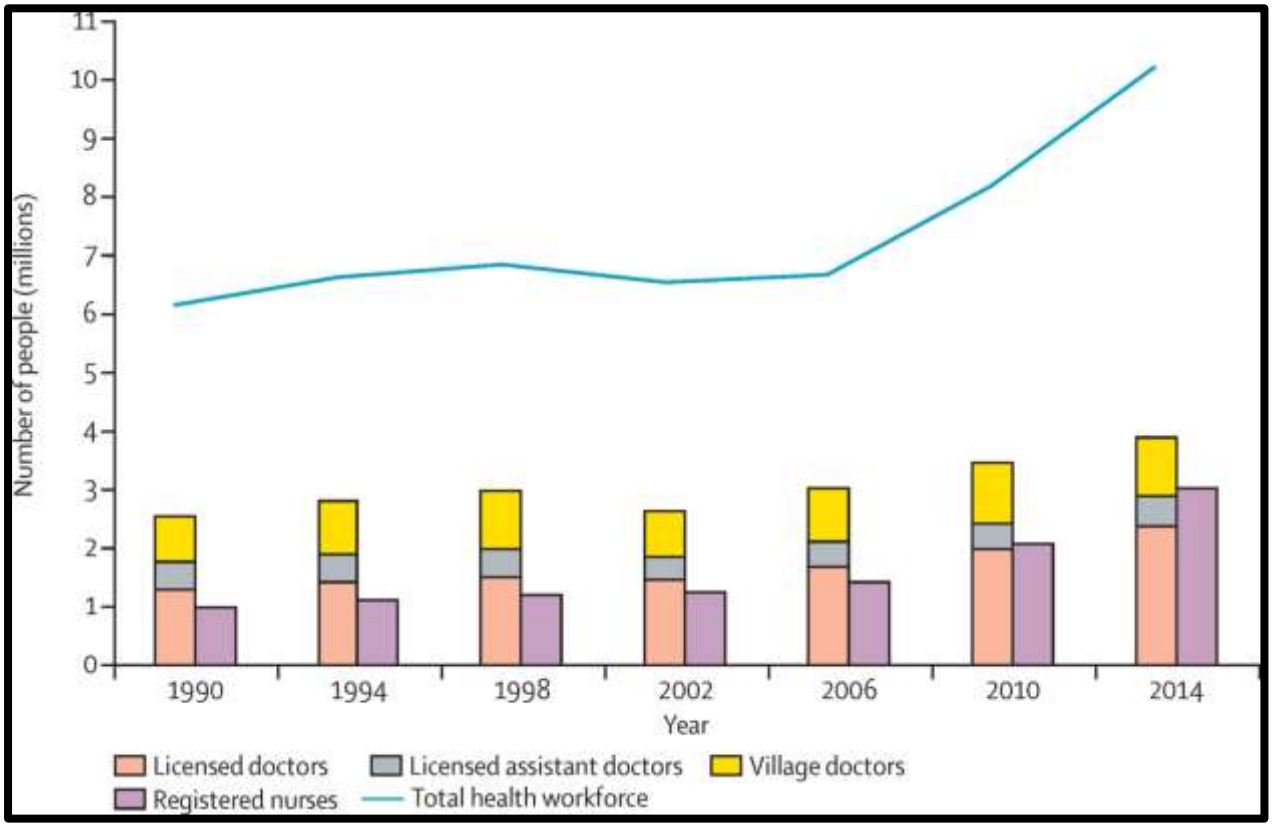

Figure 5: Number of doctors in China
(Source: Zhu, Li & Chen, 2016)

The ambitious reforms in China's higher education and health education completely depend upon health professionals who have experience in clinical and ethical services. Li and Zhou (2018) opined that medical education in China has several strengths as well as weaknesses. Strengths in the medical institutions include high-quality services along with modern facilities. On the other hand, weaknesses of medical education institutions are demotivation among faculty, lack of personalised education and lack of training programmes. Nevertheless, in current times, China has launched a new ***5+3 model*** in medical education, which is working on developing standards for MBBS degrees (Zhu, Li & Chen, 2016). This model includes 5 years of undergraduate and 3-year residency training which is working on improving the number of graduates in the country.

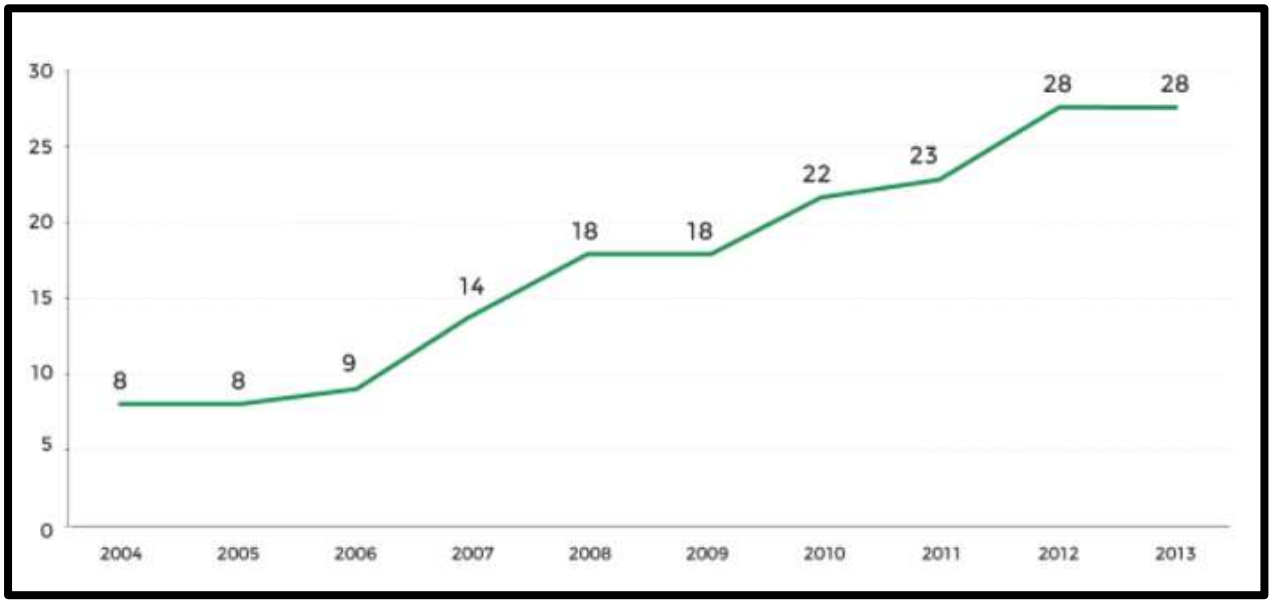

Figure 6: Changing ranking of Chinese universities among the top 500

(Source: Wes.org, 2018)

China being the second-largest economy all over the world, has succeeded in developing the finest universities. The reason behind the growth of the number of students in medical education universities in China from an international perspective is the low fee structure of the country (Chinambbs, 2022). It has been found that as the government of the country allocates a high budget for research and development in medical studies, therefore, cost of medical education in the country decreases. In addition to that, China has continuously reformed its training mode in medical education. However, declination in attraction toward medicine as a professional career, medical education in China includes challenges.

Regression analysis

YEAR	NO. OF STUDENTS GET ADMISSION IN CHINESE MEDICAL COLLEGES (In Millions)	NO. OF STUDENTS GET DOCTORATE DEGREE FROM CHINESE MEDICAL COLLEGES (In Millions)
2011	**3.57**	**2.80**
2012	3.74	3.04
2013	3.81	3.20
2014	3.83	3.41
2015	3.89	3.59
2016	4.05	3.74
2017	4.11	3.84
2018	4.22	3.87
2019	4.31	3.95
2020	4.43	4.21

Table 1: Regression analysis

(Source: Excel)

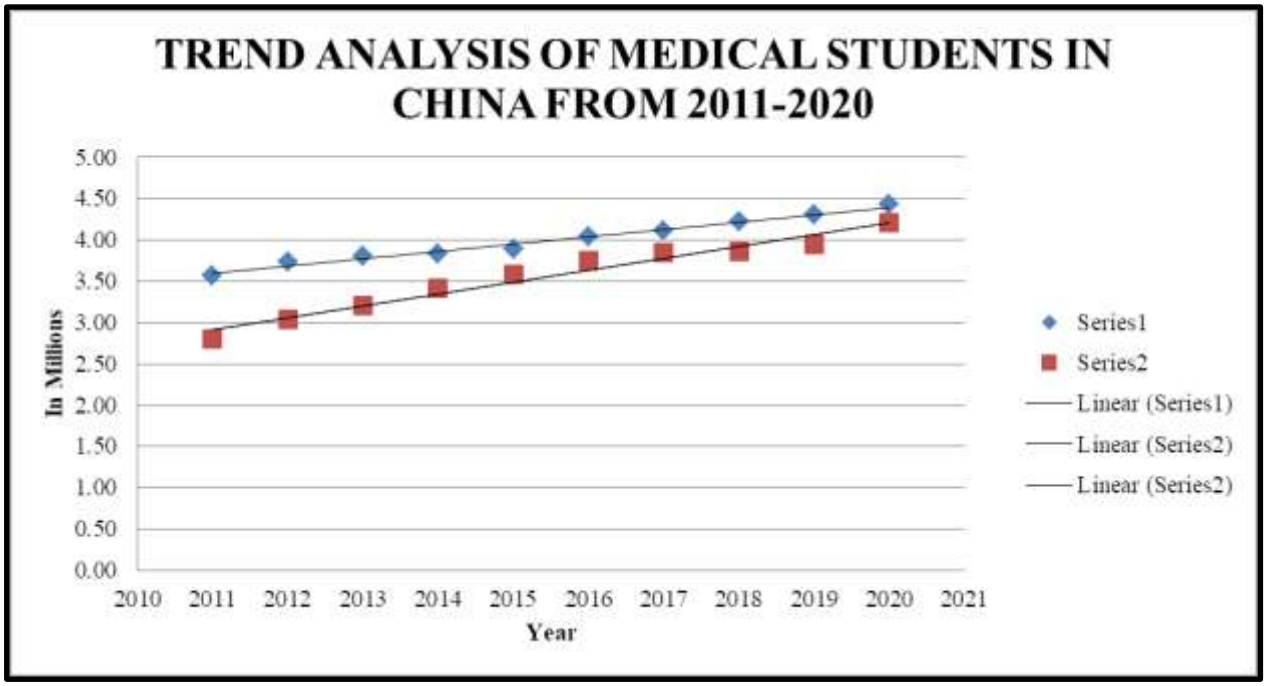

Figure 7: Trend analysis of medical students in China from 2011 to 2020
(Source: Excel)

Table 1shows the number of students taking admission in medical courses in China and the number of students getting doctorate degrees. It can be seen that the number of students taking admission to MBBS degrees in China was 3.57 million in 2011. This number increased to 3.74 million in 2012 and 3.81 million in 2012. Furthermore, from 2011 to 2020 number of students enrolled in medical degrees has significantly increased. It can be seen from ***figure 6*** that the number of students increased by about 0.86 million between 2011 to 2020. In 2020 number of medical students in China has been identified at 4.43 million. The role of the Chinese government is a significant factor in contributing to this growth of student engagement in the MBBS degree programme.

The growth in doctorate degrees has also increased from 2011 to 2020. It can be seen that the number of students who passed out from medical universities as medical professionals in 2011 was about 2.80 million. Furthermore, this number increased to 3.04 million in 2012, 3.20 in 2013 and 3.41 in 2014. Moreover, this number of doctorate degrees developed to 4.21 million in 2020.

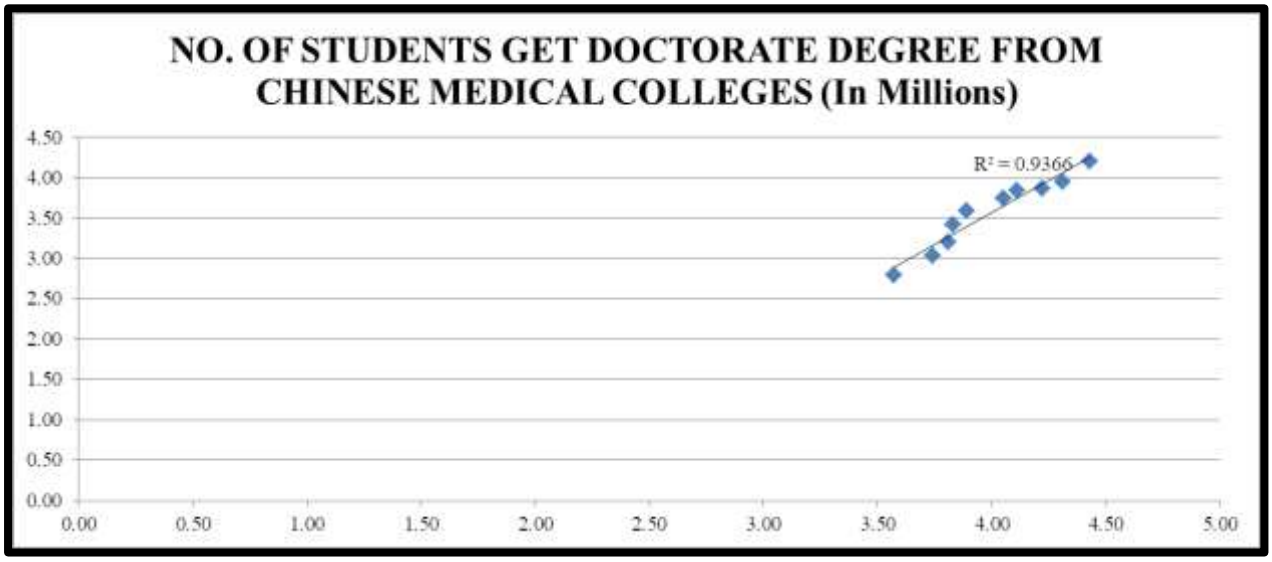

Figure 8: Number of students who get doctorate degrees from Chinese Colleges

(Source: Excel)

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.967792858
R Square	0.936623017
Adjusted R Square	0.928700894
Standard Error	0.118753059
Observations	10

Table 2: Summary output

(Source: Excel)

The value of R is at 0.96, which reflects that there is a strong correlation between the number of students taking admission to medical courses and getting doctorate degrees from Chinese medical colleges. The value of R square at 0.93 in this table shows that students' enrollment and students getting doctorate degrees share a strong relationship.

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.667296588	1.667296588	118.2287912	4.52796E-06
Residual	8	0.112818312	0.014102289		
Total	9	1.7801149			

Table 3: ANOVA table

(Source: Excel)

Value of Significance F below 0.5 in this study reveals that there is a correlation between students' enrolment in medical degrees and students' pass out from universities.

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-2.72346454	0.579475007	-4.699882669	0.001541695	-4.059763	-1.38719	-4.059763	-1.387192778
X Variable 1	1.5734646	0.144708937	10.87330636	4.5279 6E-06	1.239765194	1.907164	1.239765194	1.907164005

Table 4: Coefficient table

(Source: Excel)

C- Intercept
C- Intercept
m- slope
X variable
X-IV
Y-DV
Equation
y= C+mx
y= -2.72346454 + (1.5734646 * x)
The value of y = 1.57 time changes in x with C = -2.72346454

Value of coefficient in above table shows the dependency of students getting doctorate degrees from Chinese medical colleges on the number of students getting admission.

DISCUSSION

China is investing more and more in education; as a result infrastructure of the universities and colleges is developing. This growth in education sector in the country resulted in attracting domestic as well as international students to study in China. It has been found that financial support of Chinese government and quality of medical education in the country has resulted in an increasing number of students in medical education (Ye et al., 2019). It has been found that several medical institutions in the country focus on problem-based learning, which further attracts students in developing their learning as healthcare professionals. Besides that, a reform to further motivate students in taking part in healthcare education reform in PKUHSC has been launched by the government, which is aimed to integrate clinical and basic courses. Nevertheless, Cheng and Chen(2019) mentioned that the number of medical students from underdeveloped regions of China is still far below the standard level. Furthermore, structure of medical education in this country is complex in nature which can contribute to lower student engagement.

CONCLUSION

This study has concluded professional careers of Chinese students enrolled in medical colleges. It has been found that the continuous improvement in medical education programmes

has worked on increasing number of student enrolments. Nevertheless, poor quality of medical education is an existing challenge in the country. This study has identified number of students that enrol for medical courses and number of students that pass out as doctors from Chinese medical colleges. Moreover, role of reforms in further improving medical education in China has been found in this study.

FUTURE SCOPE

For future research in this area, primary data collection can be conducted with the help of surveys or interviews with medical students in China to better understand their professional careers. Primary data can deliver more accurate ideas regarding the relationship between doctors and medical students in medical colleges in China.

Acknowledgements

- Fund Project: Heilongjiang Province Educational Science "13th Five-Year
- Key Project in 2017 (GBB1317140); Heilongjiang Province Educational Science
- 13th Five-Year - Key Project in 2018 (GBB1318142); Qiqihar Medical
- University Educational Science Research Project (QYJY20170104)

References

[1]. Chen, M., Ni, C., Hu, Y., Wang, M., Liu, L., Ji, X., ...& Wang, X. (2018). Meta-analysis on the effectiveness of team-based learning on medical education in China. *BMC medical education*, *18*(1), 1-11.DOI:https://doi.org/10.1186/s12909-018-1179-1

[2]. Cheng, X., & Chen, J. (2019). An exploration of medical education in central and southern china: measuring the professional competence of clinical undergraduates. *International Journal of Environmental Research and Public Health*, *16*(21), 4119.; doi:10.3390/ijerph16214119

[3]. Chinambbs. 2022. MBBS in china for Indian students. *Chinambbs*. Retrieved from: https://www.chinambbs.org/mbbs-in-china-for-indian-students.html

[4]. Ha-asia. 2019. Why Indian Students Prefer China for Medical Education? *Ha-asia*. Retrieved from: https://www.ha-asia.com/why-indian-students-prefer-china-for-medical-education/

[5]. Hedy S. Wald, 2015, Professional Identity (Trans)Formation in Medical Education: Reflection, Relationship, Resilience, PhD, Vol. 90, No. 6 / June 2015

[6]. Hsieh, C. R., & Tang, C. (2019). The multi-tiered medical education system and its influence on the health care market—China's Flexner Report. *Human Resources for Health*, *17*(1), 1-13.DOI:https://doi.org/10.1186/s12960-019-0382-4

[7]. Jia, X., Zeng, W., & Zhang, Q. (2018). Combined administration of problem-and lecture-based learning teaching models in medical education in China: A meta-analysis of randomized controlled trials. *Medicine*, *97*(43).doi: 10.1097/MD.0000000000011366
Wang, Y., Yu, R., Liu, Y., &Qian, W. (2021). Students' and teachers' perspective on the implementation of online medical education in China: a Qualitative Study. *Advances in medical education and practice*, *12*, 895.doi: 10.2147/AMEP.S323397

[8]. Li, H., & Zhou, X. (2018).Medical education reform in China. *Postgraduate Medical Journal*, *94*(1118), 673-674.DOI:https://doi.org/10.1186/s40249-021-00855-y

[9]. Martins, F. S., da Cunha, J. A. C., & Serra, F. A. R. (2018).Secondary data in research–uses and opportunities. *PODIUM sport, leisure and tourism review*, *7*(3).https://doi.org/10.5585/podium.v7i3.316

[10]. Saunders, M. N., &Bezzina, F. (2015).Reflections on conceptions of research methodology among management academics. *European management journal*, *33*(5), 297-304.https://doi.org/10.1016/j.emj.2015.06.002

[11]. Statista.(2021). Number of graduates from master's and doctor's degree programs at public universities in China in 2020, by subject area.*Statista*. Retrieved from: https://www.statista.com/statistics/1095335/china-number-of-masters-and-doctors-degrees-awarded-by-subject-area/

[12]. Raju, V. (2018). Theory of Lim law: Leadership style. *Eurasian Journal of Analytical Chemistry*, *13*(6), 125–136. http://www.eurasianjournals.com/Theory-of-Lim-Law-Leadership-Style,104466,0,2.html

[13]. Raju, V. (2021). Implementing Flexible Systems in Doctoral Viva Defense Through Virtual Mechanism. *Global Journal of Flexible Systems Management*, *22*(2), 127–139. https://doi.org/10.1007/s40171-021-00264-y

[14]. Raju, V., Juan, W., Shrestha, S., Kalathinathan, A., & Ramachandran, K. (2021). *Role of Big Data Analytics in Belt and Road Initiative (BRI): Multivariate Analysis with Gaussian Distribution of Data*. 169–177. https://doi.org/10.3233/FAIA210245

[15]. Raju, V., & Phung, S. P. (2019). Strategies to enhance supply chain management practices: Identifying the performance orientation. *International Journal of Supply Chain Management*, *8*(2), 1085–1089. https://www.scopus.com/record/display.uri?eid=2-s2.0-85064975988&origin=inward&txGid=56cd28a7dbbe62387fa1667662a82e75

[16]. Raju, V., & Poh, S. P. (2019). Strategies to Enhance Supply Chain Management Practices: Identifying the Performance Orientation. *International Journal of Supply Chain Management*, *8*(2), 1079–1084. https://ojs.excelingtech.co.uk/index.php/IJSCM/article/view/2865

[17]. Wang, W. (2021). Medical education in china: progress in the past 70 years and a vision for the future. *BMC medical education*, *21*(1), 1-6.DOI:https://doi.org/10.1186/s12909-021-02875-6

[18]. Wes.org. (2018). Indian Students Seeking an MBBS: Why China? *Wes.org*. Retrieved from: https://wenr.wes.org/2018/03/indian-students-seeking-a-mbbs-why-china

[19]. Xiang, Y. T., Jin, Y., Wang, Y., Zhang, Q., Zhang, L., & Cheung, T. (2020). Tribute to health workers in China: A group of respectable population during the outbreak of the COVID-19. *International journal of biological sciences*, *16*(10), 1739.doi: 10.7150/ijbs.45135

[20]. Yang, D. Y., Cheng, S. Y., Wang, S. Z., Wang, J. S., Kuang, M., Wang, T. H., & Xiao, H. P. (2020). Preparedness of medical education in China: Lessons from the COVID-19 outbreak. *Medical teacher*, *42*(7), 787-790.https://doi.org/10.1080/0142159X.2020.1770713

[21]. Ye, G., Mao, J., Hu, J., Chen, J., &Hesketh, T. (2019). Palliative care medical student education: a cross-sectional medical school survey in mainland China. *BMJ Supportive & Palliative Care*.doi:10.1136/bmjspcare-2019-002044

[22]. Zhu, J., Li, W., & Chen, L. (2016). Doctors in China: improving quality through modernisation of residency education. *The Lancet*, *388*(10054), 1922-1929. DOI:https://doi.org/10.1016/S0140-6736(16)00582-1

[23]. Hedy S. Wald, 2015, Professional Identity (Trans)Formation in Medical Education: Reflection, Relationship, Resilience, PhD, Vol. 90, No. 6 / June 2015