

## RESEARCH ARTICLE

# ASSESSMENT OF KNOWLEDGE AND SKILLS OF BARANGAY HEALTH WORKERS: BASIS FOR DIABETES EDUCATION PROGRAM FOR LAY PERSONS

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## Abstract

This study aimed to determine the level of knowledge and skills of the barangay health workers (BHW) about diabetes management. A descriptive correlational design that included 121 BHWs in Bustos, Bulacan was utilized in the study. A test and skill demonstration checklist was utilized to determine the knowledge and skills of BHWs about diabetes management. Categorical variables such as the respondents' profile were described using frequencies and percentages. Continuous variables such as level of knowledge and skills were summarized using central tendency measures (mean) with standard deviation. Pearson correlation test for association was used to test for relationship between level of knowledge and skills. Pearson Chi square was used to test association between demographic variables and level of knowledge and skills. A  $p$  value of  $<0.05$  was considered significant in the analysis of the results. Results showed that the overall level of knowledge of the BHWs was satisfactory but varied in many aspects of diabetes management. The BHWs level of knowledge in determining signs and symptoms and diagnosis of diabetes was high but low in determining types of diabetes mellitus. The level of skills of the BHWs was high in blood pressure measurement but low in blood glucose monitoring. BHWs have varied knowledge and skills in diabetes care management. There is a need to train the BHWs further to develop their knowledge and skills. The nurse diabetes educators must provide diabetes education program for BHWs that are focused on competencies to deliver safe and appropriate health teaching activities utilizing the basic concepts and principles of diabetes management.

**Keywords:** Diabetes Management Self Education, Diabetes Type 1, Diabetes Mellitus, Diabetes Nurse Educator

## Introduction

Diabetes is a worldwide epidemic that accounts for 422 million adults living with diabetes as of 2014. The global prevalence of diabetes has nearly doubled since 1980, rising from 4.7% to 8.5% in adult population. Diabetes is no longer just the problem of high income countries but cases have also, in fact, risen faster in low and middle income countries (WHO, 2016). The Philippines is one of the world's emerging hotspots, ranking in the top 15th of the world's diabetes prevalence. Philippines is home to more than 4 million people diagnosed with diabetes and a large unknown number of people do not know that they have diabetes (IDF, 2016). Diabetes health education is vital in its management. Health care providers in different settings are pushing for diabetes education to people with diabetes to lessen the burden of this worldwide problem.

Primary health services in the Philippines are delivered in the barangay health stations, health centers and at hospitals. The health care providers are doctors, nurses and midwives with the help of the barangay health workers. The Barangay Health Worker (BHW) is a category of health care provider in the Philippines. They undergo training from government and non-government institution and render primary health care services. According to the Philippines Department of Health (DOH), as of 2009 there were 196,562 active accredited BHWs. They are considered the backbone of government health service delivery in the Philippines and their role as health educators in diabetes care is important to consider (Paz-Pacheco & Jimeno, 2015). Thus, their level of knowledge and skills in providing diabetes care and education is vital to assess.

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A training workshop aimed to enrich local government healthcare staff's knowledge and skills in diabetes care by Ku and Kegels (2014) revealed that the level of knowledge increased and the self-assessed skills also improved. The same diabetes training was conducted for community health workers by Aponte in 2015. Aponte's (2015) findings showed that the diabetes knowledge of the BHWs increased after the diabetes training. Aviles et al (2015) assessed the BHWs knowledge and skills in providing diabetes health education and revealed that the level of knowledge and skills varies on different areas of diabetes. BHWs as lay persons, have high knowledge in medical nutrition therapy and lowest in the diagnosis of diabetes. In terms of the level of skills, the highest average percentage score of the BHWs is height measurement while the lowest is blood glucose monitoring techniques.

This study aims to assess the level of knowledge and skills of the BHWs in Bustos, Bulacan to serve as basis for the development of Diabetes Education Program for Lay Persons. This Training Program will be used as a tool to train BHWs in diabetes health education process in Bustos, Bulacan.

### Research Design

The study utilized descriptive correlational research design in determining the level of knowledge and skills of the barangay health workers in diabetes education in Bustos, Bulacan. The outcome of the study will be the basis for the development of the lay diabetes education program.

### Setting of the Study

The study was conducted at Bustos, Bulacan. The Municipality of Bustos sits in the Midwest of the Province of Bulacan and about 50 kilometers from Metro Manila. It is a 2<sup>nd</sup> class semi-urban municipality with 14 barangays namely Bonga Mayor, Bonga Menor, Buisan, Camachilihan, Cambaog, Catacte, Liciada, Malamig, Malawak, Poblacion, San Pedro, Talampas, Tanawan and Tibagan. The setting was chosen because of the investigator's affiliation with the municipality as a diabetes health educator.

### Subjects of the Study

Out of 251 barangay health workers in Bustos, Bulacan, 121 were included. They were purposively selected and had voluntarily consented to become the respondents of the study. The study included barangay health workers who are presently rendering services to various Barangay Health Centers in Bustos, Bulacan for at least 6 months regardless of their age, sex and number and area of focus of previous trainings attended. All chosen barangay health workers voluntarily participated in the study as they are encouraged by their respective midwives, nurses and Municipal Health Officer.

### Instrumentation

The data collection utilized adopted test and skill demonstration checklist from Aviles et al. (2015), which was further modified to attain the objectives of the study. The test consisted of fifty (50) items that included assessment of the level of knowledge of the barangay health workers on the following 1) overview of diabetes (definition and types of diabetes), 2) types of diabetes mellitus, 3) risk factors 4) signs and symptoms, 5) diagnosis of diabetes, 6) management/ treatment of diabetes, 7) exercise management, 8) smoking cessation, 9) stress management, and 10) complications of diabetes management. The research test was validated by expert diabetes educators. Some words used in the test were changed to simpler one to facilitate understanding of the question. In addition, items were classified accordingly as mentioned above.

The skill demonstration checklist consisted of fifty-nine (59) items that were used to assess the level of skills of barangay health workers on the following: 1) anthropometric measurements (weight, height, waist and hip circumferences), 2) blood glucose monitoring, and 3) blood pressure monitoring. The checklists are standard tools used in the Diabetes Education Training (DET) conducted by Philippine Association of Diabetes Educators (PADE) and Association of Diabetes Nurse Educators in the Philippines (ADNEP).

### Data Gathering Procedure

The conduct of the study was approved by the Municipal Health Officer of Bustos, Bulacan. Proper coordination process to the different barangay health centers in Bustos, Bulacan was done to facilitate the conduct of the study. After selection of participants based on inclusion criteria, data gathering process were initialized. The participants were given one (1) hour to accomplish knowledge test and two (2) hours for skills demonstration, which consisted of four (4) stations including height and weight, waist and hip circumferences, blood pressure and blood glucose monitoring accordingly. One evaluator was assigned for each station and the participants were in pair and took turns in performing the skill/s assigned to each station.

### Statistical Treatment of Data

Descriptive and inferential statistics were used in the study. Descriptive statistics were used to interpret and describe the nature of the data, general and specific trends. Categorical variables such as the respondents profile were described using frequencies and percentages. Continuous variables, such as level of knowledge and skills were summarized using central tendency measures (mean) with standard deviation. Pearson correlation test for association was used to test for relationship between level of knowledge and skills. Pearson Chi square was used to test association between demographic variables and

level of knowledge and skills. A p value of <0.05 was considered significant in the analysis of the results.

**Results**

The profile of the Barangay Health Workers (BHW) in Bustos, Bulacan were described according to age, sex, educational attainment and years of service.

A good proportion of the respondents belong to age group 51-60 years old (n=37, 30.6%), while only few belong to 71-80 years old (n=8, 6.6%). There is only one respondent for both 20-30 years old and 81-90 years old age group (n=1, 0.8%). (Figure 1). All of the respondents are female (n=121, 100%).

The respondents' educational attainment shows that almost half of the respondents are elementary graduate (n=58, 47.9%). However, a few of the respondents are undergraduate (n= 10, 8.3%), college graduate (n= 5, 4.1%), and vocational graduate (n=4, 3.3%). (Figure 2)

More than half of the respondents have worked in the health center for 0-10 years (n=69, 57%). A good proportion of the respondents worked for 11-20 years (n=36, 29.8%). Only few of the respondents worked for 21-30 years (n=10, 8.3%) and 31-40 years (n=6, 5.0%). (See Figure 3)

The level of knowledge of the respondents in diabetes mellitus and its management was determined by the test questions

Figure 1. Age of the Respondents

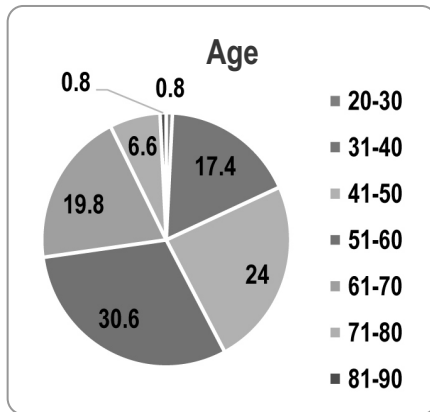


Figure 2. Respondents' Educational Attainment

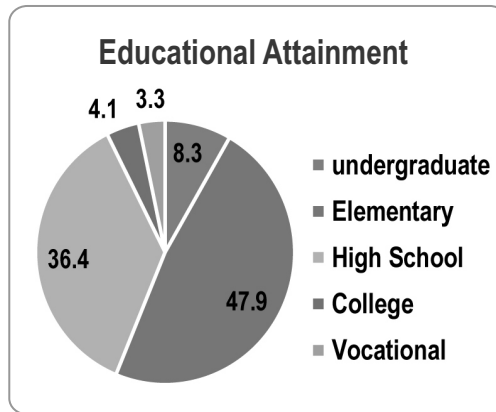


Figure 3. Respondents Years of Service

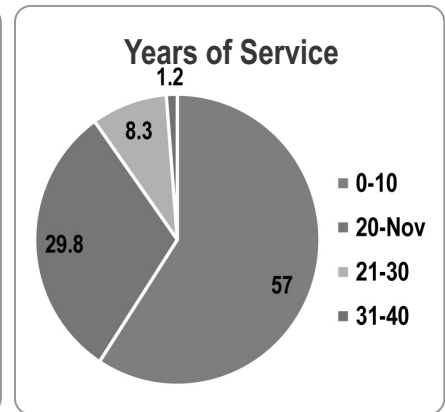
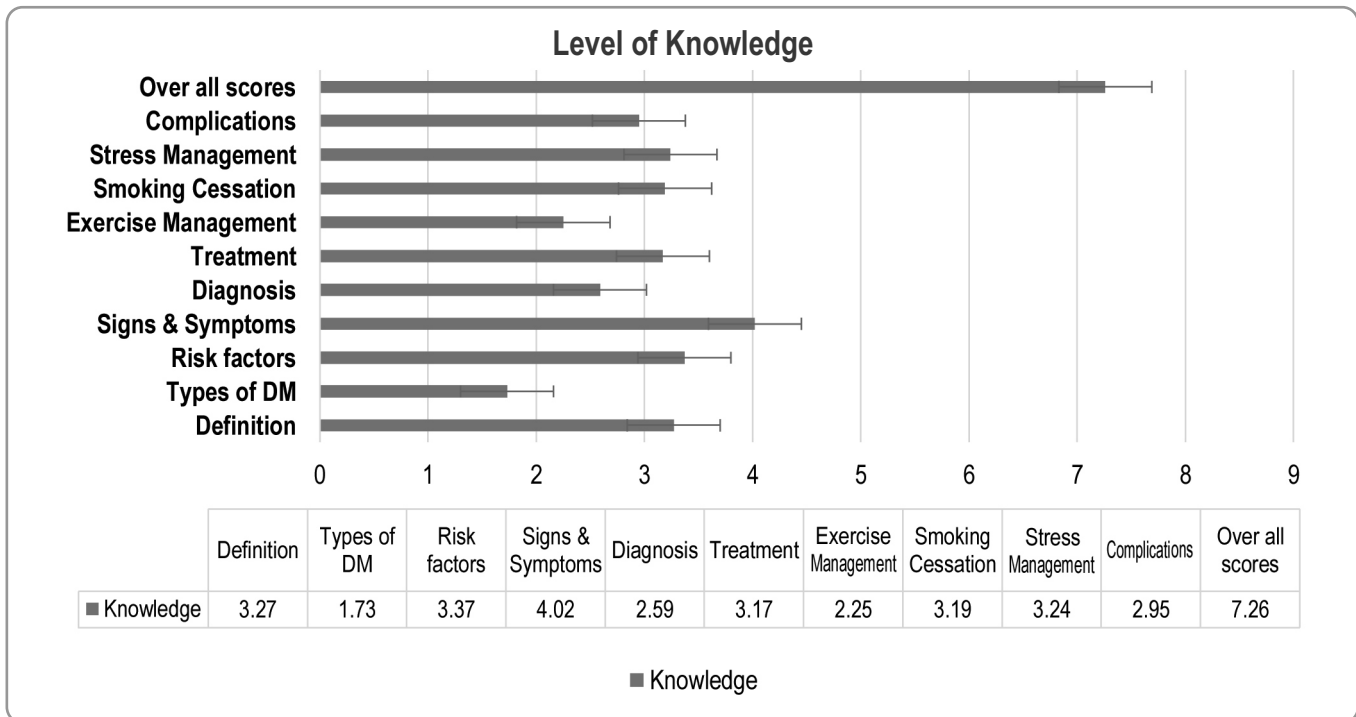


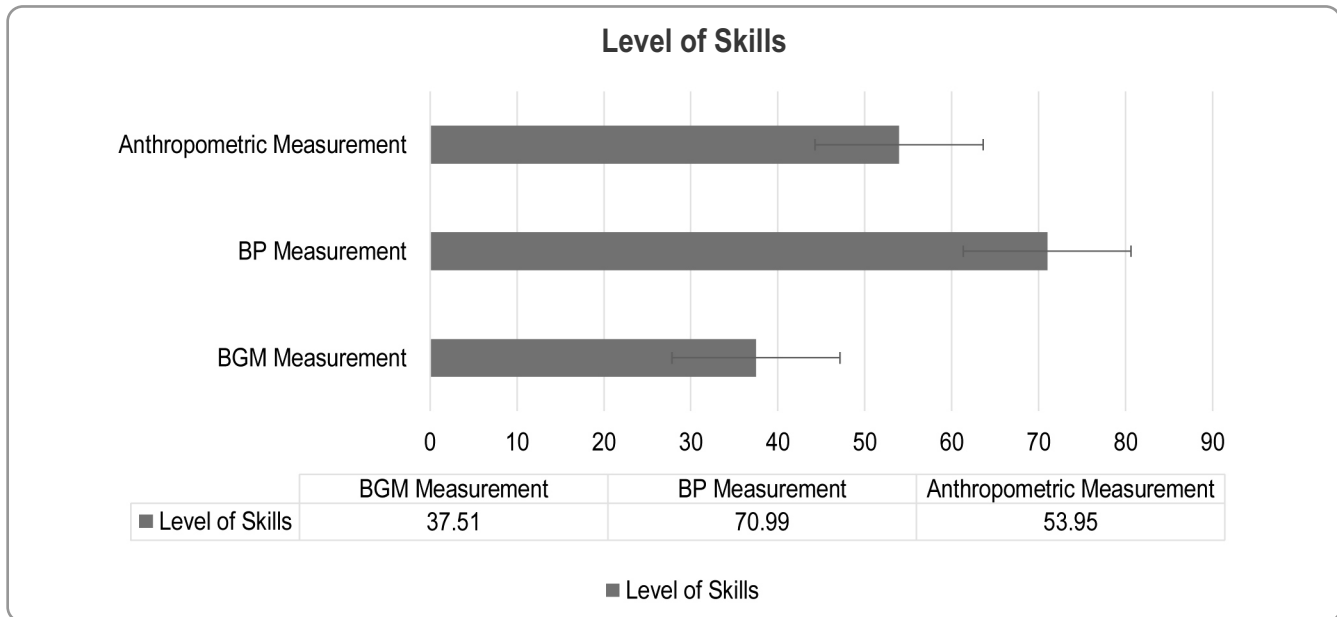
Figure 4. Level of Knowledge of the Respondents



LEGEND

Level of Knowledge - 50-40: Excellent | 39-40: Very Satisfactory | 29-20: Satisfactory | 19-10: Unsatisfactory | 9-0: Poor

Figure 5. Level of Skills of the Respondents



LEGEND  
Level of Knowledge - 100-80: Excellent | 79-60: Very Satisfactory | 59-40: Satisfactory | 39-20: Unsatisfactory | 19-0: Poor

administered to them. Respondents' knowledge was interpreted from “excellent” to “poor”. Figure 4 presents that the overall level of knowledge of the respondents were “satisfactory” ( $M=29.80$ ,  $SD= 7.26$ ). Respondents' knowledge in signs and symptoms of DM were “very satisfactory” ( $M=4.02$ ,  $SD= 1.0$ ) which ranks first. However, respondents' knowledge in Types of DM ( $M=1.73$ ,  $SD= 0.96$ ) and in diagnosis of diabetes ( $M=2.25$ ,  $SD= 1.31$ ) were “unsatisfactory”. The level of knowledge of the respondents shows “satisfactory in knowledge in diabetes definition, stress management, smoking cessation, treatment, complications, and risk factors of DM”.

The level of skills of the respondents in Blood Glucose Monitoring, Blood Pressure measurement, and Anthropometric measurements, which includes height, weight and hip and waist circumference were determined through their total scores in the return demonstrations. Respondents' skills were interpreted from “excellent” to “poor”. The Figure above shows that the level of skills of the respondents in BP measurement were “very satisfactory” ( $M=70.99$ ,  $SD= 66.68$ ). The level of skills in anthropometric measurement shows “satisfactory” results in the skills return demonstration scores ( $M=53.95$ ,  $SD= 5.46$ ). While the BGM measurement skills shows “unsatisfactory” scores in the level of skills ( $M=37.51$ ,  $SD= 30.95$ ).

The relationship between the knowledge and skills in BGM, BP measurement and anthropometric measurement were determined using Pearson correlation statistics (See Table 1). The skills of the respondents in BGM shows significant weak positive correlation ( $r= 0.21$ ,  $p=0.02$ ) in the respondents overall

scores in the knowledge test. Significant weak negative correlation was also obtained between respondents' skills in BP measurement and overall scores in knowledge test ( $r= -0.27$ ,  $p=0.00$ ). However, no significant correlation was obtained between respondents' skills in anthropometric measurement and overall scores in knowledge test ( $r= -0.03$ ,  $p=0.700$ ).

Table 1. Relationship between knowledge and skills

Variables	Mean ± SD*	r	P-value
BGM measurement	37.51 ± 30.95	0.21	0.023**
BP measurement	70.99 ± 66.68	-0.27	0.002**
Anthropometric measurement	53.95 ± 5.46	0.03	0.700
Knowledge	29.79 ± 7.21		

The correlation between the respondents' level of knowledge to demographic profile were determined using chi square. Table 2 revealed that the respondent's level of knowledge was significantly related to age, in particular knowledge to diabetes ( $r=38.54$ ,  $p=0.31$ ), smoking cessation ( $r=47.59$ ,  $p=0.02$ ), stress management ( $r=55.81$ ,  $p=0.003$ ), and complications of diabetes mellitus ( $r=44.08$ ,  $p=0.04$ ). The respondents' level of knowledge in smoking cessation was significantly related ( $r=41.46$ ,  $p=0.003$ ) to education. In terms of the respondents' year of service, it was significantly related ( $r=25.62$ ,  $p=0.042$ ) to their knowledge in stress management in DM.

No significant correlation was obtained between skills and demographic profile of the respondents (Table 3).

Table 2. Relationship between Knowledge and Demographic profile of the Respondents

Profile		Diabetes overview	Types of DM	Risk Factors	Signs & Symptoms	Diagnosis	Treatment	Exercise	Smoking	Stress	Complications	Total
Age	R	38.54	33.67	24.51	21.78	23.54	36.34	28.91	47.59	55.81	44.08*	178.12
	P-value*	0.31**	0.91	0.74	0.59	0.79	0.19	0.52	0.02**	0.00**	0.47*	0.39
Education	R	20.71	13.89	15.99	13.80	25.63	21.41	15.01	41.46	22.05	26.14	115.96
	P-value*	0.19	0.60	0.71	0.61	0.17	0.37	0.77	0.00**	0.33	0.16	0.48
Years of service	R	14.99	10.37	21.26	14.09	14.94	15.90	21.02	22.70	25.62	13.37	113.39
	P-value*	0.24	0.58	0.12	0.29	0.45	0.38	0.13	0.09	0.04**	0.57	0.03**

\*Chi square goodness of fit

Note: Sex is excluded in the cases because it is constant

\*\*P-value: the correlation between the means is considered statistically significant if the p-value is &lt;0.05

Table 3. Relationship between skills and Demographic Profile of the Respondents

Profile		BGM Measurement	BP Measurement	Anthropometric Measurement
Age	r	219.97	269.61	124.17
	P-value*	0.30	0.69	0.99
Education	r	128.62	192.08	108.51
	P-value*	0.74	0.40	0.58
Years of Service	r	120.63	127.93	97.68
	P-value*	0.14	0.77	0.15

\*Chi square goodness of fit

Note: Sex is excluded in the cases because it is constant

## Discussion

Assessment of knowledge in diabetes is vital in diabetes health education process (Cavanaugh, 2011, Powers, 2015). The BHWs must be knowledgeable enough to conduct diabetes health education process to patients with diabetes mellitus. Results of this study revealed that the BHWs overall level of knowledge were satisfactory. The level of knowledge was highest in signs and symptoms of diabetes and lowest in types and diagnosis of diabetes mellitus. A pilot study in Sweden by Smide and Nygren (2013) was conducted to determine diabetes level of knowledge of health workers in nursing home. The study determined the general level of knowledge in diabetes and found out that the health workers knowledge in diabetes varied. The health workers in the nursing homes considered symptoms of patients related to hyperglycemia, while others were uncertain. The results of the Sweden study was in contrast with the results of the present study in which BHWs level of knowledge were highest in determining signs and symptoms of diabetes mellitus. The level of skills of the BHW's in the study were very satisfactory in BP measurement, however, they have unsatisfactory level of knowledge in blood glucose monitoring. The same results were obtained by the study of Aviles et al. in the Philippines (2015). The BHWs level of knowledge in diabetes varied. However, the level of knowledge of the BHW in the study of Aviles (2015) were highest in medical nutrition therapy. In terms of skills, the BHWs level of skill were highest in height measurement and lowest in

blood glucose monitoring. The study of Aviles (2015) included BHWs who were high school graduate. Compared to the results of this study, the respondents were elementary graduate. Differences in the level of knowledge from this study and that of Aviles (2015) may be attributed to the respondent's level of education.

The BHWs or Community Health Workers' (CHWs') function as level 1 diabetes educator associate according to Diabetes Educator Practice Level Guidelines (AADE, 2014). As discussed in the position paper of AADE (2014), the role of the BHWs in diabetes management and prevention can be expected to have varied activities in the community such as basic assessment skills. Basic assessment skills included measurement of vital signs and anthropometric data. They can also provide support, general information and guidance regarding accessing care, available diabetes care offerings and financial assistance. The current update of literature on the role of BHWs in diabetes showed areas of advancement (Shah, Kaselitz, Heisler, 2013). BHWs are used to implement and evaluate interventions in diabetes that were included in Community-based participatory research (CBPR). The need to train and empower that the role of the BHWs is the work of the nurse diabetes educators. BHWs must be provided trainings that are suitable to their role in the health care and as support in diabetes education. The assessment of knowledge and skills is then necessary to come up with a structured program for BHWs.

## Conclusions & Recommendations

BHWs have varied knowledge and skills in diabetes care management. There is a need to train the BHWs further to develop their knowledge and skills. The nurse diabetes educators must provide diabetes education program for BHWs that are focused on competencies to deliver safe and appropriate health teaching activities utilizing the basic concepts and principles of diabetes management.

Based on findings of the study, a program must be developed based on the relevant competencies to effectively deliver safe and appropriate health teaching activities to individuals, families, population group and community utilizing the basic concepts and principles of diabetes care management. In the training design, the knowledge on the different types of diabetes mellitus and diagnosis of diabetes must be emphasized in the training program. Case scenarios is strongly suggested to be part of the methodology to ensure better understanding of these content. On the other hand, skill on Blood Glucose measurement must be strengthened by providing more time allotment for return demonstration. Guided practice must be part of the training design as well to ensure that competencies are attained.

Lastly, age, educational attainment and years of service must be considered in choosing Barangay Health Workers who can participate in the Diabetes Education Program for Lay Persons to maximize the outcome of the training.

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“  
*A nurse is not what you do.  
 It is what you are...*  
*I am a nurse. It's not what I do,  
 it's what I AM.*  
 ”