

Indication standard times for immunization clinical skill practice based on learning curve flattening of health worker students in 2011- 2012

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Abstract: Introduction: vaccination is one of the most important, efficient, and affordable ways to prevent infectious diseases. Vaccination is a basic duty of Iran health care system, which is implemented in the provinces by the health workers. The index of the learning curve flattening is a criterion, which able instructors to get sure that trainees have gained enough competencies. According to the fact that the skill of vaccination is crucial in different aspects, in order to be sure of the enough practicing times by the health worker trainees, this study has been done with the aim of standardization of vaccination clinical skill times practicing by the health worker trainees. This is a time series study. 54 first year health worker students of paramedical schools of Mashhad, Nishaboor and Torbatejam were included in this study in 2011-2012 academic years with non-probability convenient sampling method. The tool was the check list of clinical skills evaluation of vaccination. The analysis has been done by SPSS (version 16) software and descriptive and analytical statistics tests (Kruskal Wallis analysis, Pierson correlation coefficient with the level of significance of 0.05) were used and the learning curve has been sketched. The learning curve of clinical skills of this study illustrate that the slope of the curve is descending between the times less than 30 and 30-59. After that, the curve's slope is ascending and it is flattened for more than 90 times. The standard of the vaccination skill implementation times is maximum 90. With this, besides saving money and time, we can be sure of the enough competency level in the usual clinical education of the health workers.

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Introduction

Clinical education is a dynamic and unique process, in which various conditions and resources come together to combine theoretical learning and practical learning in real situations [1]. Lowenstein (2004) mentions the clinical education as a tool that help the students convert theoretical information to practice directly [2]. In confrontation with reality, the students use their theoretical and practical information at the same time. Clinical environment is a place for learning how to combine the theoretical science with practice and professional role [4, 3]. Ideal clinical education is unquestionable for individual, professional and clinical skills development [4]. Achieving the proper clinical skills and satisfying feeling about it make the student do their duties and roles more efficiently [5]. Clinical education is one of the important ways for the students to achieve clinical competency; however, Donald (2001) mentions that

less attention has been paid to clinical education rather than other educational fields (6, 7).

The first group of the human resources in the country's health and treatment system is the health workers in villages. They take a two-year training period after passing the theoretical and practical educations in their hometown [7]. The health working course is considerably based on clinical education, which its aim is making health worker volunteers qualified for their career. The main principle of this period is that it should be exactly according to the pre-defined educational objectives [8]. The province is the primary care giver unit of health ministry and is the workplace of the health workers. Most of the health workers' duties are done in connection with people and the village families and routine life [9].

The duties of the health workers in the health houses includes visiting the houses and census the families, making connections with people and teaching hygiene in different fields, taking care of the pregnant

mothers, taking care of children, family planning, immunization, sending the report of the activities to the health center of their village area, and etc. [10].

Vaccination is one of the most important, efficient, and affordable ways to prevent infectious diseases. Vaccination is included in the basic duties of the health care system of Iran. One of the most serious country's programs in all of the networks' stages is the child's vaccination before the age of one against preventable diseases. The immunization politics insist on the implementation of immunization against the diseases such as poliomyelitis, diphtheria, pertussis, tetanus, mums, measles, rubella, tuberculosis, hepatitis B. Based on this politics; the health personnel must immunize any eligible kids [11].

Considering the fact that the health workers are one of the main foundations of the society's cooperation in the primary health care system and have a valuable role in first aids and giving services for a large group of village population more than 25 millions in 66000 villages, [12] it is crucial to be qualified in this field. This study is aimed to indicate the standard times of immunization clinical skill practicing based on the index of flattening learning curve of the first year health worker students in 2011-2012 academic years.

Materials and methods

This is a time series study. The targeted population of this study was all of the first year health worker trainees of junior paramedical schools of Mashhad, Nishaboor and Torbatejam. Sampling has been done by non-probability convenient method which was accessible. 54 of the first year health worker trainees (30 persons from Mashhad, 12 from Nishaboor, and 12 from Torbatejam) who had the included criterions have been studied in 2011-2012 academic year. The criterions of the eligibility criteria were passing the theoretical course of immunization, not having any defections or illnesses, and satisfaction to cooperate in the study. The exclusion criterions were: being absent more than three days during the training, not having mental problem (specified by the trainer or the health worker's coworker), and discouraging to participate the study. The tools were the questionnaire of demographic data of health worker instructors and trainees, and researcher made check list of clinical skills that seeks competency of 5 main immunization skills. Each of these skills had some sub skills and the observer for each of the sub skills considered a score between zero and twenty. In the next step, the average of the sub skills scores taken as the skill's score (between zero and twenty). The validation of the study tool was confirmed by the content validity and stability by interrater reliability ($r=0.83$).

Data has been analyzed by the SPSS (16) software and descriptive statistical tests such as frequency, mean

and SD, and analytical statistical tests like Kruskal Wallis, Pierrson correlation coefficient. The level of significance considered as 0.05.

Results

All of the participants in this study were women. Age of them was between 18-26 years and the average age of them was 20.6 ± 1.7 year. Half of the participants (27 ones) were single and another half was married. The high school diploma field of most of them was natural sciences (36 people), and then human sciences (12 persons) and their total average was between 13.7-19.5 with the mean of 16.5 ± 1.8 .

The results of the Kruskal Wallis test showed that the average level of the competency in implementing 1) poliomyelitis vaccination (Table 1), DTP and Td vaccination and hepatitis B vaccination (Table 2), MMR vaccination (Table 3), BCG vaccination and tuberculin test (Table 4) and sputum sampling from suspicious patients to tuberculosis (Table 5) has a significant difference ($P_{1,2,3,4,5}=0.000$).

The Learning curves of immunization skills illustrated the level of competency, as a descending slope between the times less than 30 and 30-59, and them come in ascending slop and finally come in flat shape at the point of 119 times and more (If the variation is less than 5 percent in the learning curve, the curve is assumed as flat).

Discussion

These curve variations show that in the first times of skill implementation, the level of competency is higher and then it decreases, although in most of the cases this decrement is low. This competency decrement in the learning curve during the sequential implementation times can be the result of pervasive exercise distance, environmental situation, and the individual characterizes of the students. In this study, the main reason of the curve variations are assumed to be the accuracy and concentration decrement in some of the details because of the competence increment of the students, which is probably the result of the pseudo-self confidence in getting enough competence and also the stress and fear of the skill implementation decrement. Benner also refers to the feel of competence and being professional in the first stages of learning the skill [13]. Sun (2010), Burrirt (2009), and Yung (2006) also have shown in their studies that in sequential times of implementing a clinical skill a rising process is created in the learning curve at first, but after that, the process is descending or becomes constant [14-16]. Using the learning curve flattening criterion for standard indication is based on the idea that although the level of competence increases in each implementation time of a skill, its rate is not significant.

Table 1: mean competency of health worker students' poliomyelitis vaccination skill based on implementation times

Skill implementation times	Number of persons	competency level	competency percent
		Mean±SD	
<30	15	19.32±0.87	96.60
30-59	6	16.85±0.66	84.25
60-89	17	17.12±0.73	85.60
90-119	6	18.51±0.68	92.55
>119	10	17.83±0.67	88.10
total	54	17.99±1.21	89.95
Kruscal wallis test result		df=5	P=0.000
Chi-square= 35.604			

Table 2: mean competency of health worker students' hepatitis B, DTP and DT vaccination skill based on implementation times

Skill implementation times	Number of persons	competency level	competency percent
		Mean±SD	
<30	15	19.34±0.94	96.70
30-59	6	16.80±1.05	84.00
60-89	17	17.39±0.60	86.95
90-119	6	18.52±0.73	92.60
>119	10	17.61±0.89	88.05
total	54	18.03±1.21	89.66
Kruscal wallis test result		df=5	P=0.000
Chi-square= 31.142			

Table 3: mean competency of health worker students' MMR vaccination skill based on implementation times

Skill implementation times	Number of persons	competency level	competency percent
		Mean±SD	
<30	15	19.00±1.35	95.00
30-59	6	16.85±0.91	84.25
60-89	17	17.36±0.67	86.80
90-119	6	18.33±0.98	91.65
>119	10	17.27±0.52	86.37
total	54	17.85±1.24	89.2s5
Kruscal wallis test result		df=5	P=0.000
Chi-square= 23.955			

Table 4: mean competency of health worker students' BCG vaccination and tuberculin test skill based on implementation times

Skill implementation times	Number of persons	competency level	competency percent
		Mean±SD	
<30	15	18.54±1.14	92.70
30-59	6	17.14±0.92	85.70
60-89	17	17.44±0.40	87.20
90-119	6	18.78±0.50	93.90
>119	10	17.80±0.62	89.00
total	54	17.98±0.90	89.90
Kruscal wallis test result		df=5	P=0.002
Chi-square= 19.566			

Table 5: mean competency of health worker students' sputum sampling skill based on implementation times.

Skill implementation times	Number of persons	competency level	competency percent
		Mean±SD	
<30	15	19.01±0.90	95.05
30-59	6	16.94±1.13	87.70
60-89	17	17.16±0.91	85.80
90-119	6	18.61±0.99	93.05
>119	10	17.68±0.88	84.40
total	54	17.91±1.21	89.55
Kruscal wallis test result		df=5	P=0.000
Chi-square= 26.868			

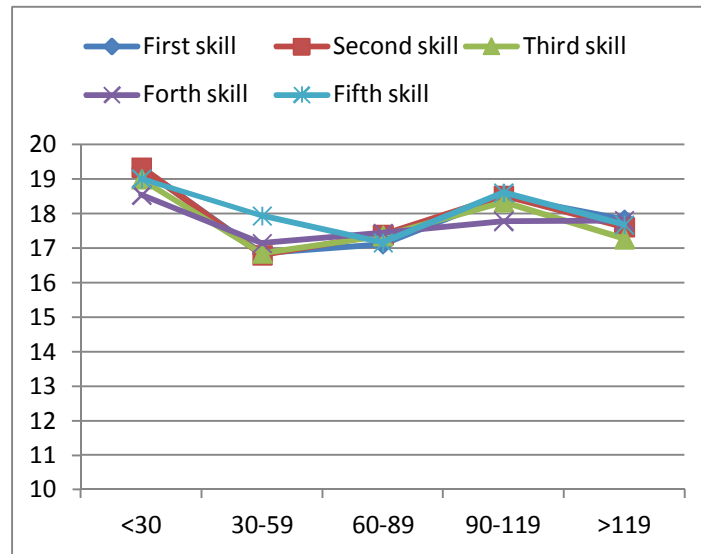


Chart 1: Health worker students' learning curve of mean competency of vaccination skills based on implementation times

The results of the study, done by Mazlom et. al. (2011) also showed that the learning curve has a positive slope at first, however after some skill implementation times the slope changes to negative. By continuing this process, the curve's slope again changes to positive and at last the variations become small and it changes to a flat line [17]. According to the fact that the clinical education needs lots of expenditures and the high level of work volume of the trainers, lack of human resources and tools for standard training as the education's obstacles [18], we can use the learning curve and indicate the standard times of skill's implementation in order to achieve efficient clinical education and save time and money. Also, instead of wasting time to implement the clinical skill, in which there are enough competencies, we can use the time to implement the skills, in which the level of competency is not enough (75 percent). Another limitation of the study was the

differences between the self-ingenuity of the health workers, which could affect the results of the studies in codification of the standards. The attendance of the researcher during the skill implementation and also the clinical trainers' control on him was another limitation of the study.

Conclusions

Based on the index of curve flattening in this study, the standard times of the vaccination skill implementation are about 90 times. Therefore, the trainees can reach to desired level of competency with less skill implementation times in camper of the rutine health workers' clinical education. In this way, we can save time, expenditures, and human resources.

References

1. Lowenstein A, Bradshaw M. Fuszard's innovative teaching strategies in nursing : Jones & Bartlett Pub; 2004.
2. McAllister L, McLeod S. Facilitating learning in clinical setting: Nelson Thornes ; 1997.
3. Midgley K. pe-registration student nurses perception of the hospital – learning environment during clinical placements. Nurse Educ Today.2006 May;26(4):338-45
4. Movaghari M, soghrati V. Internship Nursing Student's Viewpoints On Their Clinical Skills Iranian Journal Of Nursing Research . 2008; 2(6): 45-53. [In Persian].
5. Kiasaraei M, Jourshry MT. Learning curve; tool for corporate development (concepts and Applications) 2010. [In Persian].
6. Karimi Moonaghi H, Binaghi T. Teaching and learning style and the application in higher education. Mashhad: mashhad university of medical sciences vice presidency for research; 2010.[In Persian].
7. Asgari H, Kheirmand M, Yarmohamadian MH, Rohani M, Ansaripour S. Training needs assessment of health care providers working in health network in Isfahan province. Iranian J of med edu. 2011; 5(10) especial issue of education development: 668-74.
8. Training Health Workers Regulations. Ministry of Health and Medical Education center network and health promotion. 2009
9. Qari-Alavijeh A, Arab M , Kheiri S , Akbari-Sari A , Asgarimoqadam M, Mohamadi GhR, Qari-Alavijeh M. Job burnout and some of its risk factors on the health workers (Behvarz) in Koohrang County, I.R.Iran, in 2010. Journal of Shahrekord University of Medical Sciences (J Shahrekord Univ Med Sci) 2012 July, Aug; 14(3): 62-71. [In Persian]
10. Pilehvardi s. Book of City Health Network. Unicef; 2008.[In Persian]
11. Naimi E, Chman R, Afshoon E. Vaccination coverage of children under 1 year of age in the tribal community of Khohgiloyeh and Boyr Ahmad province. Armaghane- Danesh J.2004;2(38):67-77.[In Persian]
12. Training Health Workers Regulations. Ministry of Health and Medical Education - network and health promotion center; 2009. [In Persian]
13. Benner P, Tanner C, Chesla C. Expertise in nursing practice: Caring, clinical judgment, and ethics. 2ed: Springer Publishing Company; 2007.
14. Son GM. Multidimensional analysis of the learning curve for laparoscopic rectal cancer surgery. Laparoendosc. Adv. Surg. Techn.2010; 20 (7): 609-617
15. Burritt J. Supporting the learning curve for contemporary nursing practice. Nurs Adm.2009; 39 (11): 479-484
16. Yung MW. The learning curve in stapes surgery and its implication to training. Laryngoscope. 2006; 116(1): 67-71
17. Mazloun SR, Miri KH, Malek Zadeh J, Davoudi N. Developing standards for skill performance times in nursing clinical education program according to learning curve. Thesis for MS degree .Iran, Mashhad university of medical sciences, nursing and midwifery school;2011.
18. Zareiyan Jahromi A, Ahmadi, F. Learning Needs Assessment in Bachelor of Nursing: a Qualitative Research. Iranian Journal of Medical Education. 2005; 5(2). [In Persian].

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