Original Article

Do they Understand their Professional Language? An Assessment on Intern Nursing Students'

Mahmure Aygun, PhD
Asst. Prof, Biruni University, Health Sciences Faculty, Department of Nursing, Istanbul, Turkey

Dilek Ozturk, RN
Registry Nurse, Eyup State Hospital, Istanbul, Turkey

Hacer Erten, PhD
Asst. Prof, Department of Nursing, Gedik University College of Health Science, Istanbul, Turkey

Correspondence: Aygun Mahmure, Address: Biruni University, Health Sciences Faculty, Department of Nursing, Istanbul, Turkey E-mail: maygun@biruni.edu.tr

Abstract

Aim: The purpose of this study was to analyze intern nursing students' proficiency level of medical language used in clinical environment; to evaluate its relationship with academic success; and to detect which areas should be supported in curricula.

Materials- Methods: The study was conducted with 120 students. Data were collected by using a "Medical Terminology Test" which was prepared by a clinical approach and consists of " Medical Terms, Abbreviations, Expressions", a "Student Information Form". The "medical terms section" consisted of 4 subcategories and 50 medical terms; "medical abbreviations section" included 2 subcategories and 10 items; "medical expressions section" consisted of verbal - written 10 expressions containing medical terms and abbreviations.

Results: Medical Terminology Test mean correct response rate was 75%. The mean percentages of correct response per section of the Medical Terminology Test were 72 % in "Medical Terms", 84 % in "Medical Abbreviations", and 80 % in "Medical Expressions". The highest correct response rate was observed in the "Medical Abbreviations Section" ($p<0.05$). The abbreviations about of "Diagnostic Tests - Medical Procedures" was better known than the ones in "Disease – Surgical Operation" (($p<0.05$). The "verbal expressions" was better known than the ones in "Written Expressions" and difference was statistically significant ($p<0.05$). A positive correlation was found between the students' correct response rates and their academic success ($p<0.05$).

Conclusions: The results showed that the students' medical terminology knowledge level are sufficient; and that they performed better in medical abbreviations. Our findings suggest that students' knowledge in Neurology and Psychiatry needs to be improved. The results released a positive correlation between medical terminology knowledge and academic success.

Keywords: Medical terms, medical abbreviation, academic success

Introduction

When something new is discovered, it also creates a necessity for new words and a specific "language" in every branch of science and expertises. This specialized language differs from the common languages and the other specialized languages with its unique terminology, function of communication, syntax and grammatical features; and it is exclusively used by the professionals in that field of expertise (Kartal, 2010).

The terms are the words of specialized languages. The terms must be designating a scientific concept clearly; specific to a subject, a field or an academic discipline; agreed-upon; and generated throughout the historical development of that discipline (Arslantas,2012; Pilav, 2008). Abbreviations are another aspect of language. An abbreviation is a shortened form of a word, phrase, term or a proper name, having one or more letters contained in the longer form. Abbreviations are used in order to save time and place in communication, to simplify

writing and verbalizing and to standardize documentation (Aslan et al, 2004). Terminology is a group of terms, expressions, abbreviations and symbols which represents the concepts specific to a field of science, discipline or subject. Terminology is essential for professionals to do their job and to communicate among themselves; besides of that, it also facilitates the scientific improvements by enabling the global information exchanges.

Medical terminology represents the language of healthcare services and it is the effective and accurate way of communication in this field. Medical terms, which have a remarkable richness among other disciplines, has evolved into its current state throughout thousands of years. Today, especially the medical terms in the Basic Medical Sciences (such as Anatomy, Physiology) are based mainly on Latin or Greek origin while English stands out as the common international language especially in the clinical branches (Cankur,2002). The structural and functional properties of organs and systems in the human body, the common medical conditions, the symptoms and signs of diseases, the medical equipment and instruments, the medical investigations and procedures are all defined and named in medical terminology. All medical correspondences, patient records, medications and education materials for all healthcare professions are written with medical terminology. Therefore, a sufficient medical terminology knowledge is a must for healthcare professionals in terms of professional communication, scientific development and academic success.

There are many branches of medicine and all of them are linked to one unique goal: creating a harmonious and a successfull team work. Medical terminology is a common language providing effective communication among healthcare professionals from different backgrounds

Having a similar knowledge level of terminology provides the exchange of information and coordination among disciplines which leads to a better treatment and healthcare for the benefit of patients. Knowledge of medical terminology also increases patients' safety as well as the quality of the healthcare by minimizing potential misunderstandings and medical events that could result from the lack of knowledge, comprehension or interpretation of medical terminology (Yalcın and Sengül 2007; Brunetti et al, 2007; Shilo and Shilo 2014).

Another benefit of the medical terminology knowledge is about scientific communication. The only way of communication among the scientists is to have a common terminology. Due to the universal nature of medicine, the knowledge of medical terminology is required in order to create an effective academic dialogue, and to share ideas and innovations. Healthcare professionals can read articles and books in the target language, and follow academic publications only through the knowledge of a good medical terminology (Cankur, 2002; Akay, 2013).

In every discipline, subjects are taught to the audience by means of terms. In that regard, the knowledge of medical terminology forms the basis and essence of all healthcare disciplines. The knowledge of medical terminology acquired during their education contributes to the academic success of students (Cankur, 2002). The students, who encounter medical terms for the first time, have difficulties in learning them due to unheard and unfamiliar structure of terms (Yakıncı et al, 2013; Yakıncı et al, 2011). As Turkish belongs to the Ural-Altaic family of languages, it has different phonological and syntactic features than the Indo-European ones. That makes the terminology even more difficult to learn for Turkish students (Yakıncı et al, 2011; Cıkmaz and Mesut, 2008).

The purpose of this study was to (a) evaluate the level of medical terminology knowledge of intern nursing students, (b) analyze which areas are inadequate in their knowledge, (c) determine which areas should be supported in curricula, (d) assess its relevance to academic success.

Materıals and Methods

A descriptive design was used in the study which was conducted December, 2013 in the Florence Nightingale Hospital Nursing School of Istanbul Bilim University. Cirriculum of nursing consists of 8 academic semesters (4 years). During their first 6 semesters, students take courses on nursing and basic medical sciences; followed by clinical practices as an intern in the 7th and 8th academic semesters. The students don't take the medical terminology as a single course, but they learn it within the scope of other medical and nursing courses.

The inclusion to this study has 2 main criteria: Having clinical training as an intern in the 7th semester and volunteering to participate. Selected target population included all intern students in semesters VII (n=123). The response rate was 97 %, so the study sample size was 120 nursing students.

Ethical consideration: Ethical approval, which agreed with the principles in the Declaration of Helsinki, was obtained from the the Ethical

Committee of the Institute of Health Sciences, İstanbul Bilim University (decision no: 2013/HEM/1222012) to the study. Written permission from the administration of Nursing School and verbal permissons from the participating students were obtained. For the validity of the study, the students were ensured that the test was not an exam and it would not affect their academic grades in any way. Therefore we aimed to increase their motivation and willingness to participate.

Measurements / Instruments

Data were collected using two assessment instruments: "Student Information Form" and "Medical Terminology Test"

Student Information Form: This form included sociodemographic(age, gender, high-school of graduation, and their part-time internship status) and academic characteristics of students.

Medical Terminology Test :   Medical Terminology Test (MTT) was for evaluating the participants' proficiency level of the Medical Terminology knowledge, and it consisted of 70 medical terms/abbreviations/expressions selected in the light of literature review, expert views, medical records and clinical experience. A clinical approach was applied in the selection of items, giving importance on the Diagnostic / Operative / Symptomatic terminology. We used the guides on Turkish Medical Language for the spelling of the terms and abbreviations (Arslantaş, 2012; Tukish Medical Language Guide 2006).

MTT consisted of three sections: Medical Terms, Medical Abbreviations and Medical Expressions.

Medical Terms Section (MTS): This section included 50 medical terms for evaluating remember level for "medical terms" that they had learned before. These terms were subcategorized in 4 groups: "Basic Sciences" (n=16), "Medical-Surgical" (n=13), "Pediatrics - Obstetrics" (n=12) and "Neurology - Psychiatry" (n=9).

Medical Abbreviations Section (MAS): Abbreviations are widely used in medical records and verbal communication. This section included 10 standard medical abbreviations to evaluate students' knowledge of "medical abbreviations", and was divided in two subcategory: "Diagnostic Tests - Medical Procedures" (n=5) and "Disease - Surgical Operation" (n=5).

Medical Expressions Section (MES): Health professionals must be able to communicate effectively with each other both verbally and written. This section aimed to analyze students' comprehension of spoken and written medical language. It consisted of 10 expressions containing medical terms and abbreviations that students might encounter in medical reports, written or verbal orders and patient visits. These expressions were divided in two subcategory: "Verbal Expressions" (n=4) and "Written Expressions" (n=6)

Data collection/procedure: Data collection: In order to minimize mistake rate in filling out MTT, all the participating students were invited the session at the same time and place. They were not provided with any information about the study before the session, for preventing any preliminary work. The students were divided into groups of 30 and were given 50 minutes to complete the test. Each group was supervised by an instructor informed about the objectives, scope and method of the study. Before starting the test, the students were given standard information about objectives of the study

Assessment of the collected data:

• In MTS, "exact" responses were considered as "correct", while "wrong/ irrelevant/ unanswered" ones were taken as "incorrect".

• In MAS, complete interpretations and correct comprehensions of abbreviations were evaluated as "correct", while "wrong/irrelevant/unanswered" were assessed as "incorrect".

• In MES, the responses with the complete interpretations and correct comprehensions of expressions were taken as "correct", while "wrong/irrelevant/unanswered" ones were evaluated as"incorrect".

The correct response rate in MTT was calculated both for each student and for each term/abbreviation/expression.

MTT Knowledge Score: In order to group the MTT proficiency levels of students, we applied an additional scoring system on the responses. As the terms/ abbreviations/ expressions in MTT were ordered from simple to difficult, the scoring was weighted accordingly.

The scoring system:

• In MTS, a correct answer was assigned 1 point and an incorrect one was given no points. So, the MTS score ranged between "0" and "50".

• In MAS, a correct answer was assigned 2 points while an incorrect one was not given any points. The MAS score ranged between "0" and "20".

• In MES, students got 3 points for each correct answer, and no points for their incorrect answers, which made the score range of MES 0 to 30.

Overall, MTT scores ranged between 0 and 100. Based on the test scores, participants were grouped into three proficiency levels: ≥80: high level learners; 60-79: intermediate level ones; and <60: low level ones.The academic success of participating students were obtained from the database of university, in the form of gross point averages (GPA) for the first 6 semesters.Variables:

The dependent variables in this study were the correct response mean percentages of MTT, the sections of MTT, and subcategories of these sections as well as the quantitative results comprising MTT knowledge score averages. Independent variables in this study were the participants' gender, age, high-school of graduation, working as apart-time intern status, and academic success (GPA in first 6 semesters).

Data analysis: All the data of each participant were entered in a database in Microsoft Excel, and the statistical analysis was carried out using the SPSS Software, version 21.0. For descriptive statistics of the datas were used frequencies, percentages, mean and standard deviations.

Data distribution was done via Kolmogorov Simirnov test. Independent sampling t test and ANOVA were used to analyze quantitative data. Correlation analysis was carried out through Pearson correlation analysis. Repetitive measurements were made through Repeated Measures Variance Analysis and Paired Sampling t test. The results were evaluated at p ≤ .05 and at 95% confidence interval.

Results

General characteristics: The female participants were 88.3 % (n=106) of the total sample.

The mean age was 22.3 (SD 1.5; ranging between 20 and 29). 33.3 % of the students (n=40) graduated from high-schools which select their students only through centralized nationwide high school entrance exam. 86.7 % of participants (n=104) were working as a part-time intern within the last 1 year in a healthcare institution, besides of their compulsory practical training.

According to data obtained from the Students Affairs Department of İstanbul Bilim University, the average of weighted GPAs of the participating students in their first 6 semesters was 2.54 out of 4 (which equals to 71.1 out of 100) (SD 0.37; ranging between 2.0-3.9).

Medical Terminology Test results, Comparison between MTT Sections and Subcategories:

All the terms/abbreviations/expressions in MTT and their correct response mean percentages are shown in order of in the Table 1, Table 2 and Table 3.MTT total correct response rate of the participants was 75 % (SD= 10 %; ranging between= 44-97 %) (Table 4). Correct response rates belonging to the 3 sections of MTT were found to be 72 % for MTS (SD= 12 %; ranging between 38-100 %); 84 % for MAS (SD= 11 %; ranging between 50-100 %); 80 % for MES (SD= 16 %; ranging between 30-100 %) (Table 4). Comparison between the results in 3 sections of MTT revealed that highest correct response rate was in MAS, which yielded a statistically significant difference between this section and the other two sections.   (Repeated Measurements Analysis of Variance p<0.05) (Table 4) .Comparison between the correct response rates belonging to the subcategories of MTS revealed that correct response rate of the terms related to "Neurology-Psychiatry" was lower than other three groups, and that the difference was statistically significant (Repeated Measurements Analysis of Variance / p<0.05) (Table 4).The abbreviations in the subcategory of "Diagnostic Tests - Medical Procedures" in MAS was better known than the ones in "Disease – Surgical Operation" subcategory and the difference was statistically significant (Paried-Samples "t" test / p<0.05) (Table 4).The "verbal" expressions in MES was better known than the ones in "Written Expression" subcategory and difference was statistically significant (Paired-Samples "t" test / p=0,05) (Table 4).Average of MTT Knowledge Score was 77.1 (SD=10.1; distribution: 42-95). MTT Knowledge Score results indicated a distribution of high-level group / learners (≥80) 52.5 % (n=63), intermediate-level ones (60-79) 41.6 % (n=40), low-level ones (<60) 5.9 % (n=7) (Table 5).

Correlation between independent variables and MTT correct response rates: When the correlation between MTT correct response rate and the selected independent variables were examined, there was no statistically significant correlation between the participants' age, gender, high-school of graduation, and their part-time internship status. A statistically positive correlation was found between the participants' correct response rates and their   academic   success-GPAs   (Pearson's correlation coefficient r=0.197; p<0.05) (Figure 1).

Table 1. Correct Responses For Medical Terms Section (N=120)

Subcategory: Basic Sciences		Subcategory: Medical-Surgical		Subcategory: Neurology-Psychiatry		Subcategory: Pediatry-Obstetric	
Medical Terms	Correct Response n(%)	Medical Terms	Correct Response n(%)	Medical Terms	Correct Response n(%)	Medical Terms	Correct Response n(%)
Absorption	104 (86.7)	Donor	108 (90.0)	Dementia	60 (50.0)	Abortion	114 (95.0)
Axilla	102 (85.0)	Ecchymosis	106 (88.3)	Hemiplegia	90 (75.0)	Dysmenorrhea	90 (75.0)
Apex	91 (75.8)	Elevation	101(84.2)	Delirium	57 (47.5)	Fontanel	70 (58.3)
Atrophy	65 (54.2)	Epistaxis	87 (72.5)	Hypnotic	62 (51.7)	İmmunization	91 (75.8)
Descending	81 (67.5)	Fraktur	105 (87.5)	Euphoria	72 (60.0)	İnfertility	113 (94.2)
Diffuse	46 (38.3)	Hyperglycemia	113 (94.2)	Paresthesia	73 (60.8)	Lactation	78 (65.0)
Femoral	47 (39.2)	Hypersensitivity	87 (72.5)	Syncope	104 (86.7)	Meconium	97 (80.8)
Gluteus	100 (83.3)	İncision	101 (84.2)	Stroke	67 (55.8)	Menarche	96 (80.0)
İnferior	52 (43.3)	İrrigation	100 (83.3)	Tetany	99 (82.5)	Multipar	90 (75.0)
Costa	104 (86.7)	Congestion	62 (51.7)			Neonatal	78 (65.0)
Larynx	65 (54.2)	Malnutrition	86 (71.7)			Poliomyelitis	88 (73.3)
Mortality	106 (88.3)	Nephrolithiasis	58 (48.3)			Premature	101 (84.2)
Necrosis	91 (75.8)	Scar	91(75.8)				
Prognosis	98 (81.7)						
Valvula	95 (79.2)						
Vertebra	107 (89.2)						

Table 2. Correct Responses for Medical Abbreviations Section (N=120)

	Abbreviations	Correct Response n(%)
Subcategory: Test / Procedures	1. CSF(Cerebrospinal Fluid)	119(99.2)
	2. CPR (Cardiopulmonary resuscitation)	112(93.3)
	3. EEG (electroencephalography)	82(68.3)
	4. HCT (Hematocrit)	118(98.3)
	5. IUD (İntrauterine device)	119(99.2)
Subcategory: Disease /Operation	6. BPH (Benign prostatic hypertrophy)	38(31.7)
	7. CABG (Coronary artery bypass graft)	110(91.7)
	8. DVT (Deep vein thrombosis)	87(72.5)
	9. CHF (Congestive heart failure)	107(89.2)
	10. COPD (Chronic obstructive pulmonary disease)	117(97.5)

Table 3. Correct Responses For Medical Expressions Section (N:120)

|	Medical Expressions	Correct Response n(%)
Verbal Expressions	1. "The patient will be transferred to the ICU in postoperative period, and then be extubated after three hours".	103(85.8)
	2. "What is the oxygen saturation level of the patient".	120(100.0)
	3. "Transfuse two units FFP to patient, please mobilize the patient after three hours and remove the NG tomorrow".	115(95.8)
	4. "After the pneumohemothorax diagnosis, the patient got emergency surgery and was hospitalized later".	77(64.2)
Written Expressions	5. "Complete tear of the anterior cruciate ligament was seen".	116(96.7)
	6. "The antral mucosa was hyperemic and edematous".	111(92.5)
	7. "The patient underwent subtotal gastrectomy and gastrojejunostomy Yesterday".	69(57.5)
	8. "PA chest x-ray : İncreased cardiothoracic ratio. revealed bilateral pleural effusion".	65(54.2)
	9. "Complete occlusion of right popliteal artery was detected".	91(75.8)
	10. "There is approximately 40% luminal stenosis of the origin of the right vertebral artery".	93(77.5)
	*ICU: Intensive care unit, **FFP**: Fresh frozen plasma, **NG**: Nasogastric, **PA**: Posteroanterior*	

Table 4. Results and comparison of Medical Terminology Test (MTT) sections and subcategories (N= 120)

		Correct response			
		Mean ± SD (%)		Min- Max (%)	p
Medical Terminology Test (MTT)		75 ± 10		44 -97	
MTT Sections	I. Medical Terms	72 ± 12		38 -100	**0.000**
	II. Medical Abbreviations	84 ± 11	*#	50 -100	
	III. Medical Expressions	80 ± 16	*	30 -100	
Repeated Measurements Analysis of Variance: ** The difference with Part I is significant (p< o.o5), # The difference with Part III is significant (p< o.o5)*					
I. Medical terms Section: Subcategories	A. Basic Sciences	71 ± 15		31-100	**0.000**
	B. Medical / Surgical	77 ± 14	*#	46-100	
	C. Neurology/Psychiatry	63 ± 20	*	11-100	
	D. Pediatry/Obstetric	77 ± 15	*#	25-100	
Repeated Measurements Analysis of Variance: ** The difference with subcategory A is significant (p< o.o5), # The difference with subcategory C is significant (p< o.o5)*					
II. Medical Abbreviations Section: Subcategories	A. Diagnostic Tests / Procedures	92 ± 10		60 -100	**0.000**
	B. Disease / Operation	77 ± 19		20-100	
Paried-Samples "t" test: p-value < 0.05 determined to be statistically significant					
III. Medical Expressions Section: Subcategories	A. Verbal Expressions	86 ± 18		50-100	**0.000**
	B. Written Expressions	76 ± 20		17-100	
Paried-Samples "t" test: p-value < 0.05 determined to be statistically significant					

Table 5. Medical Terminology Test Knowledge Score and Rankings (N=120).

	Mean ± SD(%)		Min- Max(%)	
Average MTT Knowledge	77.1 ± 10.1		42-95	
Levels of MTT Knowledge Score:	**Score Range**	**Ranking (College of Nursing)**	**n**	**%**
1. Low-Level	0-49	FF	2	1.7
	50-54	DD	2	1.7
	55-59	DC	3	2.5
2. İntermediate-Level	60-69	CC	18	15.0
	70-79	CB	32	26.6
3. High-Level	80-89	BB	50	41.6
	90-94	BA	11	9.2
	95-100	AA	2	1.7
MTT: Medical Terminology Test				

Pearson corelation : r: 0.197, p< 0.05
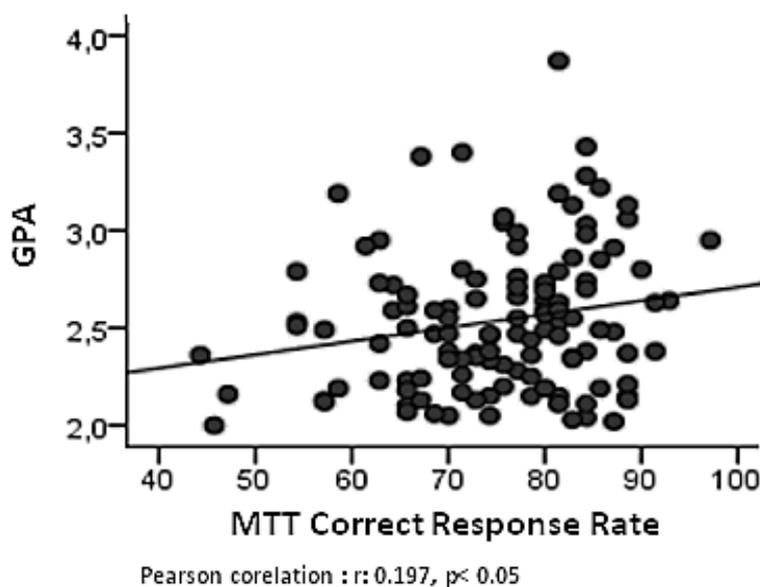
Figure 1. Correlation between Medical Terminology Test(MTT) correct response rate and academic success(GPA) (N=120)

Dıscussion

Most of the medical terminology studies found in the literature focus on the language used for communication between healthcare professionals and patients; and the methods of learning medical terminology. There are few studies analyzing the proficiency level of Medical Terminology knowledge and its relation with   academic success (Lerner et al, 2000; Jeong et al, 2013; Yang, 2005; Brahler and Walker, 2008).The discussion of this study was built on the literature available so far and along with the data of our study, we had created profiles of the participants based on the their proficiency level of Medical Terminology knowledge, and assessed its relationship between academic success.

The average age of the participants is representative of the average age of university students in Turkey. 88.3 % of the participating students were female. According to educational regulations made in 2007 in Turkey, nursing departments in universities started to accept male students. The low number of male students can be explained by the fact that nursing is still being considered as a job for women in Turkey (Bozkır et al, 2008). Academic success of participants were medium-high level.

MTT total correct response rates and MTT Knowledge Score averages in the study indicate that participants had a sufficient knowledge of medical terminology. And these results were consisted with the academic success of students. According to Yang's study, participated by nursing students who had already taken a course on medical terminology, 40.4% of the participants had ≥ 80 points, 31.4 % had 60-80 points, and 28.08 % had <60 points(Yang, 2005). Compared to Yang's study, we had realized that the participants in our study, who had not taken a course on medical terminology, had a higher correct response rate on medical terminology.

The participants in our study had higher scores in MAS according to other two sections and the overall test average. In the study of Sinha et al. participants were asked about 30 abbreviations used in patient records; the overall correct response rate was 43 %, and the correct response rate of nurses on these abbreviations was 30 % (Sinha et al,2011).   Sheppard et al. found that pediatric staff nurses had a correct response average of 55 % for selected abbreviations (Sheppard et al, 2008). The participating students

in our students were found to have higher scores on the knowledge of medical abbreviation, comparing with the literature. It can be inferred that the ability and tendency of the Y and Z-generations for communicating through abbreviations and symbols especially in internet or by smart phones, had an effect on this result (Karahisar, 2013).

According to the comparison done between the subcategories of MAS, the correct response rate in "Diagnostic Tests / Medical Procedures" was higher than the rate in "Disease / Surgical Operation", which might be attributed to the fact that students were likely to encounter such abbreviations in laboratory order forms during their practical training. Unlike our study, Sinha et al. found that correct response rate of abbreviations on "Disease-Operation" (n=5; distribution range: 55-65 %) was higher than that of abbreviations on "Diagnostic Tests" (n=2; 20-34 %) (Sinha et al,2011). However, it should be noted that their correct response rates in both sections were lower than the results of our study.

The correct response rate of MES is higher than that of the overall test and MTS, which indicates that students have a better performance at interpreting and comprehending terms and abbreviations within a given contex (Epcacan, 2009)).   The students showed a high level of knowledge for the MES expressions, especially the ones which were in the "verbal group" and were generally related to nursing activities. The lower knowledge of student on the expressions used in "medical records", can be attributed to the fact that they do not tend to read the records of surgical procedures, diagnostic imaging and etc. while planning the process of patient care.

The correct response rate of terms related to "Neurology-Psychiatry"   within   the   4 subcategories of MTS was lower than the remaining 3 subcategories and to the overall section. This result might be due to the fact that some terms belonging to the domain of neurology and psychiatry have abstract features and cannot be expressed in Turkish in a single word. Obtained results indicate that there is the need for improving the medical terminology knowledge in these fields.

The success in learning the language of a field of science is the cornerstone for learning and practicing that field of science succesfully. The knowledge of terminology acquired through the learning process is the foremost indicator of

future success (Cankur, 2002; Karadüz and Yıldırım, 2011). In line with this theory, our study found a positive correlation between students' grade point averages in the first 6 semesters and their knowledge of medical terminology. This finding suggested that the higher level of terminology knowledge has a positive effect on other subjects/courses, and thus contributes to student's academic success.

We have not found any studies in the literature that examine the direct relation between the knowledge of medical terminology and academic success. Lewis et al. found that the main factor on the academic success of nursing students was the number of lessons previously taken on anatomy/physiology (Lewis and Lewis, 2000). In the study of Underwood et al. with nursing students at university and in the study of Chen et al. with associate degree nursing (ADN) school applicants, a positive correlation was found between the exam results of anatomy and physiology courses and the final grades in the first 3 semesters (Underwood et al, 2013; Chen and Voyles, 2013). Griffiths et al. found a correlation between students' results in a 50-item anatomy/physiology test and their academic success(Griffiths, 1995). Anatomy and physiology are the courses in which students learn most of the medical terms. Therefore, the results of the above studies support a relation between medical terminology knowledge and academic success.

One of the limitations of the study was about the generalization to the larger population of nursing students, as the sample group was selected from a single nursing school. The results need to be replicated with studies in similar nursing student populations. Another limitation of our study is about the fact that the terms/abbreviations, which were used for evaluating participants' knowledge, were selected by the researchers. Medical terminology forms the basis of health disciplines education and it is the common language providing an effective communication among healthcare professionals. Therefore, it is suggested that the effects of the knowledge of medical terminology both on communication among healthcare professionals and on academic success in other health disciplines should be examined in future studies.

Conclusion

Tests evaluating the knowledge of medical terminology are mostly prepared with an anatomical approach. In this study, our aim was to evaluate students' abilities to analyze and interpret terms/abbreviations/expressions which were mainly in the domain of Diagnostic/Operative/ Symptomatic terminology, in a clinical approach.

Our study found that participating students had sufficient level of medical terminology knowledge, they performed better in medical abbreviations, they needed support with "Neurology-Psychiatry" related terms and that there is positive correlation between the level of medical terminology knowledge and academic success. This study helped us to evaluate the students' performance on medical terminology. We strongly believe that schools could greatly contribute to the quality of their graduates by detecting such weaknesses on medical terminology knowledge with this kind of studies and making necessary changes in their curricula accordingly.

References

Akay R. (2013) The internationalization of science and its contribution to the universal science. International Journal of Human Sciences, 10(2): 655-666. Aslan M, Bıcak U, Uzüm I, Yakıcı C. (2004) Standardization of abbreviations used in medice. Tıp Egitim Dunyası, 16: 016-020.

Arslantas D.(Ed). (2012) Medical Terminology.1th Ed. Eskisehir: Anatolian University Press

Bozkır G, Tascı N, Arsak A. (2008) The viewpoint to nursing of male students attending health college and three-year student in the high school in Zonguldak centre. University and Society, 8(1): 28- 32

Brahler C. J. And Walker D. (2008) Learning scientific and medical terminology with a mnemonic strategy using an illogical association technique. Advances in Physiology Education, 32(3); 219-224.

Brunetti L, Santell JP, Hicks RW. (2007) The impact of abbreviations on patient safety. The Joint Commission Journal on Quality and Patient Safety, 33(9): 576-583.

Cankur N S. (2002) Language in medical education I: Importance, development and future. Uludag Medical Journal, 28 (1): 29-32.

Chen S and Voyles D. (2013) HESI admission assessment scores: Predicting student success. Journal of Professional Nursing, 29(2): S32–S37.

Cıkmaz S. and Mesut R. (2008) Analysis of The Turkish Terms of Foreign Origin Proposed as Equivalents of Anatomical Terms. Journal of Turgut Ozal Med Cent, 15 (3) :175-179

Epcacan C. A. (2009) General vıew to the readıng comprehensıon strategıes. The Journal of International Social Research, 2(6): 207-221.

Griffiths M J, Bevil C A, Wieland M D.(1995) Anatomy and physiology as a predictor of success in baccalaureate nursing students. Journal Nursing Education, 34(2): 61-66.

Jeong I. Park S, Jeong J S. (2013) Understanding of technical terms and contents of Informed consent forms for sedative gastrointestinal endoscopy procedures. Asian Nursing Research, 7(1): 33-37.

Karadüz A. and Yıldırım I. (2011) Practices and opinions of teachers in developing word power of students. University of Gaziantep Journal of Social Sciences, 10(2): 961 -984.

Karahisar T. (2013) Digital generation, digital communication and the digitalized (!) Turkish. Online Academic Journal Of Information Technology, 4(12): 1309-1581.

Kartal E. (2010) The relatıonshıp between language, culture and educatıon. e-J NWSA Humanities Sciences, 5(3): 447-454.

Lerner E B. Et al. (2000) Medical communication: Do our patients understand? American Journal of Emergency Medicine, 18(7): 764–766. Lewis C and Lewis J H. (2000) Predicting academic success of transfer nursing students. Journal Nursing Education, 39(5):234-6.

Pilav S. (2008)The problem of term and term ıts place and ımportance ın educatıon. Kastamonu Education Journal, 16 (1): 267-276.

Sheppard J E, Weidner C E, Zakai S, Fountain-Polley S, Williams J. (2008) Ambiguous abbreviations: An audit of abbreviations in paediatric note keeping. Archives of Disease in Childhood, 93: 204–206

Shilo G and Shilo L. (2014) Writing style of young physicians in the computer and internet area. International Journal of Medical Education, 5: 82-86.

Sinha S, McDermott F, Srivivas G. (2011) Use of abbreviations by healthcare professionals what is the way forward. Postgraduate Medical Journal, 87(1029): 450-452.

Turkish Medical Language Guide (2006) Kocaeli Üniversitesi Tıp Fakültesi. (ISBN 975-8047-63-9). Kocaeli University Printing House.

Yalcın S. K, Sengül M. (2007) The role and functıon of the language ın the process of communıcatıon. Turkish Studies, 2(2): 1-21.

Yakıncı C, Akın K, Almıs H. (2013) Reaching unknowns using our own knowledge in medical term science. Turkish Pediatric Journal, 56(2): 97-100.

Yakıncı C, Celiloglu O. S, Aksu B. (2011) Usage of Turkish language in medical literature and frequent errors. Turkish Archives of Pediatrics, 46: 186-90.

Yang M-N. (2005) Nursing Pre-professionals' medical terminology learning strategies. Asıan EFL Journal, 7(1): 1-18.

Underwood L M, Wıllıams L L, Lee M B, Brunner K A .(2013) Predıctıng baccalaureate nursıng students' fırst-semester outcomes: HESI admıssıon assessment. Journal of Professional Nursing, 29(2): 38–42