Identifying The Importance Level of Factors Influencing The Selection Of Nursing As A Career Choice Using AHP: Survey To Compare The Precedence Of Private Vocational High School Nursing Students And Their Parents

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Abstract

Choosing a carrier is a kind of multi-criteria decision making problem and it is a crucial decision in people's life. The aim of this study was to determine the precedence order of the factors influencing choice of nursing as a carrier. The survey participants were the nursing students of Mektebim Anatolian Vocational High School for Health and their parents. In analyzing the data, Analytical Hierarchy Process (AHP) methodology was used. In this study, subjective opinions of nursing students and their parents turn into quantitative form with Analytic Hierarchy Process. This study found that “academic staff”, “want nursing profession” and “job guarantee” were more important factors for parents in choosing their children’s nursing career. Among the criteria, the criterion of “the security of nursing school”, “income of nursing profession” and “developing profession” had the highest weight for students. Results of this study can be used by school management, nurse leaders, Ministry Of National Education, Ministry Of Health, nursing academicians and education science academicians etc.

Keywords: Nursing education, nursing students, Private Anatolian Vocational High School For Health, career choice, analytic hierarchy process, multi criteria decision making;

1. Introduction

In 2010, The International Council of Nurses (ICN) on their official web site defined nursing with these words “Nursing encompasses autonomous and collaborative care of individuals of all ages, families, groups and communities, sick or well and in all settings. Nursing includes the promotion of health, prevention of illness, and the care of ill, disabled and dying people. Advocacy, promotion of a safe environment, research, participation in shaping health policy and in patient and health systems management, and education are also key nursing roles”.

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Available online at www.sciencedirect.com

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Selection and peer-review under responsibility of Academic World Education and Research Center.

Electronic copy available at: https://ssrn.com/abstract=2432510
Depends on the Health Statistics Yearbook 2010 there are 114,772 nurses working in Turkey (The Ministry of Health Turkey, 2010). Also Turkish Ministry for European Union (EU) Affairs report (2011) shows that there are 1.3 nurses per 1.000 people in Turkey while the average of this value in EU is 9.8 nurses per 1.000 people. Turkey has the lowest number of nurses per 1.000 people among EU countries. These quantitative data emphasizes the shortages of nurses in Turkey.

Choosing a career is a major issue for young people (Neilson et al., 2010). The age of middle school student is very early age for determining a profession such as nursing. How does a student know when he/she is 13 year olds whether he/she is going to be suited to nursing? Therefore parents have active role for directing their children to Vocational High Schools. Introduction to nursing careers during elementary school period decrease the nursing shortage problem (Lauver, 2011). Misperception (Porter et al., 2009) and unrealistic expectations (O’Donnell, 2011) of nursing among middle and high school students is a major problem for nursing profession’s future. Summer camp experiences (Flores and Ashe, 2012), high school information sessions, presentations, nurse shadowing programs (Bang et al., 2011) are some of the efforts to change the image of nursing. Advanced practice nursing, travel nursing, technologically advanced nursing, academic career of nursing are some nursing profession areas that students are unfamiliar and unaware (Porter et al., 2009). Neilson and Jones study (2012) determined that nursing is not a popular career amongst 5th and 6th year school students. Increasing middle school students' interest in the profession of nursing is a kind of effective strategy for decreasing nursing shortage problem (Cohen et al., 2004).

Why nursing students choose to go into nursing profession is very important information for Higher Nursing Education and Health Care Institutions (Mooney et al., 2008). Many complex factors affect career choice of individuals. Dal et al. (2009) analyzed a sample of students studying their BAs in the department of nursing and found that the possibility of finding employment easily and the value given the profession by the society are the two significant factors for the students in choosing the nursing profession. Positive image of nurses, impact of family and relatives, perception of nursing as a career, knowing a nurse personally, good salary with job security are some of the factors that influence students to consider nursing as their career (Cho et al., 2010; Law et al., 2003). Finding which factors are important for students reinforce that the nursing high school management need to be cognizant of the demands for students (Pettigrew et al., 2011). The research of Rossiter et al. (1999) indicated that students who were acquainted with a nurse show higher intention to pursue nursing as a career. Family, friends and relatives in the profession played an important role in influencing participants’ career selection (Mooney et al., 2008; Cohen et al., 2004).

Multi-criteria decision making technique called Analytic Hierarchy Process (AHP) is applied to determine the relative weights of the evaluation criteria. AHP approach achieves pairwise comparisons among factors or criteria in order to prioritize them using the eigenvalue calculation. AHP model was represented in a questionnaire to survey nursing students’ and parents’ opinions. The relative weight of each factor in the model was calculated.

The majority of studies indicated that one of the most important reason for choosing nursing as a career was job guarantee (Ozpancar et al., 2008). Several studies have shown that nursing is considered to be career, that provides wide range of job opportunity and job security. While previous research has revealed that many factors affect nursing students’ choice of nursing as a career, the relative weight of each of these factors remains unclear. A comprehensive literature review revealed that while some articles have been published about identifying factors of nursing students career choice, socio-demographic attributes (Wright et al, 1998; Al-Kandari and Ajao, 1998) and socio-economic issues (Rose et al., 2011) and autonomy level (Karagozoglu, 2008) of nursing students, there were no studies related to AHP based preference determination of nursing students in high schools in Turkey. Similar study was done for medical students’ choice of specialty in Taiwan by Chang et al. (2006).

2. Study objectives

The aim of this study is to propose a multi-criteria decision-making approach to evaluate the nursing students’ preference orders, to examine both students and their parents’ perceptions of nursing career and nursing school and to analyze factors influencing nurses’ choice of nursing profession as a career and identify differences and similarities in such factors between nursing students and their parents. The purposes of this study were to use
Saaty’s analytic hierarchy process (AHP) to investigate the factors that nursing students consider when choosing nursing as a career, and to derive the relative weight of each factor.

3. Methodology

3.1. Content and participants

The study group of the research is 82 nursing students with an age range of 13-15 who are enrolled in Mektebim Anatolian Vocational High School for Health in Istanbul, Turkey and their parents. 70 of the students (%85.37) are female students and 12 of them (%14.63) are male students. 60 of the students (%73.17) are at 9th grade and 22 of them (%26.83) are at 10th grade. There are no 11th and 12th year students in Mektebim Anatolian Vocational High School for Health. The questionnaire conducted between the dates 20-30 November 2012 is answered by 51 parents and 82 students. Parents and students were informed that participation in the study was voluntary and that their responses would remain anonymous. Data were collected from the parents in parent-teacher meeting and from the students in class in Mektebim Anatolian Vocational High School. Nursing students are asked to compare the criteria at a given level on a pair-wise basis to identify their relative precedence.

3.2. Data gathering instruments

AHP is a effective decision making method especially when subjectivity exists and it is very suitable to solve problems where the decision criteria can be organized in a hierarchical way into sub-criteria. The findings of previous studies about factors influencing nursing students’ choice of nursing profession were first identified by literature review. Parents and students expressed or defined a ranking for the attributes in terms of importance/weights. Each parents and students is asked to fill ‘‘checked mark’’ in the 9-point scale evaluation table. The AHP allows group decision making. One of the main advantages of the AHP method is the simple structure.

3.3. Using AHP to analyze priorities

AHP was developed in the 1970s by Thomas Saaty is a multi-criteria decision making (MCDM) methodology. It has been used extensively for analyzing complex decisions. The approach can be used to help decision-makers for prioritizing alternatives and determining the optimal alternative using pair-wise comparison judgments (Liberatore and Nydick, 1997, s. 595; Yoo and Choi s. 137, 2006).

The AHP is a selection process that consists of following steps (Saaty, 1990, 2008; Saaty and Vargas, 2001):
1. Define the problem and determine the type of knowledge sought.
2. Structure the decision hierarchy taking into account the goal of the decision.
4. Construct a set of all judgments in a square comparison matrix in which the set of elements is compared with itself (size nxn) by using the fundamental scale of pair-wise comparison shown in Table 1. Assign the reciprocal value in the corresponding position in the matrix. For a set of n elements in a matrix one needs n(n-1)/2 judgments.

| Intensity of Importance | Definition                                      | Explanation                                                                 |
|-------------------------|------------------------------------------------|-----------------------------------------------------------------------------|
| 1                       | Equal importance                              | Two activities have equal contribute to the objective                       |
| 3                       | Moderate importance                           | Experience and judgment slightly favor one activity over another.            |
| 5                       | Strong importance                             | Experience and judgment strongly favor one activity over another             |
| 7                       | Very strong on demonstrated importance        | An activity is favored very strongly over another                           |
| 9                       | Extreme importance                            | The evidence favoring one activity over another is of the highest possible order of affirmation |
| 2,4,6,8                 | For compromise between the above values       | Sometimes one needs to interpolate a compromise judgment numerically        |
5. Use overall or global priorities obtained from weighted values for weighting process. For synthesis of priorities obtain the principal right eigenvector and largest eigenvalue.

Matrix \( A = (a_{ij}) \) is said to be consistent if \( a_{ij} a_{jk} = a_{ik} \) and its principal eigenvalue \( (\lambda_{\text{max}}) \) is equal to \( n \).

The general eigenvalue formulation is:

\[
Aw = \begin{bmatrix}
1 & \frac{w_1}{w_2} & \ldots & \frac{w_1}{w_n} \\
\frac{w_2}{w_1} & 1 & \ldots & \frac{w_2}{w_n} \\
\vdots & \vdots & \ddots & \vdots \\
\frac{w_n}{w_1} & \frac{w_n}{w_2} & \ldots & 1
\end{bmatrix}
\begin{bmatrix}
w_1 \\
w_2 \\
\vdots \\
w_n
\end{bmatrix}
= \lambda_{\text{max}} W
\]

For measure consistency index \((CI)\) adopt the value \( CI = (\lambda_{\text{max}} - n) / (n - 1) \).

Accept the estimate of \( w \) if the consistency ratio \((CR)\) of \( CI \) that random matrix is significant small. If \( CR \) is not less than 0.1, revise the judgments. The \( CR \) is obtained by comparing the \( CI \) with the an average random consistency index \((RI)\) The following gives the average \( RI \):

| \( n \) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Random Consistency Index \((RI)\) | 0 | 0 | 0.52 | 0.89 | 1.11 | 1.25 | 1.35 | 1.40 | 1.45 | 1.49 |

Parents and students are asked to compare the criteria on a pair-wise basis to determine their relative importance. The first level of the hierarchy involved three major criteria: nursing profession related criteria, nursing school related criteria and student related criteria. The 3 main criteria are decomposed into 20 sub-factors.

### 4. Results

| \( C_i \) | Nursing profession related criteria | \( C_j \) | School related criteria | \( C_k \) | Students related criteria |
|---|---|---|---|---|---|
| \( C_{11} \) | Job guarantee | \( C_{21} \) | Distance to home | \( C_{31} \) | Want nursing profession |
| \( C_{12} \) | Get a job fast | \( C_{22} \) | Success of school | \( C_{32} \) | Personality fit nursing |
| \( C_{13} \) | Social status and reputation | \( C_{23} \) | Security | \( C_{33} \) | Students scores |
| \( C_{14} \) | Work conditions | \( C_{24} \) | Student transportation service | \( C_{34} \) | Want nursing bachelor degree |
| \( C_{15} \) | In health sector | \( C_{25} \) | Cafeteria |
| \( C_{16} \) | Income | \( C_{26} \) | Academic staff |
| \( C_{17} \) | Job variety | \( C_{27} \) | Tuition fees |
| \( C_{18} \) | Developing profession |
| \( C_{19} \) | Relatives and family’s advice |

3 first level criteria and 20 sub criteria are given in Table 3. The study result about nursing profession based criteria found that nursing students thought that income (16.8%), developing profession/growth potential (15.9%) and job variety (13.6%) were important, whereas their parents considered job guarantee (15.0%), social status and reputations (14.8%) and in health sector as being important (14.7%).

### Table 4. Parents’ evaluation results of first level criteria with AHP

| Criteria | Weights\((w)\) | \(\lambda_{\text{max}}\) | CI | RI | CR |
|---|---|---|---|---|---|
| \( C_1 \) | 0.448 | \(\lambda_{\text{max}} = 3.0824\) | | | |
| \( C_2 \) | 0.331 | CI=0.0412 | 0.0710 |
| \( C_3 \) | 0.221 | RI=0.58 |

### Table 5. Students’ evaluation results of first level criteria with AHP

| Criteria | Weights\((w)\) | \(\lambda_{\text{max}}\) | CI | RI | CR |
|---|---|---|---|---|---|
| \( C_1 \) | 0.454 | \(\lambda_{\text{max}} = 3.0424\) | | | |
| \( C_2 \) | 0.334 | CI=0.0212 | 0.03659 |
| \( C_3 \) | 0.211 | RI=0.58 |
Table 6. Parents’ evaluation results of nursing profession related criteria with AHP

| Criteria | Weights(w) | $\lambda_{max}$, CI, RI | CR |
|----------|------------|-------------------------|----|
| C11      | 0.150      |                         |    |
| C12      | 0.090      | $\lambda_{max}= 9.0793$ |    |
| C13      | 0.148      | CI=0.0099               | 0.007 |
| C14      | 0.058      | RI=1.45                |    |
| C15      | 0.147      |                         |    |
| C16      | 0.065      |                         |    |
| C17      | 0.148      |                         |    |
| C18      | 0.121      |                         |    |
| C19      | 0.072      |                         |    |

Table 7. Students’ evaluation results of nursing profession related criteria with AHP

| Criteria | Weights(w) | $\lambda_{max}$, CI, RI | CR |
|----------|------------|-------------------------|----|
| C11      | 0.075      |                         |    |
| C12      | 0.076      | $\lambda_{max}= 9.1584$ |    |
| C13      | 0.106      |                         |    |
| C14      | 0.100      | CI=0.0198               | 0.014 |
| C15      | 0.124      |                         |    |
| C16      | 0.168      | RI=1.45                |    |
| C17      | 0.136      |                         |    |
| C18      | 0.159      |                         |    |
| C19      | 0.055      |                         |    |

Table 8. Parents’ evaluation results of school related criteria with AHP

| Criteria | Weights(w) | $\lambda_{max}$, CI, RI | CR |
|----------|------------|-------------------------|----|
| C21      | 0.131      |                         |    |
| C22      | 0.186      | $\lambda_{max}= 7.0830$ |    |
| C23      | 0.174      |                         |    |
| C24      | 0.083      | CI=0.0138               | 0.0105 |
| C25      | 0.074      |                         |    |
| C26      | 0.234      | RI=1.32                |    |
| C27      | 0.1192     |                         |    |

Table 9. Students’ evaluation results of school related criteria with AHP

| Criteria | Weights(w) | $\lambda_{max}$, CI, RI | CR |
|----------|------------|-------------------------|----|
| C21      | 0.1777     |                         |    |
| C22      | 0.1777     | $\lambda_{max}= 7.0777$ |    |
| C23      | 0.2347     |                         |    |
| C24      | 0.0712     | CI=0.01294             | 0.0098 |
| C25      | 0.0655     |                         |    |
| C26      | 0.2087     | RI=1.32                |    |
| C27      | 0.1245     |                         |    |

Table 10. Parents’ evaluation results of student related criteria with AHP

| Criteria | Weights(w) | $\lambda_{max}$, CI, RI | CR |
|----------|------------|-------------------------|----|
| C31      | 0.317      | $\lambda_{max}= 4.0037$ |    |
| C32      | 0.244      | CI=0.00123              | 0.00136 |
| C33      | 0.196      | RI=0.9                 |    |
| C34      | 0.243      |                         |    |

Table 11. Students’ evaluation results of student related criteria with AHP

| Criteria | Weights(w) | $\lambda_{max}$, CI, RI | CR |
|----------|------------|-------------------------|----|
| C31      | 0.237      | $\lambda_{max}= 4.0086$ |    |
| C32      | 0.275      | CI=0.00286              | 0.0032 |
| C33      | 0.246      | RI=0.9                 |    |
| C34      | 0.242      |                         |    |

Job guarantee is the most important factor to be considered with an overall priority value of 0.150 for parents and income is the most important factor to be considered with an overall priority value of 0.168 for students. Other considerable factors about nursing profession based criteria for parents are ranked as follows according to priority: job variety (14.8%), developing profession/ growth potential (12.1%) and get a job fast (9.0%) factors. Also other important factors for students are ranked as follows according to priority: in health sector (12.4%), social status and reputations (10.6%) and work conditions (10.0%) factors. All first and second levels criteria weights are given in Table 4 to Table 11. Criteria comparisons between parents and students are given in Fig. 1 to Fig. 3.

![Figure 1. Nursing profession related criteria comparisons between parents and students](https://ssrn.com/abstract=2432510)
This study found that “security of nursing school” (0.0785), “income of nursing” (0.0765) and “developing profession” (0.0723) were more important factors to the nursing students in choosing nursing profession. Of the 20 criteria “academic staff” had the highest weight of 0.0774, followed by “want nursing profession” with 0.0701 and “job guarantee” with 0.0674.

5. Conclusion and suggestions

The overall priorities are shown at Table 12. The findings of this study could provide a foundation for policy makers, university and hospital administrators in planning and developing strategies. Due to the use of a sample from a single high school in Turkey, sampling bias exists in this study. Findings from this study cannot be
generalized, suggesting that a further study is needed to confirm the preliminary findings using random sampling among all nursing high schools in Turkey. Also this study’s results can be used for recruitments efforts and development strategies of nursing profession facing the problem of a shortage.

References

Al-Kandari, F.H., Ajao, E., (1998). Recruitment and retention of nursing students in Kuwait. International Journal of Nursing Studies, (35), 245-251

Bang, K.S., Kang, J.H., Jun, M.H., Kim, H.S., Son, H.M., Yu, S.J., Kwon, M.K., Kim, J.S., (2011). Professional values in Korean undergraduate nursing students. Nurse Education Today, (31), 72-75

Cho, S.H., Jung, S.Y., Jang, S., (2010). Who enters nursing schools and why do they choose nursing? A comparison with female non-nursing students using longitudinal data. Nurse Education Today, (30), 180-186

Chang, P.Y., Hung, C.Y., Wang, K.I., Huang, Y.H., Chang, K.J., (2006). Factors influencing medical students’ choice of specialty, 105 (6), 489-496

Cohen, J.A., Palumbo, M.V., Rambur, B. and Mongeon J., (2004). Middle school students’ perceptions of an ideal career and a career in nursing. Journal of Professional Nursing, 20 (3), 202-210

Dal, Ü., Arifoğlu, Ç.B., Razi, G.S., (2009). What factors influence students in their choice of nursing in North Cyprus? Procedia Social and Behavioral Sciences, (1), 1924-1930

Flores, C., Ashe, M.J., (2012). Simulating nursing school to engage high school students. Clinical Simulation in Nursing. Article in Press, e1-e5

Karazogolu, S., (2008). Nursing students’ level of autonomy: A study from Turkey. Nurse Education Today, (29), 176-187

Lauver, L.S., (2011). Health fairs as a forum to pique young children’s interest in nursing. Journal of Pediatric Nursing (26), 359-363

Liberatore, M.J., Nydick, R.L., (1997). Group Decision Making In Higher Education Using The Analytic Hierarchy Process, Research In Higher Education, Vol. 38, No. 5

Law, W., Arthur, D., (2003). What factors influence Hong Kong school students in their choice of a career in nursing? International Journal of Nursing Studies, (40), 23-32

Mooney, M., Glacken, M., O’Brien, F., (2008). Choosing nursing as a career: A qualitative study. Nurse Education Today, (28), 385-392

Neilson, G.R., McNally, J.G., (2010). Not choosing nursing: Work experience and career choice of high academic achieving school leavers. Nurse Education Today, (30), 9-14

Neilson, G.R., Jones, M.C., (2012). What predicts the selection of nursing as a career choice in 5th and 6th year school students? Nurse Education Today, (32), 588-593

O’Donnell, H., (2011). Expectations and voluntary attrition in nursing students. Journal of Nurse Education in Practice, (11), 54-63

Özpancar, N., Aydın, N., Akansel, N., (2008). Determination of beginning nursing students’ perceptions about nursing profession. C.U. Hemsirelik Yüksekokulu Dergisi, (12) 3, 9-17 (In Turkish)

Pettigrew, A.C., Dienger, M.J., King, M.O., (2011). Nursing students today: Who are they and what are their learning preferences? Journal of Professional Nursing, (27) 4, 227-236

Porter, G., Edwards, P.B., Granger, B.B., (2009). Stagnant perceptions of nursing among high school students: Results of a shadowing intervention study. Journal of Professional Nursing, (25) 4, 227-233

Rose, S., (2011). Academic success of nursing students: Does motivation matter? Journal of Teaching and Learning in Nursing, (6), 181-184

Rossiter, J.C., Foong, A., Chan, P.T., (1999) Attitudes of Hong Kong high school students towards the nursing profession. Nurse Education Today, (19), 464-471

Saaty, T.L., (1990). How To Make Decision: The Analytic Hierarchy Process, European Journal of Operational Research,North Holland, 48, 9-26

Saaty, T. L., Vargas Luis L., (2001). Models, Methods, Concepts & Applications of The Analytic Hierarchy Process. International Series in Operations Research & Management Science, Kluwer Academic Publishers

Saaty, T. L.,(2008). Decision Making With The Analytic Hierarchy Process. Int. J. Services Sciences, 1 (1), 83

Tomey, A.M., Schwier, B., Marticke, N., May, F., (1996). Students’ perceptions of ideal and nursing career choices. Journal of Nursing Outlook, (44) 1, 27-30

Wright, C.M., Frew, T.J., Hatcher, D., (1998). Social and demographic characteristics of young and mature aged nursing students in Australian universities. Nurse Education Today, (18), 101-107

Yoo, K.E, Choi, Y.C.,(2006). Analytic Hierarchy Process Approach For Identifying Relative Importance Of Factors To Improve Passenger Security Checks At Airports, Journal of Air Transport Management 12, 135-142