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Full Length Research Paper

Determinants of effective productivity among service workers: the case of nurses in Botswana

Ntonghanwah Forcheh[1] and Thabo T. Fako[2]

[1]Department of Statistics, University of Botswana, Private Bag UB00705, Gaborone.
[2]Department of Sociology, University of Botswana, Private Bag UB00705, Gaborone.

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The study proposes a measure of effective productivity among service workers and seeks a parsimonious predictive model of "effective productivity" among nurses in Botswana. Employee productivity has become a concern of organisations in all economic sectors world wide. In Botswana, it has also become a national priority issue and has been listed as one of the goals of the long term vision for Botswana due to perceived low productivity among the workforce. Productivity among nurses is of special significance because of their critical role in the primary health care system. Nurses working under local government control in Botswana provide a good case study since they all have to perform certain routine activities from which their productivity could be measured and compared. Self completed anonymous questionnaires were used to collect the relevant data from all health facilities under local government control in Botswana. A representative sample of 325 questionnaires were returned and analysed. Chi-squared test of association was used to identify univariate factors associated with effective productivity from among a list of 38 variables. Hierarchical stepwise multiple logistic regression analysis was used to identify a predictive model for effective productivity among nurses. Thirteen of the 38 variables were found to be significant univariate predictors of effective productivity ($p<0.05$). Only eight of these factors were retained during a search for a parsimonious predictive model. These in order of importance were midwifery training, involvement with the Village Development Committee, involvement in making health policies, peer support, religious affiliation, ability to complete the Botswana Obstetric Record, quality of health after posting and involvement with the community. The overall impact of these factors was found to be additive. The results underline the importance of midwifery training for effective productivity among nurses in Botswana. It is concluded that all nurses in Botswana should be encouraged and accorded the opportunity to do midwifery training. Nurses should further be encouraged to become more involved in the communities in which they work, as well as develop supportive relationships and a friendly atmosphere at the work place.

Key words: Botswana nurses, effective productivity, logistic regression, midwifery training, peer-support, primary health care.

INTRODUCTION

Historically, the study of productivity was largely the concern of economists interested in the optimal, effective and efficient utilisation or transformation of resources (capital, land, materials, energy, information, time, effort and labour) to achieve desired results, useful end-products or consumable outputs in terms of volume, quantity and quality (Brinkerhoff and Dressler, 1990; Campbell and Campbell, 1990; Dunnette, 1982; Prokopenko, 1987; Schermerhorn et al., 1995). This concept of productivity involves the rate, the efficiency and the effectiveness with which the final product is achieved (Lawlor, 1987; Nasar, 2002), and is best applied to industrial settings.

Although some researchers have cautioned against

*Corresponding author. E-mail: forchehn@mopipi.ub.bw. Fax: (267) 585 099. Tel: 355 2695.

measuring productivity below the level of the economy as a whole (Nasar, 2002), the productivity of individual employees has become a pre-occupation of most organisations world-wide. As a result, productivity is increasingly being studied by researchers across many disciplines (Botswana Vision, 2016, 1997; Hope, 1999; Lloyd, 1999; Soloko, 2006). In many such disciplines, economist-informed indicators that measure productivity in terms of the amount of goods produced and the rate at which goods are produced compared with the work effort, time and money needed to produce the goods are becoming inadequate.

In Botswana for example, the Botswana National Productivity Centre (BNPC) was set up in 1993, with the principal responsibility being to "stimulate debate and generate productivity consciousness in the country, promote increased productivity in all sectors of the economy, assist organisations in identifying areas where there is deficiency in skills and where workers' performance can be improved" (BNPC, 1996). Productivity among nurses in Botswana has been of special interest because of the critical role nurses play in the primary health care system which is the foundation of heath provision in the country, and which continues to be strained by the burden of HIV/AIDS (Fako et al., 2004; Fako and Forcheh, 2000; Fako and Linn, 1994, Owuor-Omondi and Kobue, 1993).

For most of the work that service professionals do, the inputs and outputs are not well-defined or measurable. More than 10 years after the BNPC was established, indicators of productivity in different sectors of the economy and organisations are yet to be defined and there is a general dearth of systematic studies aimed at documenting factors associated with employee productivity in Botswana. Generally, service organisations tend to use performance indicators as proxies to productivity (Hope, 1999; Tyson and Jackson, 1992; Campbell and Campbell, 1990). Some organisations have adopted a performance management system (PMS) or variants thereof, as an instrument for stimulating and measuring employee productivity and performance. Performance management systems try to identify specific expectations of work for each employee, agree on performance targets and indicators to assess the extent to which such targets were reached during the year. At the end of the year, the performance of each individual employee is then assessed by the supervisor using the agreed indicators. This information then forms the basis of the level of productivity of the employee. Such a PMS has been adopted by the government of Botswana since about 2001, and some parastatal organisations in the country have also adopted and adapted PMS.

In measuring productivity at individual employee level, Wattles and Harris (2003) computed an overall productivity score by combining the scores on each of seven self-rated items. Fox et al. (2004) measured the productivity of workers in a tea farm using the number of kilograms of tea plucked in a day. Lim et al. (2000) measured reduced productivity due to illness by counting the number of days sick employees were able to work while cutting down on what they did. Burton et al. (2003) used hours of paid work missed + (hours worked with migraine)×(100 - %effectiveness/100), as a measure of lost productivity due to migraine. These researchers measured productivity using inputs such as amount of time (hours, days, etc.) put into the work over a given period, without relating these inputs to outputs.

This paper presents a measure of effective productivity that can be used to measure the productivity of employees in service professions where inputs and outputs can not be easily quantified. The paper also presents statistical methodology that is suitable for modelling the relationship between effective productivity and various characteristics of workers in an attempt to determine a predictive model for effective performance. The statistical methodology is aimed at determining those factors that, acting singly or interactively, can be used to distinguish effective performers from non-effective performers. In particular we seek to determine which factors are associated with effective productivity among nurses, which the best single overall predictor of effective productivity is and whether any of the factors interact with others in explaining differential levels of effective productivity among nurses or whether the effects are additive.

Methods and data

Self completed anonymous questionnaires were used to collect relevant data from all health facilities under local government control in Botswana. All together, a representative sample of 325 questionnaires were returned and analysed.

In measuring productivity at individual level, it is useful to set performance targets that reflect the minimum performance score over the range of routine activities normally expected of each employee. The target should reflect both the rate at which tasks are performed and the number of tasks routinely completed. These tasks depend on the job description and expectations. For nurses working in clinics and health posts in Botswana, each is expected to regularly perform a set of routine clinical, antenatal and postnatal activities. In all, there were a total of five (5) routine clinical activities eleven (11) routine antenatal activities and sixteen (16) routine postnatal activities.

Each of the 32 routine activities was assigned a weight of 0, 1, 2, or 3 to correspond to the categories that the activity is: "never performed", "sometimes performed", "often performed" or "always performed" respectively. An aggregate performance score for each nurse was computed as the product of the weight (rate) with which the nurse performed the set of routine activities and the number (quantity) of such routine activities that the nurse performed. For example, if a nurse never performed 5 of the activities, sometimes performed another 9, frequently performed 12, and always performed 6, then her total score would be $0 \times 5 + 1 \times 9 + 2 \times 12 + 3 \times 6 = 51$.

The aggregate performance scores thus ranged from 0 for a nurse who *never* performed any of the 32 activities to 96 for a nurse who *always* performed all the 32 activities. Since these scores are derived from an ordinal scale, they are not truly measured on a ratio scale, for while 0 indicates "absence of performance in these activities", the nurse who scores 60 (say) cannot be said to be twice as productive as one who scores 30. It is thus useful to scale the

scores back to an ordinal scale for proper statistical analysis and interpretation.

We construct the measure of effective productivity with a view that a nurse who attains an effective level of productivity should be one who routinely performs most tasks frequently or always. Such a nurse should score an above average score. Furthermore, since weights were based on self-ratings, the cut-off should be more stringent to compensate for bias. Thus a nurse who attained an effective level of productivity was taken to be one whose score fell in the upper 75th percentile of the possible maximum score.

One critic of this operational measure of productivity argued that nurses with higher levels of training could perform a wider range of activities than nurses with lower levels of training, and could, therefore, have a higher score without necessarily being any more productive. However, the activities included were those expected of all nurses who work in the primary health care institutions from which the nurses in the sample were selected. Furthermore, categorising nurses only in terms of whether they attained or did not attain an effective level of productivity also reinforces the quality of the measure. The only subjectivity left is on the cut-off point, and we argue that this measure of performance of routine nursing duties is a good proxy for effective productivity in so far as it enables meaningful comparisons between nurses who attain an effective level of productivity and those who do not.

Analysis

Preliminary analysis explored the relationship between productivity and each of a set of 38 explanatory variables (see Table 1) that ranged from individual background characteristics, adequacy of resources, recognition and support from peers and supervisors, involvement in the community and participation in making policies. Chi-squared test of association was performed to determine which of the 38 variables were significantly associated with effective productivity. For significant factors that had more than 2 factor levels, pair-wise comparisons were performed to understand the sources of differences among factor levels. If two factor levels were found not to differ, they were merged together to improve the predictive quality of subsequent models. All factors that were found to be significant from the chi-squared tests were included in a stepwise multiple logistic regression analysis in order to construct a parsimonious predictive model for effective productivity.

The search for the optimal model was done by fitting hierarchical models of increasing complexity using conditional likelihood ratio criterion as implemented in SPSS version 13. The following hierarchical models were considered:

Model 1 (M_1): Main effects model
Model 2: (M_2): M_1 plus 2 factor interactions
Model 3: (M_3): M_2 plus 3 factor interactions
Model k (M_k): M_{k-1} plus k-factor interactions

In fitting the first model (M_2), the factor with the largest likelihood ratio was entered first. Thereafter, other factors were added sequentially. The factor included at step (r+1) was the factor that had the highest change in the likelihood ratio, among the remaining factors not yet in the model, provided that the change was significant (at the 0.01 level of significance). The null hypothesis being tested at this step was:

H_{01}: Factor r+1 is not a significant predictor of effective productivity given the r- factors that are already in the model (r=0,1,2…q).

The final model, M_1 with q-terms was reached once no other factor was found to result in a significant change in the likelihood ratio.

In order to determine model M_2, all 2-factor interaction terms between the q-factors retained in the main effects model, M_1, were considered for inclusion. The first 2-factor interaction term to be added to the main effects model was the one that lead to the largest change in likelihood, provided that this change was significantly different from zero (at 1% level of significance). Additional 2-factor interaction terms were again added sequentially using for-ward stepwise addition within block, until no more terms were found to result in a significant change in the likelihood ratio. In model M_3, the 3-factor interaction terms considered for inclusion were those derived from the 2-factor terms retained in M_2. Suppose for example, that the 2-factor interactions retained in M2 were AC, AD and DE, then the interactions: ACD, ACE, ADE and CDE would be considered for inclusion in model M_3. In general, the null hypothesis used to include the $(r+1)^{th}$ term in model M_k was:

H_{0r}: The $(r+1)^{th}$ k-factor interaction term is not a significant additional predictor of effective productivity, given models M_1, M_2,…,M_{k-1} and the r^{th} k-factor interaction terms that are already in the model M_k.

The rth k-factor interaction term is the rth most significant interaction term among the k-factors in the model. The final model (M_k) was reached once no (*r+1)*-factor interaction term produced a significant change in the likelihood ratio. The percentage of cases correctly classified as “effective performers” or “not effective performers” was used as a measure of goodness of fit of the model.

Results

Out of the 325 nurses who responded to all questions and were included in the study, 138 (42.7%) attained an effective level of productivity. Results of chi-squared test of association between effective productivity and each of the 38 possible explanatory variables is shown in Table 1. A total of 13 factors were found to be significantly associated with effective productivity ($p<0.05$). Of these, six factors were very strongly associated with *effective productivity* (p-value < 0.001), namely; professional training, midwifery training, participation in making policies in maternal child health and family planning (MCH/FP), attendance of the Mehary Project course, ability to complete the Botswana Obstetric Record and peer reliance. Three more factors were strongly related to *effective productivity* (p-value < 0.01), namely: religious affiliation, age group and learning from superiors. Other factors including number of village health committee meetings attended, involvement in the community, perception of health after posting and registration with the Botswana Nursing Council were moderately (p-value < 0.05), related to *effective productivity*.

Pair-wise tests based on relative odds-ratio criteria were used to determine the sources of significance among the significant factors that comprised of more than two levels. The significance of level of professional nursing training as a predictor of effective productivity was found to be due to differences between enrolled nurse-midwives (EN-midwife), registered nurse-midwives (RN-midwife) and nurses without midwifery training. A comparison of odds ratios revealed that EN-midwives were the most effective performers, followed by RN-midwives, and that there were no significant differences in performance between the various categories of nurses that had no midwifery training (that is, enrolled nurses, registered nurses, family heath practitioners and community heath nurses). These categories were thus combined in subsequent multivariate analyses into a category called “non-midwives”. Enrolled nurse-midwives and registered nurse-midwives were combined into a new category called “midwives”. As such, it was no longer necessary to treat midwifery training as a separate variable from level of nursing training. For analytical purity, the new variable was called “type of nursing training”.

The predictive power of the factor: ‘Ability to complete the Botswana Obstetric record (BOR)’ lay in the difference between those nurses who were very comfortable completing the BOR, and those who were not (that is, either they were “just comfortable”, “not comfortable” or “extremely uncomfortable”). As such, ability to complete

Table 1. Bivariate associations between effective productivity and explanatory factors.

Sno	Factor	Chi-squared	Df	P-value
1	Level of Professional Training	34.32	5	0.000
2	Midwifery Training	20.92	1	0.000
3	Participation in making MCH/FP policies	19.50	2	0.000
4	Attendance of Mehary project course	16.06	1	0.000
5	Ability to Complete the Botswana Obstetric Record	18.46	3	0.000
6	Peer reliance	15.26	2	0.000
7	Religious affiliation	12.83	2	0.002
8	Age Group	15.07	4	0.005
9	Learning from superiors	10.46	2	0.005
10	Attendance of Village Health Development committee meetings	10.84	3	0.013
11	Involvement with the Community	6.15	1	0.013
12	Perception of Health after Posting	7.90	2	0.019
13	Registration with the Nursing and Midwifery Council	4.72	1	0.030
14	Perceived staff shortages	5.51	2	0.064
15	Change in Health After Posting	5.32	2	0.070
16	Type of health facility	6.98	3	0.073
17	Relative Level of In-service Training	6.52	3	0.089
18	Perceived workload	2.40	1	0.121
19	Registration with the Nurses Association	2.26	1	0.133
20	Number of Children	5.31	3	0.150
21	Reliance on workshops and seminars	4.74	3	0.192
22	Conflict between admin and nursing duties	1.59	2	0.451
23	Satisfaction with Income	1.27	2	0.531
24	Martial Status	1.03	2	0.599
25	Level of income	0.91	2	0.636
26	Deployed in Preferred Facility	0.13	1	0.715
27	Number of Times Supervisor Visited in Last 6 Months	2.09	4	0.720
28	Consistency of work with training	0.13	1	0.720
29	Adequacy of transport facilities	0.52	2	0.771
30	Attendance of workshops and seminars	0.92	3	0.821
31	Attendance of refresher courses	0.68	3	0.878
32	Academic education	0.02	1	0.889
33	Deployment in district of birth	0.01	1	0.915
34	Satisfaction with workstation	0.16	2	0.922
35	Rank of Nurse	0.11	2	0.948
36	Satisfied with Current Position	0.08	2	0.962
37	Recognition from superiors	0.04	2	0.982
38	Telecommunication	0.002	2	0.999

the BOR was also re-categorised into those nurses who were very comfortable and those who were not very comfortable completing the BOR.

Nurses aged 35-44 were significantly more effective performers than younger and older nurses. Furthermore, the difference between nurses younger than 35 years and those older than 44 years was not significant. Hence the factor, age was re-categorised into those aged 35-44 and 'others'. The significance of peer support and supervisory support lay in the difference between nurses who “always got support" from their peers and the others (who sometimes, rarely or never got support from their peers). These three categories of nurses were combined into one factor.

There was an inverse linear relationship between change in health after posting (a measure of stress) and *effective productivity*. Nurses whose heath had deteriorated after posting (i.e. those under stress) were more productive than those whose heath had improved. Nurses who rarely or never participated in making maternal child health and family planning (MCH/FP) polices were significantly less productive than those who always or sometimes participated. However, there was no significant difference between the later two. Hence the main difference in productivity was between nurses who participated (always/sometimes) and those who did not participate in MCH/FP policy making. This factor was accordingly re-categorised in subsequent multivariate analyses.

Table 2: Model significance and improvement as factors are added to get model m1.

		Significance of Fitted Model			Improvement in Model when factor is entered			
Step	**Factor Added**	**Chi-square**	**df**	**Sig.**	**Chi-square**	**df**	**Sig.**	**Correct Class %**
1	Training	26.870	2	.000	26.870	2	.000	64.0
2	Involvement with VDC	43.532	3	.000	16.663	1	.000	67.1
3	Involvement in policy	60.000	4	.000	16.468	1	.000	72.0
4	Peer Support	72.850	5	.000	12.850	1	.000	71.4
5	Religious Affiliation	82.606	6	.000	9.756	1	.002	71.7
6	Ability to complete BOR	88.629	7	.000	6.023	1	.014	74.5
7	Change in health after posting	98.912	9	.000	10.284	2	.006	72.3
8	Community Involvement	104.540	10	.000	5.628	1	.018	74.8

Eleven of the nurses did not respond to the question on "change in their heath since posting". Exploratory analysis revealed that none of these nurses attended VDC meetings, all were registered with the Botswana Nursing and Midwifery Council, and none were aged 35-44, and relatively more of them were rated as effective performers compared to the entire sample. Discriminant analysis was used to predict the group membership of these 11 nurses.

Predictive Models for Effective Productivity

When fitting the main effects model (M_1), type of nursing training was identified as the single most important predictor of effective productivity. This was followed respectively by ability to complete the Botswana Obstetric Record (BOR), participation in MCH/FP, attendance of the Mehary training programme, religious affiliation, age group, supervisor support, involvement in the community, attendance of VHC, attendance of VDC, change in health after posting, membership of the Botswana Midwifery and Nursing Council and lastly, in-service training. Hence type of nursing training was the first variable entered into the main effects model. Conditional on having type of nurse training in the model, attendance of VDC became the most significant factor among the remaining 13 factors and it was therefore the second factor added to the model (Table 2).

Involvement in making MCH/FP policies became the most significant factor given type of nursing training and participation in village development committee (VDC) work. The variables added at subsequent stages using conditional likelihood criteria were; peer support, religious affiliation, ability to complete the BOR, change in health after posting and involvement in the community respectively. These 8 factors are shown in Table 2 according to the order in which they entered model M1. The model fit and improvement when each factor was added as well as the percentage of cases correctly reclassified based on the model are also shown in Table 2. The six variables; attendance of Mehary project course, age-group, supervisor support, attendance of village health committee meetings, membership of the Botswana Nursing and Midwifery Council and attendance of in-service training which were found to be univariate predictors of effective productivity (Table 1) became non-significant due to their associations with the variables included, and were hence dropped during model fitting.

The percentage of nurses that were correctly classified using model M1 ranged from 64.0% when only type of nursing training was in the model, to 74.8% when all 8 factors were in the model (Table 2 and Figure 1). As shown in Figure 1, the percentage of nurses correctly classified is not a monotonic function of the number of factors added. The addition of more factors improves the predictive power of the model as measured by likelihood ratio, but does not necessarily increase the classification rate. The fewer the number of factors in the model, the lower the percentage of nurses correctly classified as "effectively productive", and the higher the number correctly classified as "not-effectively productive". As more factors are added, the overall percentage of nurses correctly classified increases only slowly, but the overall predictive power of the model improves significantly as shown in the trend in the proportion of effectively productive nurses that are correctly classified.

Among all the 24 possible pairs of 2-factor interactions terms between the 8 factors in model M_1, only the interaction between "type of nursing training" and "change in health after posting" was found to be significant ($p = 0.011$). With this interaction term added, the proportion of nurses correctly re-classified as either effective or not effective rose to 76.6%. The significance of this interaction term was due only to a difference between Enrolled nurse midwives who had enjoyed good health after being posted to their work stations and nurses with no midwifery training whose health had deteriorated.

The results of the final fitted model are shown in Table 3. The coefficients of all the main effect factors are positive. This suggests that the least effective performers are those who have no midwifery training, do not participate in maternal child health and family planning meetings, do not attend Village Development Committee meetings, do not have peer support and are not comfortable completing the Botswana Obstetric Record. All the terms that make up the interaction between change in health after posting and type of nursing training are not significant, suggesting that the main effects model may well be adequate in predicting *effective productivity* among nurses in Botswana.

Discussion of Results

The paper proposed a measure of productivity among service workers, based on routine activities that each is expected to do. When the measure is applied to nurses in Botswana, it is found that among the factors not associated with productivity were the type of heath facility in which nurses worked (p=0.073), conflict between administrative and nursing duties (p=0.451), basic level of education (p=0.889), rank of nurse (p=0.948). The lack of a significant association between these variables and effective productivity reinforces the view that the proposed measure of productivity is reliable and is not confounded with nurses training, rank or work setting.

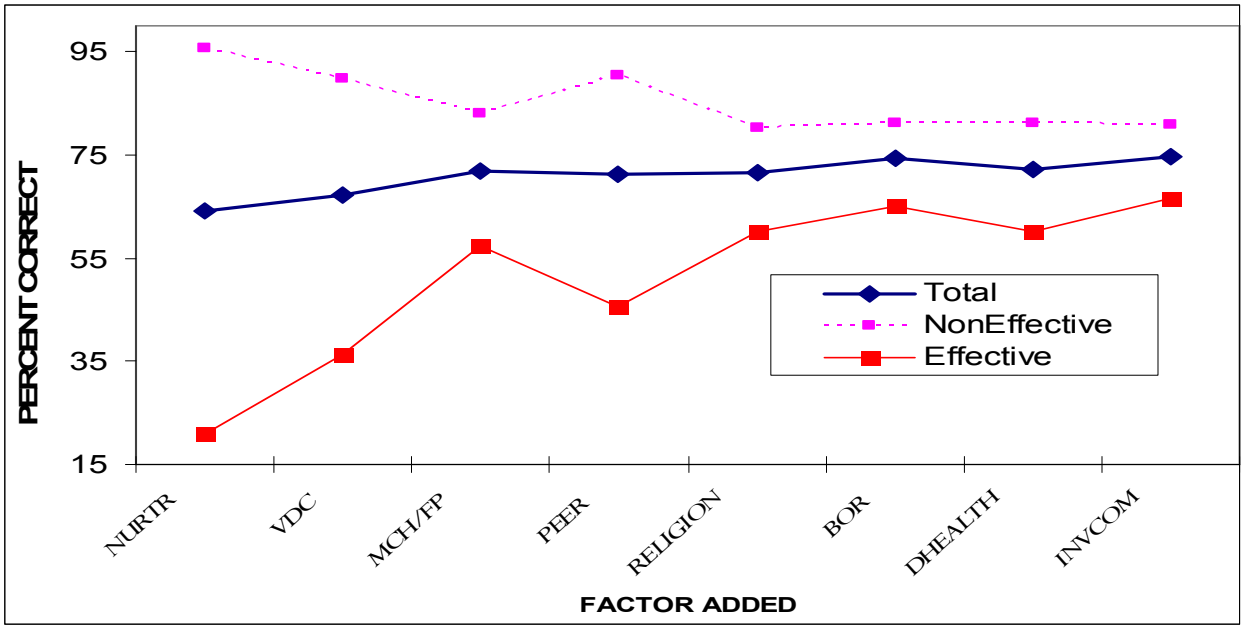

Figure 1: Percentage of nurses correctly classified having attained an effective or non-effective level of productivity by factor added to model m1.

In trying to determine factors that are associated with effective productivity among nurses in Botswana (who were used as a case study), the study started with tests of bivariate association between effective productivity and 38 factors known in the literature to be possible correlates of productivity. The bivariate tests identified 13 factors to be associated with nurse productivity. Six of the 13 factors were very strongly associated with *effective productivity* (p-value < 0.001), namely; professional training, midwifery training, participation in making policies in maternal child health and family planning (MCH/FP), attendance of the Mehary Project course, ability to complete the Botswana Obstetric Record and peer reliance. Three more factors were strongly related to *effective productivity* (p-value < 0.01), namely: religious affiliation, age group and learning from superiors. The remaining 4 factors were moderately ($p < 0.05$) associated with effective productivity, namely: number of village health committee meetings attended, involvement in the community, perception of health after posting and registration with the Botswana Nursing Council.

In an attempt to determine a parsimonious model for effective productivity, the study further found type of nursing training (which in essence reflected the effect of midwifery training) to be the single most important predictor of *effective productivity*. Along with this factor, the following seven factors were identified as conditional predictors of *effective productivity* among nurses: (1) attendance of Village Development Committee meetings, (2) participation in making maternal child health and family planning (MCH/FP) policies, (3) receiving support from peers, (4) being a Christian, (5) being very comfortable completing the Botswana Obstetric Record, (6) experiencing change in health after posting and (7) being involved in the community. The remaining 5 of the 13 univariate predictors were excluded during stepwise logistic regression.

Further analysis found that the interactions between these factors do not add anything significant to the prediction of *effective productivity,* and hence the effect of these eight factors on productivity was additive. The proportion of nurses that could be correctly classified as productive or not productive using the final model was used as goodness of fit for the model. It was found that this proportion was 74.8%.

In summary, the study highlights the importance of midwifery training in the efficient delivery of the Botswana Primary Health Care system. This is consistent with findings by Fako, Forcheh and Ncube (2004) that midwives were the most comfortable group of nurses to complete the Botswana Obstetric Record. It is also consistent with findings by Fako and Forcheh (2000) that midwives were the most involved in antenatal health education in Botswana. When contrasted with the fact that basic level of education as well as the rank of a nurse are not determinants of *effective productivity*, this finding points to the inherent quality of midwifery training as a critical component in training knowledgeable, high performing and effective nurses who work in the Primary Health Care system in Botswana.

Midwifery training in Botswana results in more knowledge and understanding of pregnancy, labour and child-

Table 3: Final conditional stepwise model for predicting effective productivity

	B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I.for EXP(B)	
Main Effects							**Lower**	**Upper**
Nursing Training			12.296	2	.002			
No Midwifery	0					1		
EN Midwife	2.611	.747	12.226	1	.000	13.612	3.150	58.820
RN Midwife	.541	.524	1.066	1	.302	1.717	.615	4.792
MCH/FP Policies	1.239	.287	18.602	1	.000	3.452	1.966	6.063
Attend VDC	.938	.291	10.433	1	.001	2.556	1.446	4.517
Peer Support	1.077	.315	11.692	1	.001	2.935	1.583	5.439
Religion	.952	.289	10.826	1	.001	2.591	1.470	4.569
Comfortable Completing BOR	.773	.301	6.587	1	.010	2.165	1.200	3.906
Change in Health after posting			9.214	2	.010			
Deteriorated Health	0					1		
Same Health	1.148	.379	9.190	1	.002	3.153	1.501	6.626
Improved Health	.627	.490	1.633	1	.201	1.871	.716	4.893
Involvement in Community	.642	.295	4.751	1	.029	1.901	1.067	3.388
Interaction effects								
Change in Health by Nursing Training			11.828	4	.019			
Same Health by EN Midwife	-.181	1.335	.018	1	.892	.835	.061	11.429
Same Health by RN Midwife	-.497	.718	.479	1	.489	.608	.149	2.485
Improved Health by EN Midwife	-2.451	1.141	4.613	1	.032	.086	.009	.807
Improved Health by RN Midwife	1.962	1.085	3.268	1	.071	7.113	.848	59.679
Constant	-3.712	.497	55.776	1	.000	.024		

birth processes. It empowers a nurse with the confidence to approach clinical, antenatal and postnatal care and health education with competence and more confidence than would a nurse without midwifery training even if the later nurse has a higher level of nursing training (such as registered nurse as opposed to enrolled nurse) or high level of basic education, or has been in the job for longer. Attending Village Development Committee meetings and being involved in making maternal child health and family planning policies further enhances the productivity of nurses. Involvement of workers in the decision-making process (participatory management) is consistent with the intrinsic human need for recognition, approval and status, and has been found to reduce errors, absenteeism, turnover and grievances as well as increase efficiency, improve employee morale, attitude and productivity (Rosenberg, 1980).

The importance of peer support is consistent with findings of several studies (Campbell and Campbell, 1990; Schermerhorn et al, 1995; Vecchio 1988; Wright and Edwards, 1998). Peer support among nurses is very important in Botswana where nurses work in isolated clinics away from other health professionals such as medical doctors, laboratory assistants, pharmacists, etc. The predictive power of the factor “ability to complete the Botswana Obstetric Record (BOR)” even after adjusting for midwifery training and peer-support suggests that a well informed nurse who is confident in her job is likely to be highly productive as well.

Conclusion and Recommendations

From a policy perspective, this study suggests that all nurses should be encouraged and accorded the opportunity to do midwifery training, irrespective of their basic level of education or their rank. It further indicates that nurses should be encouraged and given the opportunity to become more involved in their communities so as to identify with the needs of their clientele. A cordial and friendly atmosphere at the workplace that gives the nurse the confidence to look for help and support from his/her peers should also be encouraged.

We recommend that researchers interested in the productivity of individual employees in service related professions should identify routine tasks that each employee is expected to perform, and set scored criteria targets of measuring how productive each employee was over a given time frame. In this paper, the scores were 0, 1, 2 or 3 depending on the regularity with which the employee performed the task. Depending on context, measures of quality could be inbuilt into the regularity aspect when assigning the scores. An overall measure of productivity could then be derived from the aggregate

score of each employee based on the number or routine activities performed and their score on each activity.

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