



2014

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Improving Nursing Education and Training in Central Asia

Abstract

This project seeks to evaluate the reasons why Central Asian countries, specifically Uzbekistan, seem to be falling behind other nations in terms of the quality of nursing education and training. This will be achieved by analyzing the motivations and expectations of students going into the nursing field, as well as trends in education space.

Additionally, it provides historical information on the development of nursing in countries such as the US that have more complicated/sophisticated healthcare systems. These comparisons are made in order to investigate potential similarities and differences as well as to provide recommendations to better the Uzbek approach in educating nursing professionals.

Keywords

Nursing, Uzbekistan

Disciplines

Business | Nursing

Social Impact Research Experience

Improving Nursing Education and Training in Central Asia

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I would like to thank Professor Patricia Danzon for her guidance, as well as Dr. Asher Martin, Bethany Schell, and the rest of SIRE team for their continuous support.

I would also like to thank nurses from Global Med Services for contributing their insights and sharing their experiences. Additional thank you to all the nursing students from Borovski Nursing College for their participation in the research.

Abstract.

This project seeks to evaluate the reasons why Central Asian countries, specifically Uzbekistan, seem to be falling behind other nations in terms of the quality of nursing education and training. This will be achieved by analyzing the motivations and expectations of students going into the nursing field, as well as trends in education space.

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Nursing

Overview of Uzbek Education System.

Education is one of Uzbekistan's highly prioritized developmental goals. Currently, students can choose from 22 universities, 131 Bachelor's, and 664 Master's programs. Every citizen is guaranteed equal rights in having access to higher education, regardless of gender, language, age, ethnicity, social status, or religion. Adjustments and implementations in the education system are executed in accordance with the Uzbek constitution by Oliy Majlis (UNDP). Admission decisions are based on the candidates' transcripts and enrollment test scores. All universities administer enrollment tests on the same date, August 1st, and test dates for lyceums and colleges follow the same rule; however, the test date for these varies yearly. Basic governmental goals in education stress the importance of:

- rewarding talent and hard work
- humanitarian and democratic nature of education
- continuous development of the education system

The Uzbek education system can be divided into 3 levels:

Level 1 – Basic education, includes grades 1 through 9

Level 2 – Secondary special and professional education:

- Lyceum, includes grades 10-12, analogous of high school diploma

- College, specialized education, and employment are post-graduation options

***Note: in Uzbekistan, college is a 3 year program equivalent to the US 10th-12th grades

Level 3 – Higher education, bachelor's and master's degrees

Nursing Programs in Uzbek Colleges and Current Barriers for Higher Quality of Nursing Education.

Currently, Uzbekistan has several institutions that provide nursing education for students interested in pursuing a career in nursing. There are 5 professional colleges and 2 universities (Bachelor's and Master's degrees) that offer this professional training. Secondary special and professional education is free in Uzbekistan; therefore, all students graduating from 9th grade (6 million students annually) voluntarily continue their education at colleges and academic lyceums. To offset the costs of providing free education, the government administers enrollment tests on the same date. This means that each candidate has only one chance per year (there are no safeties if the student does not pass examinations). This policy ensures that applicants prepare well for the tests and only the brightest and most talented get the benefit of a free education. The acceptance rate for colleges and lyceums is determined by 2 factors:

- number of students applying (always high)
- specialty/major (specialties such as Law, Finance, Medicine/non-Nursing specialties tend to be more competitive)

Borovski Medical College is the most popular option for Uzbek students since it has an acceptance rate of 75% for the nursing specialty program. However, this number drops to 40% for specialties like OBGYN and General Medicine. This might seem to be a pleasant outlook for nursing candidates, but difficulties arise later when students interested in continuing their education have to go through the highly selective process to be accepted to one of the two universities that offer degrees in Nursing (both Bachelor's and Master's degrees).

Currently, students face several barriers for continuing their education in the nursing field, which include a limited number of options for post-secondary education, the current design of the education and training program, lower salary and benefits post-graduation compared to other medical professions, and social stigma associated with nursing profession.

Development of Nursing Education Programs in the US.

Although nursing itself is not a novel field, it is a relatively new concept in Uzbekistan. The Nursing branch at Borovski Medical College was started in 1959, which is quite recent compared to nursing development in the rest of the world.

Development of professional nursing in the US dates all the way back to the Civil War in 1861. During the Civil War, the country faced a shortage of medical professionals, and at that time the nursing profession was vaguely defined. The field of nursing transformed to be more professional as Civil War nurses laid the foundation and changed public opinion on the importance of nursing and women's role in it. Society not only became more accepting of women working outside of their homes but also realized the value of them receiving formal education. This was an instrumental change and motivated the establishment of nursing training. Some of the first nursing programs include Nightingale School of Nursing and the nurse training school of Women's Hospital of Philadelphia. Within 10 years after nursing training was established, the number of schools increased to 35 institutions. The growth didn't stop, and 432 more institutions were established by the end of 1900. This not only pushed the nursing field forward but also served as an incentive to improve the training further. Both hospitals and physicians realized the benefits of using nursing student labor and incorporated the new concept of "clinical training" into education programs. This truly

revolutionized the nursing field and even today is one of the most challenging but beneficial opportunities for nursing students (Egenes, 2010).

Advances in science and discoveries such as microscopes and other aid instruments for assessment of bodily functions allowed for further expansion of nurses' responsibilities.

Nurses became able to utilize these instruments to collect information and think critically to evaluate and establish care plans for their patients. As more sophisticated procedures became more common, nurses were not just changing dressings and administering medications.

Bedside care expanded to care in operation rooms under more complex conditions (Egenes, 2010).

Establishment of Nursing Associations was one of the most important steps in developing nursing education programs, training, and practice. In 1896, the Nurses' Association Alumnae of the United States and Canada, currently known as American Nurses Association (ANA), was founded. This organization was intended to provide licensure of nurses as well as establish a code of ethics, promote the nursing profession, and improve the image of nursing. They also addressed financial, professional, and other concerns and interests. One of the most important concerns that ANA voiced and worked on was the lack of uniform educational standards in nursing training and practice. As a result, the American Society of Superintendents of Training Schools of Nursing was established. This organization focused on improving the standards of nursing education throughout the country (Egenes, 2010).

In 1901, New York, New Jersey, Illinois, and Virginia were the first states that organized together with the goal of establishing a nursing act. Two years later, North Carolina passed a nurse licensure act. In 1921, 48 states, including the District of Columbia and Hawaii, enacted practice acts regulating the nursing profession. Although the first acts were more

permissive than mandatory, this step was a tremendous milestone in shaping nursing practice. For the first time, nursing had a legislative component incorporated into the practice of medicine. Practice acts and mandatory nursing licensing aimed to standardize responsibilities, rights, and practice methods among all states (Egenes, 2010).

Comparison of Uzbek and American Nursing Education Programs.

As in the case of the United States, the initiative to establish and develop the nursing profession in Uzbekistan was motivated by the need for nursing professionals due to several reasons. Demand for nursing care rises as the population is more prone to illness as well as a mismatch between demand for medical care and the rate of production of medical professionals (UNDP).

Firstly, as the population of Uzbekistan grows yearly, the demand for nurses grows, especially with the increased prevalence of illnesses such as diabetes, chronic heart diseases, and STIs. The hope is that the number of nurses who enroll in training will increase. The projection by the United Nations Development Program was that by the end of 2013, more than 5,100 qualified nurses will be able to graduate and share their knowledge (UNDP). This alone would have helped more than 35,000 people that fall into HIV risk group to receive education about this disease through more than 10,000 STI information sessions conducted by nurses (UNDP). Nurses are also instrumental in reduction of tuberculosis spread. The programs aim to have more nursing professionals in rural areas as it creates a big difference for the populations that have very limited access to healthcare due to lack of local clinics or hospitals (USAID, 2013). Most of the patients that require attention live too far from the city or cannot afford transportation; as a result, they prematurely stop treatment or disregard it

completely, making uninformed choices since they are unaware of consequences for the entire society that are associated with untreated TB (USAID, 2013).

Secondly, the constant mismatch between the rate of qualified medical professionals and the demand for care contributed to the boost and interest in nursing. The Uzbek educational pathway to becoming a doctor is similar to American one. One must spend 8 years in medical school receiving theoretical and practical training. Medical Schools are part of the higher level education model and are not subsidized by the government. Therefore, students not only have to go through the competitive selection process but also must be able to afford tuition fees. When the healthcare model was relying too heavily on doctors, uneven distribution of responsibilities decreased the level of satisfaction and increased stress levels for doctors. All these factors resulted in decreased interest in medicine, especially the doctor's profession. Establishment of nursing training programs allowed for correction of this imbalance as the nurses' training program is shorter (3 year college program is sufficient to practice nursing). Additionally, nurses took over some of the responsibilities such as documentation, patient assessment and preparation, and bedside care that were before attributed to doctors (USAID, 2013).

Lastly, public interest served as a great factor in development of nursing profession. Applicants applying for nursing colleges not only benefit from free education but also were able to practice right after graduation, since a Bachelor's degree in Nursing is not a requirement for the majority of clinics and hospitals in the country. This trend is even more evident in rural and non-capital areas of the country that do not have nursing colleges and therefore experience shortages of nurses.

Theory.

One of the fundamental differences in nursing education trends between two countries is that the hierarchy of responsibilities depending on type of education the candidate received. The US nursing education programs can have practical as well as academic focus, which allows students pursuing career in nursing some flexibility and wide variety of options. For example, Certified Nurse Assistant program is the fastest way to get your foot into the nursing field. Because of the short duration of the program, it is mostly focused on training to perform very basic nursing responsibilities such as patient observation, first aid, CPR, assessing vital signs or assisting patients with activities of daily living (making bed, toileting, bathing). CNAs are not licensed professionals, which obligates them to work under the supervision of an RN or LPN. Associate degree programs in nursing (ADN) that take 2-3 years to complete focus mostly on practical/technical skills. ADN allows graduates to become Registered nurses (RNs); however, it does limit options when they try to obtain more senior positions. On the other hand, a 4-year-long Bachelor's of Science Degree in Nursing program (BSN) has a more academic focus and incorporates training in variety of areas such as management, leadership and communication. Although the BSN is a more vigorous program because it incorporates both academic and training portions of nursing job, it has more opportunities for advancement: graduates can choose from variety of fields such as research, consulting, teaching or administration (Tatano, 2000).

While American healthcare system has a clearly outlined breakdown of responsibilities for each tier of nursing professionals, Uzbekistan has a less hierarchical system. Nursing students in Uzbekistan who attend medical colleges receive more practice-oriented education (similar

to ADN because of its duration), but their responsibilities are more comparable with the CNA's ones.

Although it might seem like the current Uzbek nursing education system is meeting most of its objectives, there are a lot of negative effects of leaving the current system without implementing an idea of the importance of obtaining higher level of education.

Pursuing a higher level education allows nurses to learn about complexity of care and gain more practice in a clinical setting. Currently, Uzbek nursing students have to pass clinical rotations as part of their program just as nursing students in the US. The main difference arises on the academic level. The US education program is longer and focuses not only on sciences (learning anatomy and understanding pathophysiology of diseases) but also the importance of interprofessional collaboration, teamwork, ethical issues, and dilemma involved in care. Research suggests that incorporation of these learning points into the education program not only results in better outcomes in units such as critical and emergency care, but also improves patients' satisfaction.

While US hospitals have a hierarchy of responsibilities for nurses depending on the level of education they received, Uzbekistan lacks this differentiation, therefore discouraging graduates from pursuing training beyond the secondary specialized level. Another differentiating factor, salary, is one of the main incentives for American nurses to continue their education and earn higher credentials. Salaries in Uzbekistan are determined by geography and employer, rather than the degree of education.

Although many would think that the government is the guiding hand in shaping the interest in continuing nursing training, it is not always true, as many rules and regulations are employer-specific. Some hospitals, such as the Hospital of the University of Pennsylvania,

require staff to go through mandatory training sessions and educational meetings that further qualifications and improve professional skills by keeping providers up-to-date with medical research findings. Such continuous on-job training is not available in Uzbek hospitals.

According to Louise Forsetlund, research has shown that even by providing educational meetings alone, patient outcomes and quality of care can improve by 6%.

In the following section, I will discuss the barriers Uzbek nursing students face in pursuing higher level of education and recommendations to better the system.

Methodology.

For this research, I focused on the Borovski Medical College as a primary source of information. Data collection was based on interviewing students, as they are the most affected party of the research.

The primary source of information was student surveys and interviews. The questions were focused on job satisfaction, reasons behind choosing nursing career path, future goals and motivations, as well as recommendations on improvement of students' experience. This was an important piece of research in understanding the mismatch between expectations and reality.

For quantitative data analysis, I used a questionnaire that targeted college freshmen and seniors. It focused on questions like demographics, expectations for the program, and future plans (specifically, how many students are planning to stay in the nursing field). The respondents had an opportunity to provide their comments on the issue, in addition to the survey.

Results.

The qualitative and quantitative results are provided below. 120 students were surveyed, 7 students provided feedback and participated in the interview, and 4 agreed to have their responses published.

Quantitative Data.

Currently, Borovski accepts up to 1,500 applicants (nursing major) yearly. The nursing program usually starts with 150-170 students, who later move on into other medical fields. 95% of the nursing class is female students from local schools in Tashkent. The number of students from other states ranges from 2-5 per year. Year 2011 was the most successful in terms of retaining students within nursing field as 10 out of 77 (13%) graduates decided to continue and got accepted into Nursing Bachelor's program. In 2012, the interest in nursing field almost doubled (from 77 in 2011 to 140 in 2012), but dropped again in 2013 (115 students). The interest in continuing education in nursing and pursuing higher level degree has dropped to 10% and stayed at this level throughout past 2 years.

Using RStudio software, we analyzed collected data provided in the Table 1 (Appendix) through a Contingency Table analysis. Three trials were conducted to evaluate correlation between gender and reasons for not pursuing higher education in nursing, level of satisfaction as well as reasons for choosing nursing degree and plans of continuing nursing education.

All trials revealed statistical significance of the following implications:

- Male nursing students are more likely to not continue to higher levels of nursing education due to the profession being non-prestigious and the difficulty of getting into higher level of education institutions (p=0.01341)

- Students who picked the nursing major because it was “easier to get in” are less likely to continue pursuing higher education in medical University/BSN degree (p=0.0253)
- Students who are satisfied with the current nursing training program at their college are as likely to not pursue degree from medical University as those who are non-satisfied with training program (p=0.5253)

Qualitative Data.

In an attempt to understand declining interest in pursuing nursing education, I interviewed several volunteers who shared their experience. The responses further supported our quantitative findings.

Zilola, a 25-year old nurse at Global Med Systems clinic shared that she has been trying to apply for nursing Bachelor’s program for several years now, but all attempts have been unsuccessful. “You spend entire year preparing for this exam and the pressure of doing well is very stressful because we can apply only to one University. I have been trying since I was 19 and graduated from college. I am 25 now. Last year was my last year to try because it is very discouraging to keep failing.” Now, she is very content with practicing nursing just with her college diploma.

Akmal is a 23-year old Barovski graduate who changed careers after graduating from college. Now, he is pursuing degree in mechanical engineering from Polytechnic University of Tashkent. “I have decided to continue my education but switched majors after I worked as a nurse for 2 years. Job satisfaction was very low because I had to work 8-10 hour days and mandatory night shifts but the salary was barely enough to pay for my rent. I was hoping for promotional benefits or a raise but after a year of struggling I gave up and spent another year

preparing for enrollment tests. This is my first year at Polytechnic University and I see a lot more opportunities with this Bachelor's degree.”

Alisher is a 21-year old Barovski graduate who is now pursuing Bachelor's degree in Fizkulturniy University of Tashkent. “I loved nursing program when I joined Borovski. I liked the interactions with patients during my clinicals. I learnt a lot. I was a professional basketball player and a full-time student at the same time. You can imagine how hard it was to combine school and athlete responsibilities. I stayed in this program and graduated successfully. However, I decided to pursue a degree and become a professional trainer instead of a nurse. I listened to my father who always told me that nursing is not a well-respected profession especially for males. At some point I couldn't go against his will and now only use my nursing skills when my grandmother needs me to take her blood pressure or administer an IV medication.”

Discussion of challenges and further research questions.

From analysis of the interviews and observations, some of the biggest challenges faced by students that prevent them from continuing education are the current application system, job satisfaction, and social stigma associated with nursing field.

The majority of respondents shared that they would benefit from multiple test dates when applying to Universities as it will allow them to have backup options and avoid delays in continuing education if they don't get accepted to their preferred university. Additionally, male respondents agreed that they would have stayed in nursing instead of transferring into “more manly fields” such as finance or law if nursing were a socially acceptable profession for males. But image is not the only cultural barrier for male nurses. All four male nursing

students agree that they cannot practice as freely as female nurses because female patients almost always prefer to opt out of care by male nurses. Additionally, non-available employer-sponsored benefits or periodic raise in salaries to match the inflation is the main reason to switch careers and pursue higher level education in other areas such as law and finance. 70% of surveyed responded that they would like to attend additional training sessions for advancing nursing skills, if they were sponsored by the employer.

Recommendations and Conclusion.

Reviewing the challenges and looking back at the historical development of nursing education programs in the US, we can lay out the following areas for improvement and recommendations that would encourage college graduates to pursue higher-level education in nursing.

1. Alter the admission process and allow candidates to apply to more than one institution per given year
2. Require state licensure prior to practicing
3. Incorporate inter-disciplinary and collaborative training into the education program
4. Create a hierarchy of responsibilities depending on the education level
5. Require hospitals to work on benefits and incentive programs based on performance
6. Promote positive image to develop societal acceptance of nursing as a profession

As the demand in nursing trends upwards, it is important to create a favorable environment for preparing skilled nursing professionals. We believe that implementing

the above recommendations will result in positive inflow and interest in the nursing profession. While our research is based on the historical trends in countries such as the US that have already undergone successful development of the education programs in nursing, our recommendations are based on the general attitudes and opinions of Uzbek students.

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Appendix A. Table 1.

Student	Age	Gender	Reason 1 for choosing nursing	Reason 2 for choosing nursing	Level of satisfaction with academic program	Plans after graduation	Reasons for not choosing nursing career
1	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not prestigious
2	16	M	Family/parents chose for me	Family/parents chose for me	S	Apply for non-medical university	Not prestigious
3	16	F	Easy to get in	Easy to get in	S	Work as a nurse	NA
4	16	F	Family/parents chose for me	Family/parents chose for me	S	Apply for non-medical university	Not worth it
5	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not prestigious
6	16	F	Family/parents chose for me	Family/parents chose for me	S	Work as a nurse	NA
7	17	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not prestigious
8	17	F	Family/parents chose for me	Family/parents chose for me	S	Work as a nurse	NA
9	16	F	Easy to get in	Easy to get in	U	Apply for non-medical university	Not prestigious
10	16	M	Family/parents chose for me	Family/parents chose for me	S	Apply for non-medical university	Not prestigious
11	16	F	Easy to get in	Easy to get in	S	Apply for medical university	NA
12	16	F	Family/parents chose for me	Family/parents chose for me	S	Apply for non-medical university	Not prestigious
13	16	M	Easy to get in	Easy to get in	U	Apply for non-medical university	Not prestigious
14	16	M	Family/parents chose for me	Family/parents chose for me	S	Work as a nurse	NA

15	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not prestigious
16	16	F	Family/parents chose for me	Family/parents chose for me	S	Apply for non-medical university	Not worth it
17	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it
18	16	F	Easy to get in	Wanted to be a nurse	S	Apply for non-medical university	Not worth it
19	16	M	Easy to get in	Easy to get in	U	Apply for non-medical university	Not worth it
20	16	M	Wanted to be a nurse	Wanted to be a nurse	S	Apply for medical university	NA
21	16	F	Easy to get in	Easy to get in	S	Work as a nurse	NA
22	16	M	Wanted to be a nurse	Wanted to be a nurse	S	Apply for medical university	NA
23	16	F	Easy to get in	Easy to get in	S	Work as a nurse	NA
24	15	M	Easy to get in	Wanted to be a nurse	S	Apply for medical university	NA
25	16	M	Easy to get in	Easy to get in	S	Work as a nurse	NA
26	16	F	Easy to get in	Wanted to be a nurse	S	Work as a nurse	NA
27	16	F	Easy to get in	Easy to get in	U	Apply for non-medical university	NA
28	16	F	Easy to get in	Wanted to be a nurse	S	Apply for non-medical university	Not worth it
29	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it
30	16	F	Easy to get in	Wanted to be a nurse	S	Apply for non-medical university	Not worth it
31	16	M	Easy to get in	Easy to get in	S	Apply for non-medical university	Not prestigious
32	16	F	Easy to get in	Wanted to be a nurse	S	Apply for non-medical	Not worth it

						university	
33	17	F	Easy to get in	Easy to get in	S	Apply for medical university	NA
34	16	F	Wanted to be a nurse	Wanted to be a nurse	S	Apply for non-medical university	Not worth it
35	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it
36	16	F	Easy to get in	Wanted to be a nurse	U	Apply for non-medical university	NA
37	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it
38	16	F	Easy to get in	Wanted to be a nurse	S	Apply for non-medical university	Not worth it
39	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it
40	16	F	Easy to get in	Wanted to be a nurse	S	Apply for non-medical university	Not worth it
41	16	M	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it
42	16	F	Easy to get in	Wanted to be a nurse	S	Apply for non-medical university	Not worth it
43	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it
44	17	M	Easy to get in	Wanted to be a nurse	S	Work as a nurse	NA
45	16	F	Easy to get in	Easy to get in	U	Apply for non-medical university	Not worth it
46	16	F	Easy to get in	Wanted to be a nurse	S	Work as a nurse	NA
47	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it
48	16	F	Easy to get in	Wanted to be a nurse	S	Apply for non-medical	Not worth it

						university	
49	16	F	Easy to get in	Easy to get in	U	Apply for non-medical university	Low salary
50	16	M	Easy to get in	Wanted to be a nurse	S	Apply for non-medical university	Not prestigious
51	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it
52	16	F	Easy to get in	Wanted to be a nurse	S	Apply for non-medical university	Low salary
53	16	M	Easy to get in	Easy to get in	S	Apply for medical university	NA
54	16	F	Wanted to be a nurse	Wanted to be a nurse	U	Apply for non-medical university	Low salary
55	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Low salary
56	16	F	Wanted to be a nurse	Wanted to be a nurse	S	Apply for non-medical university	Not worth it
57	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it
58	16	M	Wanted to be a nurse	Wanted to be a nurse	U	Apply for medical university	NA
59	16	F	Easy to get in	Easy to get in	U	Apply for non-medical university	NA
60	16	M	Wanted to be a nurse	Wanted to be a nurse	U	Apply for non-medical university	Not prestigious
61	17	F	Easy to get in	Easy to get in	U	Apply for non-medical university	Not worth it
62	16	F	Wanted to be a nurse	Wanted to be a nurse	U	Apply for non-medical university	Not worth it
63	15	M	Easy to get in	Easy to get in	U	Apply for non-medical	Low salary

						university	
64	16	M	Wanted to be a nurse	Wanted to be a nurse	S	Work as a nurse	NA
65	16	F	Easy to get in	Easy to get in	U	Apply for non-medical university	Not worth it
66	15	F	Easy to get in	Wanted to be a nurse	U	Apply for non-medical university	Not worth it
67	17	F	Easy to get in	Easy to get in	U	Apply for non-medical university	Not worth it
68	16	F	Easy to get in	Wanted to be a nurse	S	Apply for non-medical university	Not worth it
69	16	F	Easy to get in	Easy to get in	U	Apply for non-medical university	Not worth it
70	16	F	Easy to get in	Wanted to be a nurse	S	Apply for non-medical university	Not worth it
71	17	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it
72	16	F	Easy to get in	Wanted to be a nurse	S	Apply for non-medical university	Not worth it
73	17	F	Easy to get in	Easy to get in	U	Apply for non-medical university	Not worth it
74	16	M	Easy to get in	Wanted to be a nurse	U	Apply for non-medical university	Not prestigious
75	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it
76	17	F	Wanted to be a nurse	Wanted to be a nurse	S	Apply for non-medical university	Not prestigious
77	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not prestigious
78	16	F	Easy to get in	Wanted to be a nurse	U	Apply for non-medical university	Not prestigious

79	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not prestigious
80	16	M	Easy to get in	Wanted to be a nurse	U	Apply for non-medical university	NA
81	16	M	Easy to get in	Easy to get in	S	Apply for non-medical university	Low salary
82	16	F	Easy to get in	Wanted to be a nurse	S	Apply for non-medical university	Low salary
83	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Low salary
84	16	F	Easy to get in	Wanted to be a nurse	U	Apply for non-medical university	Low salary
85	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not prestigious
86	16	M	Wanted to be a nurse	Wanted to be a nurse	U	Apply for non-medical university	Low salary
87	16	F	Easy to get in	Easy to get in	U	Apply for non-medical university	Not prestigious
88	16	F	Easy to get in	Wanted to be a nurse	S	Apply for non-medical university	Not prestigious
89	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not prestigious
90	16	F	Easy to get in	Wanted to be a nurse	U	Apply for non-medical university	Not prestigious
91	17	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it
92	16	F	Easy to get in	Wanted to be a nurse	U	Apply for non-medical university	Not worth it
93	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it

94	16	M	Easy to get in	Wanted to be a nurse	S	Apply for medical university	NA
95	16	M	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it
96	16	F	Easy to get in	Wanted to be a nurse	S	Apply for non-medical university	Not worth it
97	16	F	Easy to get in	Easy to get in	U	Apply for non-medical university	Not prestigious
98	16	F	Easy to get in	Wanted to be a nurse	U	Apply for non-medical university	NA
99	16	M	Easy to get in	Easy to get in	U	Apply for non-medical university	Not prestigious
100	16	F	Easy to get in	Wanted to be a nurse	U	Apply for non-medical university	Not worth it
101	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Low salary
102	15	F	Easy to get in	Wanted to be a nurse	S	Apply for non-medical university	Low salary
103	16	F	Easy to get in	Easy to get in	U	Apply for non-medical university	Low salary
104	16	F	Wanted to be a nurse	Wanted to be a nurse	U	Apply for non-medical university	Low salary
105	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it
106	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it
107	17	M	Easy to get in	Easy to get in	S	Apply for medical university	NA
108	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it

109	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not worth it
110	16	F	Easy to get in	Easy to get in	U	Apply for non-medical university	NA
111	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not prestigious
112	16	M	Easy to get in	Easy to get in	S	Apply for non-medical university	Not prestigious
113	16	M	Easy to get in	Easy to get in	S	Apply for non-medical university	Not prestigious
114	17	F	Easy to get in	Easy to get in	S	Work as a nurse	NA
115	17	F	Easy to get in	Easy to get in	U	Apply for non-medical university	Low salary
116	16	M	Easy to get in	Easy to get in	U	Apply for medical university	NA
117	16	F	Easy to get in	Easy to get in	U	Apply for non-medical university	Not prestigious
118	16	F	Easy to get in	Easy to get in	U	Apply for non-medical university	Not prestigious
119	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not prestigious
120	16	F	Easy to get in	Easy to get in	S	Apply for non-medical university	Not prestigious

Appendix B.

Model 1.

```

> data2=data.frame(gender,nonnursing)
> data2=na.omit(data2)
>
> gender=data2$gender
> summary(gender) #gender is a factor with levels M and F
F M

```

```

76 16
> nonursing=data2$nonursing
> summary(nonursing)
  Low salary No prestigious Not worth it
      15      31      46
>
> table=table(nonursing,gender)
> table
      gender
nonursing  F M
  Low salary  12 3
  No prestigious 21 10
  Not worth it  43 3
> chisq.test(table)

```

Pearson's Chi-squared test

```

data: table
X-squared = 8.623, df = 2, p-value = 0.01341

```

Model 2.

```

> View(data)
> reason1=data$Reason.1.for.choosing.nursing
> plans=data$Plans.after.graduation
> table3=table(reason1,plans)
> table3
      plans
reason1  Apply for medical university Apply for non-medical university Work as
a nurse
  Easy to get in          7          85          8
  Family/parents chose for me          0          5          3
  Wanted to be a nurse          3          8          1
> chisq.test(table2)

```

Pearson's Chi-squared test

```

data: table2
X-squared = 7.3532, df = 2, p-value = 0.02531

```

Model 3.

```

data=read.csv("sire3.csv")
> satisfaction=data$Level.of.satisfaction.with.academic.program
> plans=data$Plans.after.graduation
> table2=table(satisfaction,plans)

```

```
> table2
      plans
satisfaction Apply for medical university Apply for non-medical university Work as a nurse
      S           8                   62                   12
      U           2                   36                   0
> chisq.test(table2)
```

Pearson's Chi-squared test

```
data: table2
X-squared = 7.3532, df = 2, p-value = 0.52531
```