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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.

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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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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.

Table1. The fundamental scale of pair-wise comparison for AHP

| 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 $a_{ij} \cdot a_{jk} = a_{ik}$ and its principal eigenvalue (λ_{max}) is equal to n .

The general eigenvalue formulation is:

$$Aw = \begin{bmatrix} 1 & w_1/w_2 & \dots & w_1/w_n \\ w_2/w_1 & 1 & \dots & w_2/w_n \\ \dots & \dots & \dots & \dots \\ w_n/w_1 & w_n/w_2 & \dots & 1 \end{bmatrix} \begin{bmatrix} w_1 \\ \dots \\ w_n \end{bmatrix} = nw$$

$$a_{ij} = w_i / w_j, \quad i, j = 1, 2, \dots, n$$

$$Aw = \lambda_{max} w$$

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

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:

Table 2. Average RI values

| 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

Table 3. 3 first level criteria and 20 sub criteria of selecting nursing education

| C ₁ | Nursing profession related criteria | C ₂ | School related criteria | C ₃ | 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) | λ_{max} , CI, RI | CR |
|----------------|------------|--------------------------|--------|
| C ₁ | 0.448 | $\lambda_{max}= 3.0824$ | |
| 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) | λ_{max} , CI, RI | CR |
|----------------|------------|--------------------------|---------|
| C ₁ | 0.454 | $\lambda_{max}= 3.0424$ | |
| 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) | λ_{max} , CI, RI | CR |
|-----------------|------------|--------------------------|-------|
| C ₁₁ | 0.150 | $\lambda_{max}= 9.0793$ | 0.007 |
| C ₁₂ | 0.090 | | |
| C ₁₃ | 0.148 | | |
| C ₁₄ | 0.058 | CI=0.0099 | |
| C ₁₅ | 0.147 | RI=1.45 | |
| C ₁₆ | 0.065 | | |
| C ₁₇ | 0.148 | | |
| C ₁₈ | 0.121 | | |
| C ₁₉ | 0.072 | | |

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

| Criteria | Weights(w) | λ_{max} , CI, RI | CR |
|-----------------|------------|--------------------------|-------|
| C ₁₁ | 0.075 | $\lambda_{max}= 9.1584$ | 0.014 |
| C ₁₂ | 0.076 | | |
| C ₁₃ | 0.106 | | |
| C ₁₄ | 0.100 | CI=0.0198 | |
| C ₁₅ | 0.124 | RI=1.45 | |
| C ₁₆ | 0.168 | | |
| C ₁₇ | 0.136 | | |
| C ₁₈ | 0.159 | | |
| C ₁₉ | 0.055 | | |

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

| Criteria | Weights(w) | λ_{max} , CI, RI | CR |
|-----------------|------------|--------------------------|--------|
| C ₂₁ | 0.131 | $\lambda_{max}= 7.0830$ | 0.0105 |
| C ₂₂ | 0.186 | | |
| C ₂₃ | 0.174 | | |
| C ₂₄ | 0.083 | CI=0.0138 | |
| C ₂₅ | 0.074 | RI=1.32 | |
| C ₂₆ | 0.234 | | |
| C ₂₇ | 0.1192 | | |

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

| Criteria | Weights(w) | λ_{max} , CI, RI | CR |
|-----------------|------------|--------------------------|--------|
| C ₂₁ | 0.1177 | $\lambda_{max}= 7.0777$ | 0.0098 |
| C ₂₂ | 0.1777 | | |
| C ₂₃ | 0.2347 | | |
| C ₂₄ | 0.0712 | CI=0.01294 | |
| C ₂₅ | 0.0655 | RI=1.32 | |
| C ₂₆ | 0.2087 | | |
| C ₂₇ | 0.1245 | | |

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

| Criteria | Weights(w) | λ_{max} , CI, RI | CR |
|-----------------|------------|--------------------------|---------|
| C ₃₁ | 0.317 | $\lambda_{max}= 4.0037$ | 0.00136 |
| C ₃₂ | 0.244 | CI=0.00123 | |
| C ₃₃ | 0.196 | RI=0.9 | |
| C ₃₄ | 0.243 | | |

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

| Criteria | Weights(w) | λ_{max} , CI, RI | CR |
|-----------------|------------|--------------------------|--------|
| C ₃₁ | 0.237 | $\lambda_{max}= 4.0086$ | 0.0032 |
| C ₃₂ | 0.275 | CI=0.00286 | |
| C ₃₃ | 0.246 | RI=0.9 | |
| C ₃₄ | 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 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.

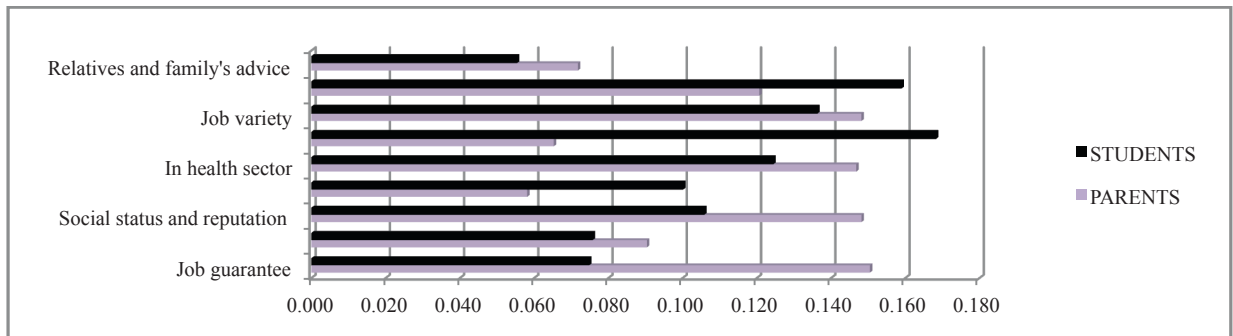


Figure 1. Nursing profession related criteria comparisons between parents and students

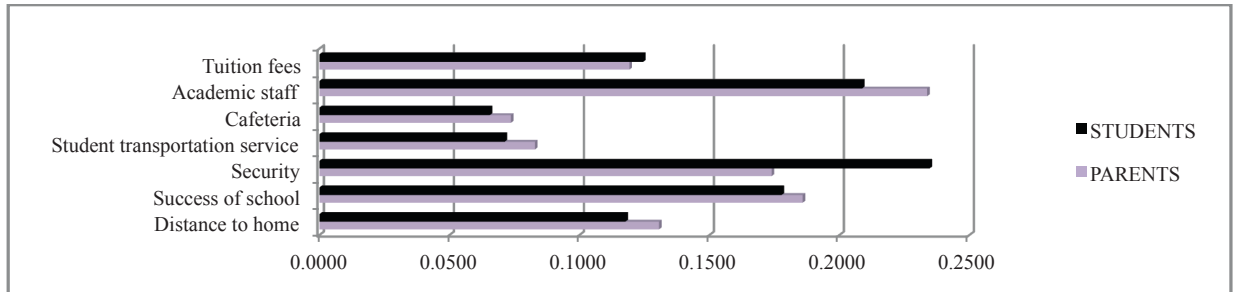


Figure 2. School related criteria comparisons between parents and students

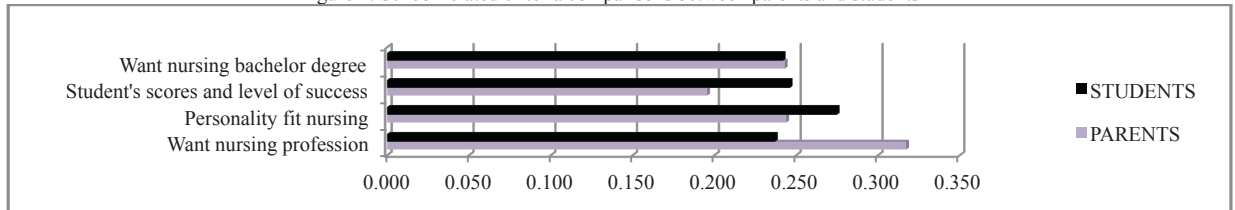


Figure 3. Students related criteria comparisons between parents and students

Table 12. The overall priorities

| Criteria | Parents | | Students | |
|--|----------------|------|----------------|------|
| | Global Weights | Rank | Global Weights | Rank |
| C ₂₆ Academic staff | 0.0774 | 1 | 0.0698 | 4 |
| C ₃₁ Want nursing profession | 0.0701 | 2 | 0.0501 | 11 |
| C ₁₁ Job guarantee | 0.0674 | 3 | 0.034 | 17 |
| C ₁₃ Social status and reputation | 0.0664 | 4 | 0.0481 | 12 |
| C ₁₇ Job variety | 0.0664 | 5 | 0.0619 | 5 |
| C ₁₅ In health sector | 0.0658 | 6 | 0.0566 | 8 |
| C ₂₂ Success of school | 0.0615 | 7 | 0.0594 | 6 |
| C ₂₃ Security | 0.0576 | 8 | 0.0785 | 1 |
| C ₁₈ Developing profession | 0.054 | 9 | 0.0723 | 3 |
| C ₃₂ Personality fit nursing | 0.0539 | 10 | 0.0581 | 7 |
| C ₃₄ Want nursing bachelor degree | 0.0537 | 11 | 0.0511 | 10 |
| C ₂₁ Distance to home | 0.0433 | 12 | 0.0394 | 15 |
| C ₂₂ Success of school | 0.0433 | 13 | 0.052 | 9 |
| C ₁₂ Get a job fast | 0.0405 | 14 | 0.0344 | 16 |
| C ₂₇ Tuition fees | 0.0395 | 15 | 0.0416 | 14 |
| C ₁₉ Relatives and family's advice | 0.0322 | 16 | 0.0252 | 18 |
| C ₁₆ Income | 0.0293 | 17 | 0.0765 | 2 |
| C ₂₄ Student transportation service | 0.0274 | 18 | 0.0238 | 19 |
| C ₁₄ Work conditions | 0.026 | 19 | 0.0455 | 13 |
| C ₂₅ Cafeteria | 0.0244 | 20 | 0.0219 | 20 |

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.

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