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Factors affecting budget implementation for successful delivery of primary health care building facilities within Nigerian health sector

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ABSTRACT

Several studies have attributed high maternal mortality and morbidity rates in rural areas of developing countries including Nigeria to poor budget performance in the provision of primary health care (PHC) facilities. Yet, very little studies focused on the effects of factors affecting budget implementation for the successful delivery of PHC building facilities in the rural areas of Nigeria. Thus, this study assesses the factors affecting budget implementation for successful delivery of PHC building facilities in northern Nigeria. A sample of 317 respondents from a population of 1777 project managers was administered questionnaires through stratified proportionate random sampling technique. The survey attains 87% valid response rate. Data obtained were analyzed using warp5 PLS-SEM software. The results indicated low effects of factors affecting budget implementation on the successful delivery of PHC building facilities in northern Nigeria. Similarly, linear relationships exist between budget implementation factors and successful delivery of PHC building facilities. Moreover, the study provided criteria for assessing the effects of budget implementation factors affecting successful delivery of PHC building facilities in northern Nigeria and other developing countries that are facing similar problems. The study solicited for the improvement on the budget implementation of PHC sector through adequate budget and monitoring bases for mitigating maternal mortality and morbidity rates in the rural areas of developing countries through successful delivery of PHC building facilities.

KEYWORDS

Building facilities; Nigeria; PHC; budget performance

Introduction

The high rates of maternal mortality and morbidity in most developing countries including Nigeria are attributed to poor delivery of PHC building facilities (Kruk and Freedman 2008; Adafin et al. 2018). Successful delivery of any building facility is dependent upon adequate implementation of budget (Gambo et al. 2016a). Poor budget implementation is one of the factors affecting successful delivery of PHC facilities and subsequently leads to poor performance due to cost and time overruns, abandonement of projects etc. (Gambo et al. 2017a). Hence, resulting in insufficient supply of adequate PHC facilities that will improve the health care development in developing nations like Nigeria (Gambo et al. 2017a). Budget is an estimate of costs, revenues and resources to be spent on facilities over a specified period of time particularly 1 year, reflecting a reading of future financial conditions and goals. Budget is the most important administrative tool that serves as a plan of action for achieving quantified objectives. Successful delivery of any facility is achieved through proper budget implementation; it is a standard way of measuring achievements or performance of specified objectives and serves as a device for coping with foreseeable adverse situations (Wildavsky 1986; Khoshgoftar et al. 2010).

The United Nations Children's Fund (UNICEF) (2015) reported that in a day, Nigeria loses almost 2,300 children under the age of 5 and 145 women of childbearing age due to inadequate provision and delivery of health care centres particularly in rural areas. Nigeria's inadequate health centres, as well as poor delivery of health care facilities has resulted in the country's recording the second largest under–5 years maternal mortality rate in the world (Gambo et al. 2016b). In the same vein, about 40,000 women die annually in Nigeria due to insufficient health care building facilities (Sun Newspaper 2017). Consequently, the Federal Government of Nigeria is urge to expedite actions and build more than 10,000

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medical centres in the 774 local government areas of the country in order to curtail the problem. However, the factors affecting budget implementation on the successful delivery of health care building facilities/services for the promotion of good health care system especially at the lower level of governance in Nigeria are rarely been looked into.

The government neglects on handling of factors affecting budget implementation for the successful delivery of adequate health care building facilities culminated in a high maternal death in the rural areas of developing countries (Abdulraheem et al. 2012; Aziz and Abdel-Hakam 2016). This resulted in high rates of maternal mortality and morbidity which were attributed to inadequate budget provision, poor delivery of health care building facilities as well as misplaced priorities (Grundy et al. 2009; Aziz 2013). Abdulraheem et al. (2012) identified the following as factors affecting project budget implementation in developing countries: poor governance at most levels of government, political instability to consolidates budget achievements, poor policies and lack of commitment to promote health care building facilities by the states and local governments, corruption which leads to infrastructural decay, undue politicization of health sector and poor constitutional and legal framework on health sector. Wakerman et al. (2008) argue that the problems of PHC budget in many countries of the world are poor co-ordination, integration and implementation of health policies, programs, projects and donor support, poor funding and budgetary provisions for health that is less than the stipulated 15% of the National budget as prescribed by the World Health Organization and affirmed by the 2001 Abuja declaration of African Heads of State. Moreover, inadequate involvements of health care professionals and communities in the planning, implementation, monitoring and evaluation of health policies, programs and projects, as well as in budget monitoring. The high level of poverty in many developing countries, inadequate health care coverage, weak primary level of health care facilities, and lack of commitment by the government to develop primary healthcare systems and the poor state of social and physical infrastructure that includes water and power supply, roads networks and communication facilities are aiding to the poor health care facilities particularly in the rural areas (Reddy et al. 2011; Shehata and El-Gohary 2011; Amadi 2018). Thus, results in the decay of PHC building facilities in most developing countries.

In the light of the above, this study assesses the effect of the factors affecting budget implementation on successful delivery of PHC building facilities in rural areas of northern Nigeria with a view to minimizing maternal mortality and morbidity rates.

The objectives of the study are:

i. To identify the major factors affecting budget implementation of health care building facilities in the rural areas of Northern Nigeria.
ii. To investigate the effects of factors affecting budget implementation on successful delivery of primary health care building facilities in Northern Nigeria

2. Literature review

The literature review discussed previous studies conducted on budget implementation and delivery of building projects as well as Nigerian health care system. The literature evaluated different studies carried out in relation to budget and delivery of health care facilities.

2.1 Budget implementation factors

There are several Studies conducted on the factors affecting budget implementation of building facilities. These factors pose a great danger during the construction stage and on the successful delivery of the whole project in developing countries (Chua et al. 1999; Tavakolirad et al. 2011; Gambo et al. 2016b). These studies identified factors such as the project managers' related factors, project team factors, and the planning and control efforts factors, namely: number of organizational levels between project managers and craftsmen, project manager experience on budget monitoring and expenditure in relation to the project technical scope, problems related to detailed design that affect budget and constructability program, project team turnover rate, frequency of control meetings during construction, frequency of budget updates, and control system of budget which affect budget implementation process of building facilities delivery in Singapore. Chua et al. (1999) attributed poor delivery of building facilities to inadequate budget provision and misplaced priorities, while Abdulraheem et al. (2012) argue that poor implementation of budget for PHC building facilities in Nigeria are due to factors such as: political factors, structural factors, poor governance at most levels of government in Nigeria, political instability to consolidates budget achievements, poor policies and lack of commitment to promote health care building facilities by states and

local governments, corruption which leads to infrastructural decay, undue politicization of health sector, and poor constitutional and legal framework on health sector. According to Kirimi (2012), the structural and cultural factors play important roles in the under-utilization of budget funds for the delivery of building facilities in Kenya. These include lack of alignment between organizational structure and structure of implementation reporting requirements, value and the usefulness of implementation information that are inadequate. In Ethiopia, Tafa and Bessie (2016), reported that lack of proper planning and allocation of budget for building facilities, inadequate timely revision of initial proposed physical activity plan based on the approved and available budget, inadequate knowledge on the concept of program budgeting system, shortage of adequate number of human resources and insufficient involvement of all concerned bodies during the budget plan preparation are the main challenges of budget implementation in university building facilities. Moreover, they indicated that problems associated with the decentralized budget administration system, absence of result oriented evaluation of budget implementation and poor/irregular revision of plan in accordance with the available budget, lack of effective communication, lack of effective budget monitoring and evaluation, and absence of full involvement of the line managers in planning process were the internal factors that affect budget implementation of public university building facilities. Similarly, PHC facilities in Rwanda experience an increase of 23% in the number of institutional deliveries as a results of improved budgetary allocations (Basinga et al. 2011). PHC centres did not achieve its goals for several reasons, including the refusal of experts and politicians in developed countries to accept the principle of adequate budgeting and controlling of factors influencing budget implementations through communities planning of healthcare services (Pfeiffer 2003; To 2003).

Primary health care (PHC) building facilities

Facility is a space where users carry-out routine work activities for operational purpose towards achieving organizational purpose, as a hosting venue. A facility is a work-station where the processing actions related to the organization of the business such as health and information, operation planning, filing, designing, analyzing, supervising, deciding and communications take place (Mosallanejad et al. 2016). It provides work space and services to satisfy users' demands and needs in an office building setting that includes staff offices, patient rooms, availability of water and power, fencing, waiting and record rooms, pharmacy and dispensary rooms etc. (Tiwari and Mutascu 2011). Generally, health building facilities serve as the medium for every health organization to achieve support and promote adequate health care services thereby improving lifespan of patients through adequate budget implementation and provisions of laboratory/test units, delivery rooms, post- natal units, consulting rooms, toilets, store etc. Thus the successful deliveries of the facilities are directly related to the budget implementation (Callway et al. 2008). The successful delivery and quality of building facilities stimulate users' healthy working style and improve users' well-being (Sindhu and Gidado 2014). To successfully deliver any facility, there must be adequate budget implementation (Gambo et al. 2016; Sindhu and Gidado 2014). Adequate and successful delivery of budgeted PHC such as office buildings, toilets, dispensary rooms, etc. are the integral approach that maintains, improves and adapts the built environment to support the primary business objectives of PHC management (Sindhu and Gidado 2014). Murray and Frenk (2000) states that the contemporary users of any building facility spent about 90% of workers time in it. This leaves a very thoughtful effect on users' well-being and their productivity. Poor and decayed (unsuccessful delivery) building facilities pose the problems of uncomfortable working environment and plays a vital role in affecting efficiency, workability, quality of life, well-being and level of satisfaction of the users. Hence poor budget implementation affects successful delivery of health facilities (Gambo et al. 2017b). Successful delivery of any facility enhances its value, quality and the usage through provisions of adequate health care services in the rural area and its neighbourhoods (Callway et al. 2008). Most health care buildings are used for a specific purpose to promote quality health care services for the people as well as serve as the image of the country, consequently, improves the well-being of the people particularly in the rural areas, and in turn improves the productivity of the working class of the population (Tiwari and Mutascu 2011).

Nigeria health care services

The Nigerian health care system has suffered several down-falls in terms of successful delivery of health care building facilities (Gambo et al. 2016a). In spite of Nigeria's strategic population in the world and the

most populous country in the African continent, the country is greatly underserved in the delivery of health care building facilities particularly in the rural areas where almost 70% of the population live (Gambo et al. 2016b). Health care building facilities are greatly inadequate in rural areas and the few available are left in dilapidated conditions (Abdulraheem et al. 2012). Governments in the past came out with different health care reforms to address the problems affecting the successful delivery of health care facilities, nonetheless the reforms failed to solve the current problems affecting primary health care building facilities in the country (Van Lerberghe 2008). According to Abdulraheem et al. (2012), health care system in Nigeria remains weak due to poor budget implementation process, political, cultural and environmental factors. These factors mostly affect the implementation process which resulted in lack of coordination, fragmentation of services, dearth of resources, including drug and supplies, inadequate and decaying infrastructure, inequity in resource distribution, and poor access to health care, and very deplorable quality of care. The report further outlined the lack of clarity of roles and responsibilities among the different levels of government to have compounded the situation (Van Lerberghe 2008).

Unarguably, problems in the health care system of any country abound to a certain extent (Dougherty and Conway 2008). Although health has the potential to attract considerable political attention of any government/organization, the amount of attention it attracts actually varies from one government to the other. In United States (US), three stages to transform health care sector (3T) road map were suggested. The results indicated step by step transformation of the US health care system from first stage (1T) and second stage (2T) transformations road maps to the third stage (3T), which is required to create and sustains information-rich and patient-focus health care system that reliably delivers high-quality health care facilities at the grassroots (Dougherty and Conway 2008).

For decades, communicable diseases outbreak was a threat to lives of individuals and to national security; this poses a danger to any country and its neighbours where there are low levels of health care building facilities to curtail the menace of the disease (Peterson 2002). It is very difficult in developing countries to efficiently and effectively manage outbreaks of diseases because of either low level of health care building facilities or dilapidated health care building facilities (Nnamuchi 2014). Most of the PHC centres in developing countries lack adequate facilities (units) for medical and epidemiological surveillance for adequate health care delivery which are essential functions of public health agencies whose mandate is to protect the public from major health threats (Zweigenthal et al. 2016). The Nigerian health care system had recorded several deaths of patients due to infectious disease and mass chemical poisoning for many years because of low level of health care building facilities (Gambo et al. 2016a; Azevedo 2017).

Research methodology

This study explore literature to gain insights and ideas about the factors affecting budget implementation for successful delivery of PHC building facilities in developing countries, as well as understand the variables and issues associated with them. Subsequently, the literature findings were used to develop a structured questionnaire that was used to elicit information on budget implementation for PHC building facilities delivery. Thus, the study design is descriptive. The study area is the communities that benefited from PHC building facilities in the northern geo-political zones of Nigeria. The zones comprised of 19 states and the administrative headquarters of Nigeria, Abuja. The zones occupy almost 70% of the total land mass of the country (744,249.08 Sq. Km), and a home to slightly more than half (74.2 m) of Nigeria's population (140 million) (Gambo et al. 2016b).

The Nigerian Business Directory (NBD) (2014) was used to arrive at a sample frame of 1777; it comprises of public and private project managers that have been involved in the execution of PHC building Facilities in the northern geopolitical zones of Nigeria. Afterwards, a sample size of 317 respondents was determined using Krejcie and Morgan (1970) Table. Subsequently, questionnaires were administered to the respondents through stratified proportionate random sampling technique. This technique was adopted because of the uneven distribution of the study population. A total of 276 valid questionnaires were returned, while, 26 were rejected. Thus, not included in the analysis because of discrepancies in the responses and/or majority of the items in the questionnaire were left unattended or unanswered. The survey records approximately 87% valid response rates.

Questionnaire development

The primary research tool for this study was a self-administered questionnaire. The questionnaires were administered to obtain data on: respondents'

Table 1. Development of the construct for the study.

A. Building Facilities
A.1. Adequacy of gross floor area
A.2. Availability of land space within the PHC Centre
A.3. Availability of adequate water supply
A.4. Availability/adequate waiting and record area
A.5. Presence of Pharmacy/dispensary room/office
A.6. Presence/adequate laboratory unit
A.7. Adequate/sufficiency of delivery unit
A.8. Availability of post-natal unit
A.9. Presence of consulting rooms
A.10. presence/available store unit
A.11. Adequate staff/patients toilet
A.12. Presence of fence/gate/gate house
A.13 availability of power supply and communication facilities
B. Direct Budget Related Factors
B.1. adequate budget provision
B.2. good placed priorities
B.3. good coordination/implementation of health care budget
B.4. sufficient fund/support from donor groups
B.5. Project manager's experience on budget monitoring
C. Political Factors
C.1. good governance
C.2. Political stability
C.3. Good policies and adequate government commitment to the provision of facilities
C.4. Effects of corruption
C.5. Politicization of Health issues
C.6. good constitutional and legal framework on health policies
D. Cultural Factors
D.1. Low level of health care coverage
D.2. Weak primary health care policies/facilities
D.3. Poor state of other social facilities (amenities)
D.4. Lack of involvement of concern communities in the implementation of budget
E. Structural Factors
E.1. Lack of structural alignment among the personnel responsible for budget monitoring
E.2. Poor structural performance
E.3. Poor reporting system
E.3. Shortage of Human resources
E.4. Lack of performance information
E.5. Lack of proper planning
E.6. Inadequate timely revision of budgeted proposal

Note: Adapted Constructs of the study.

demographic profiles, and the study objectives. Questions asked were closed and ended (Guthrie 2010). Questions on the study objectives were captured by five constructs (i.e. latent variables): delivery of primary health care building facilities (PHCFAC), factors affecting budget implementation (BUDFAC): political factors (POLFAC), cultural factors (CULFAC), and structural factors (STRUFAC). The measurement items for PHCFAC were adapted from Sindhu and Gidado (2014), and Tiwari and Mutascu (2011). The measurement items for BUDFAC were adapted from Kirimi (2012), and Tafa and Bessie (2016). The study by Kirimi (2012) contributed towards the development of POLFAC, Tafa and Bessie (2016) developed CULFAC, while Abdulraheem et al. (2012), and Tafa and Bessie (2016) developed STRUFAC (see Table 1). PHCFAC is the dependent variable (DV), while BUDFAC, POLFAC, CULFAC and STRUFAC are the independent variables (IV). The questionnaire used 5 point Likert response scale for the DV and IVs'. For the DV the response scale are: not available (level 1)-refers to absolute unavailability of facilities in the health care buildings; least available (level 2)-implies to minimal availability of facilities in the health care buildings; averagely available (level 3)-describes the moderate availability of facilities in the health care buildings; available (level 4) implies where there is adequate availability of facilities in the health care buildings; and highly available (level 5)-implies that there are standards availability of facilities in the health care buildings. While, for the IVs' the response scale are: ineffective (level 1)-refers to factors that are completely not effective in the implementation of budgets for PHC facilities; least effective (level 2)-implies to factors that are minimally effective in the implementation of budgets for PHC facilities, moderately effective-(level 3)-refers to factors that are averagely effective in the implementation of budgets for PHC facilities; effective (level 4)-implies to factors that are adequately effective in the implementation of budgets for PHC facilities, and highly effective (level 5)-implies to factors that are completely effective in the implementation of budgets for PHC facilities.

Partial least squares-structural equation modelling (PLS-SEM), using WarpPLS 5.0 (Kock 2016), was used to analyze the data obtained and to examine the effect of the relationship among the construct through development of conceptual framework into a model. PLS-SEM facilitates theory building in studies that seek to explore causal relationships between latent variables (Hair et al. 2011a). Moreover, PLS SEM was employed for the analysis because of its high predictive ability, and for examining the validity of reflectively measured constructs (Hair et al. 2014; Hazen et al. 2014).

Base on the conceptual framework in Figure 1 the following hypotheses were developed:

H_A1: There is a positive relationship between Factors affecting budget implementation and the successful delivery of primary health care building facilities in Northern Nigeria

H_A2: There is a positive relationship between political factors affecting budget implementation and the successful delivery of primary health care building facilities in Northern Nigeria

H_A3: There is a positive relationship between cultural factors affecting budget implementation and the successful delivery of primary health care building facilities in Northern Nigeria

H_A4: There is a positive relationship between structural factors affecting budget implementation

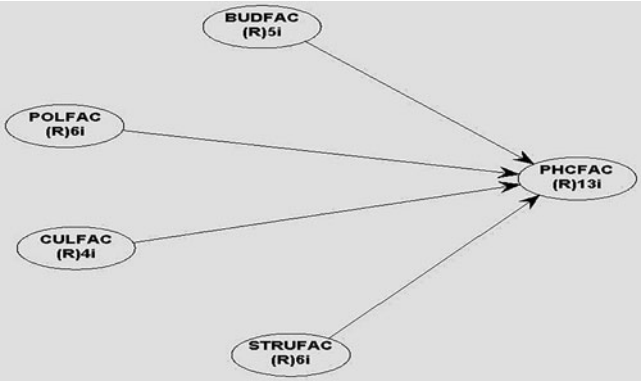

Figure 1. Conceptual Framework.

and the successful delivery of primary health care building facilities in Northern Nigeria.

The issue of missing data

Missing data imputation algorithm for this study used Arithmetic Mean Imputation. The issue of missing data provided a source of bias in structural equation modelling (SEM), employing the partial least squares method (PLS), are commonly handled with deletion methods such as listwise and pairwise deletion which were not recommended likewise full information likelihood and expectation-maximization methods have some shortcomings (Schreiber et al. 2006; Xiong et al. 2015; Kock 2018). PLS-SEM algorithm does not recourse to deletion. Therefore, five single missing data imputation methods are considered employing in PLS Mode A algorithm Kock (2018) suggested Arithmetic Mean Imputation because it yielded the least biased results, followed by Stochastic Hierarchical Regression Imputation and Hierarchical Regression Imputation. Single missing data imputation methods perform better with PLS-SEM based on their performance with other multivariate analysis techniques such as multiple regression and covariance-based SEM.

Model assessment using warp 5.0 PLS-SEM

Table 2 shows the assessment of the model by Warp 5.0 PLS-SEM analysis which typically follows two steps, namely: the assessment of structural model (Chin 2010; Hair et al. 2011a; 2011b) and reflective measurement model. The assessment of the measurement model examines the validity and reliability of the measurement instrument and relationship among the constructs. The model for this study has five reflective constructs namely: successful delivery of primary health care building facilities, direct budget related factors affecting budget implementation, political factors affecting budget implementation, cultural factors and structural factors affecting budget implementation of primary health care building facilities. All the five constructs are first order constructs. The reflective measurement model evaluates reliability and the validity of the model. The two criteria are composite reliability (CR) and the average variance extracted (AVE) (Chin 2010; Hair et al. 2011a). On the other hand, the indicator and construct reliability were assessed to evaluate the reliability of the reflective measurement model for the structural equation modelling. The indicator reliability was evaluated by cross checking the loading of each indicator variable on its associated latent construct and the loading should be higher or more than 0.70 before accepting the reliability of the indicator variable (Hulland 1999; Hair et al. 2011a). For the assessment of construct reliability, two coefficients are considered, that is, CR and the Cronbach's alpha (α) (Bagozzi and Yi 1988; Cohen 1988; Chin 2010). Hair et al. (2014) recommended CR for PLS-SEM. Table 2 shows the results of the measurement model of this study which indicated high internal consistency and reliability. The indicators loadings were all well > 0.70 and both the CR and Cronbach's α ranged from 0.758–0.877 and 0.731–0.875 respectively. This shows that all the indicators and constructs reliability are acceptable.

The convergent and discriminant validity are also considered in the validation of the reflective measurement model (Hair et al. 2011a). The AVE values of the constructs must be greater than 0.5 for an accepted convergent validity (Bagozzi and Yi 1988; Hair et al. 2011a). The AVE is only applicable for models with reflective indicators. AVE measures the total variance of a construct through its indicators (Chin 2010). The AVE values for this study are higher than 0.70 as well as the loadings of the indicators. Therefore, the convergent validity of the measurement model is highly acceptable (Davcik 2014; Hair et al. 2014).

Discriminant validity test

Table 3 indicates the discriminant validity of measurement model. The discriminant validity is the extent to which construct is distinguished from other constructs in the model (Chin 2010; Hair et al. 2014). This is achieved through checking of the AVE of each construct and must be higher than the highest squared correlation of the construct of any other construct in the model or alternatively the loading of an

Table 2. Results of the measurement model evaluation.

Construct	Items	Factor Loading	CR	Cronbach's α	AVE
Primary Health Care Facilities (PHCFAC)	A.1	0.897	0.977	0.975	0.767
	A.2	0.799			
	A.3	0.895			
	A.4	0.804			
	A.5	0.801			
	A.6	0.907			
	A.7	0.825			
	A.8	0.818			
	A.9	0.802			
	A.10	0.818			
	A.11	0.801			
	A.12	0.883			
	A.13	0.895			
Direct Budget Related Factors (BUDFAC)	B.1	0.670	0.758	0.731	0.707
	B.2	0.866			
	B.3	0.862			
	B.4	0.874			
	B.5	0.788			
Political Factors (POLFAC)	C.1	0.809	0.895	0.858	0.788
	C.2	0.821			
	C.3	0.885			
	C.4	0.845			
	C.5	0.843			
	C.6	0.853			
Cultural Factors (CULFAC)	D.1	0.788	0.933	0.904	0.778
	D.2	0.796			
	D.3	0.804			
	D.4	0.765			
Structural Factors (STRUFAC)	E.1	0.757	0.928	0.906	0.782
	E.2	0.730			
	E.3	0.777			
	E.4	0.809			
	E.5	0.830			
	E.6	0.840			

Note: Threshold: Cronbach'sα-alpha > 0.7; CR-composite reliability > 0.7; AVE-average variance extracted > 0.5.

indicator with its associated construct must be higher than that with other construct (Fornell and Larcker 1981; Chin 2010; Hair et al. 2011a). The results indicated that the square root of AVE for each construct with its correlation to another construct is acceptable discriminant validity of the measurement model. Base on the results of the measurement model the questionnaires were acknowledged to be reliable and valid for the assessment of the five study constructs.

Results

Respondents demographic information

Table 4 depicts the respondents' demographic profiles. Thirty five percent of the respondents' are project managers working in the public sector of the economy, while 64.67% of the respondents are working in the private sector. This result shows that both the public and private sector of the economy are involved in the management of PHC building facilities in Nigeria. However, the private sector is more involved than the public sector in the management of PHC building facilities delivery. Thus there is an expectation of transparency and accountability in their dealings. All the respondents hold at least a bachelors' degree in construction related disciplines. A little above 20% of the respondents are PhD holders; slightly above 38% has MSc degrees, while almost 42% of the respondents hold BSc degrees as their highest educational qualification. This shows that all the respondents are educationally qualified to respond to a research of this nature, and as such, enhanced the validity of the research data. In addition, Table 2 reveals that the study respondents have an average of 13 years' working experience in the construction industry; this implied that the professionals are very experience in the delivery of PHC building facilities.

Model fit indices

Past studies provided basic sets of guidelines and recommendations for information that should be included in any manuscript that has confirmatory factor analysis as the primary statistical analysis techniques, such indices includes Chi-square χ^2, Alaike Information Criteria AIC, Comparative fit, Parsimonious fit, Goodness-of-fit index and so on (Schreiber et al. 2006; Davcik 2014; Hair et al. 2014; Hazen et al. 2015; Xiong et al. 2015). However, Kock and Warp (2012) stated that there is a philosophical straight forward distinction between CB-SEM and PLS-SEM, if the research objective is theory testing and confirmation, then the appropriate method is CB-SEM. In contrast, if the research objective is prediction and theory development, then the appropriate method is PLS-SEM. Conceptually and practically, PLS-SEM is similar to using multiple regression analysis. On the interpretation of the model fit, if the goal is to only test hypotheses, where each arrow represents a hypothesis, and then the model fit indices are of little importance. However, if the goal is to find out whether one model has a better fit with the original data than another, then the model fit indices are a useful set of measures related to model quality (Kock and Warp 2012).

However, PLS-SEM software algorithms reported the following indices:

The fit indices are used to compare the indicator correlation matrices such as the standardized root mean squared residual (SRMR), standardized mean absolute residual (SMAR), standardized chi-squared (SChS), standardized threshold difference count ratio (STDCR), and standardized threshold difference sum ratio (STDSR). As with the classic model fit and quality indices, the interpretation of these indices depends on the goal of the SEM analysis. Since these indices refer to the fit between the model-implied and

Table 3. Results for discriminant validity.

	PHC Facilities (PHCFAC)	Direct Budget Related Factors (BUDFAC)	Political Factors (POLFAC)	Cultural Factors (CULFAC)	Structural Factors (STRUFAC)
Primary Health Care Facilities (PHCFAC	**0.876**				
Direct Budget Related Factors (BUDFAC)	0.229	**0.554**			
Political Factors (POLFAC)	0.330	0.121	**0.767**		
Cultural Factors (CULFAC)	−0.165	−0.073	−0.054	**0.882**	
Structural Factors (STRUFAC)	−0.177	−0.057	−0.112	0.751	**0.826**

Note: Threshold: Discriminant validity showing AVE > highest squared correlation of the construct.

Table 4. Respondents demographic profile.

Area of operation in the economy	No.	%	Cumulative	
Public sector	112	35.33	35.33	
Private sector	205	64.67	100	
Total	317	100		
Educational qualifications	**No.**	%	**cumulative** %	
PhD	64	20.23	20.23	
MSc	121	38.10	58.33	
BSc	132	41.67	100	
Total	317	100		
Years of experience	**Mid value (X)**	**Frequency (F)**	**% of F**	**FX**
5–10	7.5	77	24.21	577.50
10–15	13.5	96	30.16	1296.00
Over 15	15.0	144	45.63	2160.00
Total		317	100	4033.50

Mean years of experience $= \sum FX/\sum F = 4033.50/317 = 12.72 \approx 13$ years.

empirical indicator correlation matrices, they become more meaningful when the goal is to find out whether one model has a better fit with the original data than another, particularly when used in conjunction with the classic indices Kock and Warp (2012). When assessing the model fit with the data, several criteria are recommended as follows.

Average path coefficient (APC)=0.171, $p = 0.001$, Average R-squared (ARS)=0.196, $p < 0.001$, then Average adjusted R-squared (AARS)=0.183, $p < 0.001$, The Average block VIF (AVIF)=1.179, acceptable if $\leq$ 5, ideally $\leq$ 3.3, the Average full collinearity VIF (AFVIF)=1.606, acceptable if $\leq$ 5, ideally $\leq$ 3.3, VIF are used when indicators are formative. Tenenhaus GoF (GoF)=0.350, small $\geq$ 0.1, medium $\geq$ 0.25, large $\geq$ 0.36 then GoF is regarded as moderate, GoF is the geometric mean of the average communality (outer measurement model) and the average R^2 of endogenous latent variables, represents an index for validating the PLS model globally, as looking for a compromise between the performance of the measurement and the structural model, respectively. The Sympson's paradox ratio (SPR) =1.000, acceptable if $\geq$ 0.7, ideally = 1. Therefore, it is acceptable in this study The R-squared contribution ratio (RSCR)=1.000, acceptable if $\geq$ 0.9, ideally = 1 it is regarded as ideal in this study. The Statistical suppression ratio (SSR) =1.000, acceptable if $\geq$ 0.7 so it is acceptable in this study. Nonlinear bivariate causality direction ratio (NLBCDR)=1.000, acceptable if $\geq$ 0.7 which is regarded as acceptable in this study. Therefore this model has good fit indices.

Coefficient of determination (R^2) Measures and path coefficients of the model

Figure 2 indicates the R^2 measure of endogenous latent variables (constructs) and the path coefficients of the model. The model is evaluated as a part of preliminary assessment of structural relationship. that is, inner model and hypothetical framework (Chin 2010; Hair et al. 2014). The path coefficient must be significant for valid relationship and is the coefficient of determination, that is, highly dependent on the research area. Chin (1998) suggested 0.67, 0.33 and 0.19 as substantial, moderate and weak measures for R^2 respectively. The R^2 for this study was 0.20 which indicated weak relationship between criterion and predictor variables with p_{value} between BUDFAC and PHCFAC $p < 0.01$which was significant at $p \leq 0.05$ level of significance and had a path coefficient β_{value} of 0.18, also the path coefficient between POLFAC and PHCFAC was $p < 0.01$ significant at $p \leq 0.05$ level of significance with a β_{value} of 0.29 respectively. The path coefficient between CULFAC and PHCFAC had a β_{value} of 0.29 at $p = 0.2$, which was not significant at $p \leq 0.05$ level of significance. Lastly, the $\beta_{value,}$ that is, model path coefficient between STRUFAC and PHCFAC was −0.17 at $p < 0.01$, which was significant at $p \leq 0.05$ level of significance.

The effect size (f^2) is a measure that verifies whether the effects indicated by the path coefficient are low, moderate or high for the values of f^2 0.02, 0.15 and 0.35 respectively (Cohen 1988). Effect size (f^2) indicates the effect of a certain construct on the dependent latent variable is substantial (Chin 2010). The f^2 between BUDFAC and PHCFAC is 0.048 which indicated a low effect. The f^2 between PHCFAC and POLFAC, CULFAC, STRUFAC were 0.10, 0.01 and 0.04 respectively. These indicated a moderate effects of POLFAC on PHCFAC, low effects of CULFAC on PHCFAC, and low effects of STRUFAC on PHCFAC. On the average there is low effect of the independent variables on the dependent

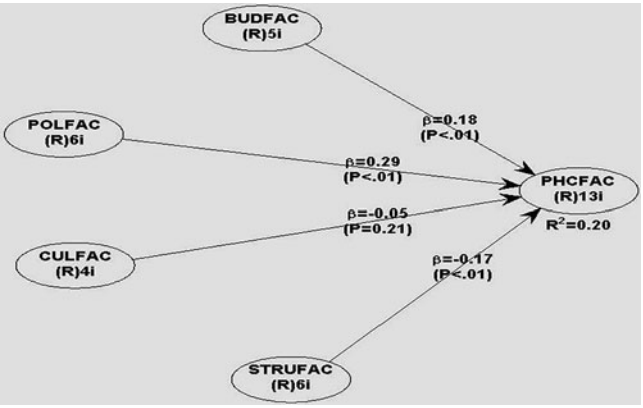

Figure 2. Assessment results for the structural model.

variable. The predictive competency of each endogenous construct in the model was determined by Stone-Geisser's (cross-validated redundancy) (Q^2) (Hair et al. 2014). The predictive skill of this model was 0.19 and Warp PLS-SEM automatically generates Q^2 (Kock and Warp 2012). (see Table 5). Hazen et al. (2014) reported that Q^2 values indicate the predictive relevance as either weak (0.02), moderate (0.15), or strong (0.35) Therefore, this model exhibit predictive relevance because the $Q^2 > 0$ and hence the prediction capability of the model is moderate (Chin, 2010; Hair et al. 2014; Hazen et al. 2014). Thus, indicates the path model's predictive relevance on the endogenous construct to be moderate (PHCFAC) (Hair et al. 2014; Hazen et al. 2014).

Linearity amongst the study constructs

Figures 3 and 4 present a combined graph of PHCFAC and BUDFAC and that of PHCFAC and POLFAC. The two graphs show that linear relationships exist between PHCFAC and the two independent latent constructs of BUDFAC and POLFAC. The relationships impliedly indicated positive relationship which means that an increase in BUDFAC would lead to an increase in PHCFAC. Similarly, the second graph indicated a positive relationship which implies an increase in POLFAC would lead to an increase in the PHCFAC. The coordinates' points (x_0, y_0 and x_1, y_1) and the regression line of the first graph (PHCFAC and BUDFAC graph) were (−3.06, −0.56 and 0.98, 0.18). The coordinates of the second graph (PHCFAC and POLFAC graph) were (−2.57, −0.76 and 1.02, 0.30).

Figures 5 and 6 present a combined graph of PHCFAC and CULFAC and then the graph of PHCFAC and STRUFAC. The two graphs show that linear relationships exist between PHCFAC and the two independent latent constructs of CULFAC and STRUFAC respectively. The relationships indicated that negative relations exist, which mean that a decrease in CULFAC would lead to an increase in PHCFAC. Similarly the second graph indicated a negative relationship which implies a decrease in STRUFAC would lead to an increase in the PHCFAC. The coordinate's points (x_0, y_0 and x_1, y_1) and the regression line of the first graph (PHCFAC and CULFAC graph) were (0.97, −0.08 and −2.43, 0.20). The coordinates of the second graph (PHCFAC and STRUFAC graph) were (1.09, −0.08 and −2.50, 0.18).

Discussion

This study assessed the effects of factors affecting budget implementation of PHC building facilities in Nigeria. Four constructs were considered as predictor or independent variables that predict the effects of factors affecting budget implementation for the successful delivery of PHC building facilities in northern Nigeria. The constructs were direct budget implementation factors which were identified from studies of Sindhu and Gidado (2014), and Tiwari and Mutascu (2011). These were budget implementation related factors that are directly affecting successful delivery of PHC building facilities. Then political factors, that is, factors mostly related to politics in the awards, provisions, execution, completion and handover/closure or review of a contract for the provision of health care building facilities. The factors were identified from studies by Kirimi (2012), and Tafa and Bessie (2016). Cultural factors this are organizational cultural budget implementation related factors that are affecting successful delivery of primary health care building facilities. The factors were identified from a study by Tafa and Bessie (2016). The structural factors these are budget implementation related factors that are mostly connected to the hierarchical structure of the organization during budget implementation and were identified from a study by Tafa and Bessie (2016). The dependent construct, that is, the successful delivery of PHC facilities were identified from the studies of Tiwari and Mutascu (2011), Mosallanejad et al. (2016) and Sindhu and Gidado (2014). However, this research is an empirical study of the effects of budget implementation factors affecting successful delivery of PHC building facilities in northern Nigeria, as against previous studies which focused attention primarily on developing conceptual framework for budget planning of building works. More contrasting is that previous studies concentrated on budgeting systems effects on core health care issues excluding PHC building facilities.

Table 5. Hypotheses-testing results.

Hypotheses	Path coefficient	*p* value	Effect size (f^2)	Stone-Geisser's Q^2	Supported
BUDFAC → PHCFAC	0.179	0.002	0.048	0.193	Yes
POLFAC → PHCFAC	0.285	<0.001	0.102		Yes
CULFAC→ PHCFAC	−0.051	0.209	0.010		No but insignificant
STRUFAC→ PHCFAC	−0.167	0.004	0.036		No

Note: Level of significance (p) $\leq$ 0.05; Q^2-cross validated redundancy $>$ 0.

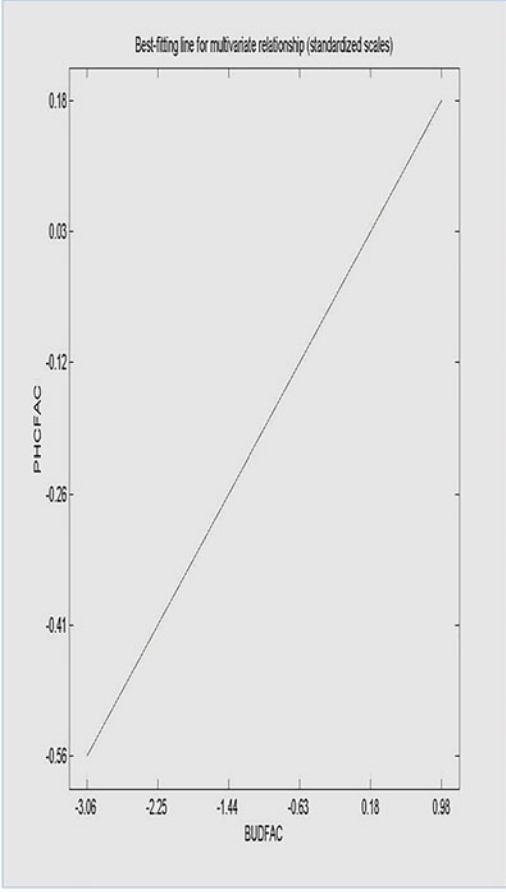

Figure 3. Relationship of PHCFAC and BUDFAC.

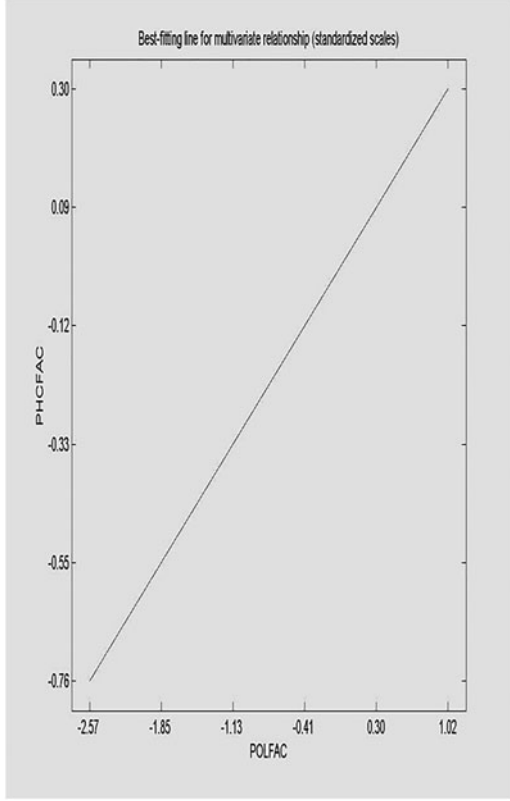

Figure 4. Relationship of PHCFAC and POLFAC.

The measurement model indicated a consistent, reliable and valid questionnaire. The results of the analysis indicated low effects between the successful delivery of PHC building facilities and the four independent latent variables of direct, political, cultural and structural budget implementation factors and the path coefficients for the model were all significant except between cultural implementation factors and the successful delivery of PHC building facilities. This supported the findings of Kirimi (2012) and contradicted the finding of Tafa and Bessie (2016) on the factors affecting budget of tertiary institutions in Ethiopia. All the hypotheses developed for this study were supported except the hypotheses developed on cultural factors and the successful delivery of PHC building facilities. The graphs show that linear relationships exist between the independent and the dependent constructs. There were positive linear relationships between successful delivery of primary health care facilities and direct budget implementation factors and also political factors. The results indicated that a negative and linear relationship exist between successful delivery of primary health care building facilities and cultural and structural implementation factors.

Conclusion

The study aimed at assessing the effect of factors affecting budget implementation for successful delivery of PHC building facilities in Northern Nigeria, with the view to improving on the health care services in the rural areas of northern part of Nigeria. The assessment of the effect is valuable for future improvement in the successful delivery, as well as adequate provision of PHC building facilities by local, states and Federal governments of Nigeria respectively, and other donor agencies like World Bank, world health organisation, UNICEF, United States Agency for International

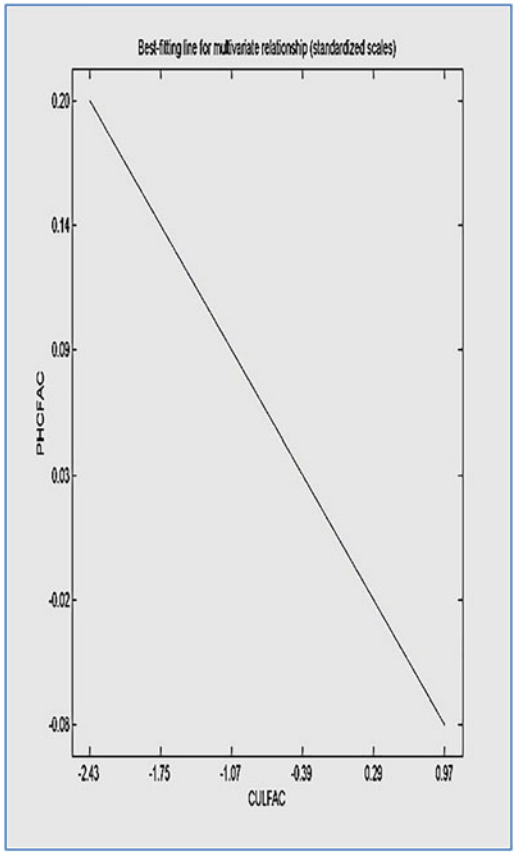

Figure 5. Relationship of PHCFAC and CULFAC.

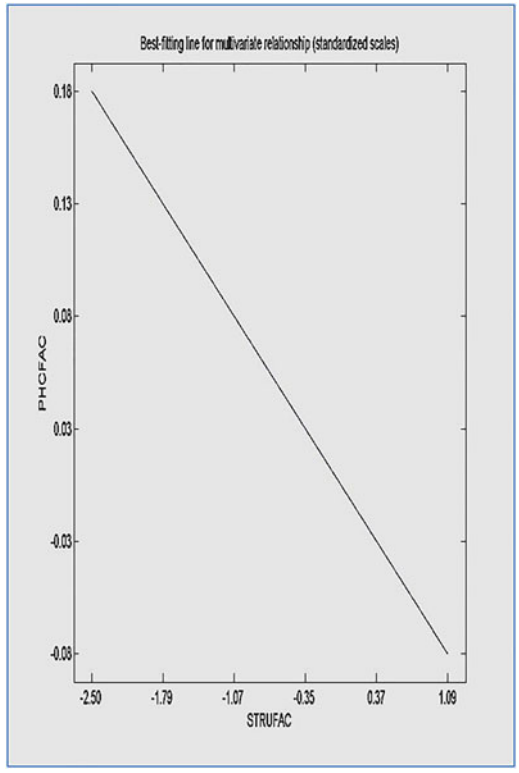

Figure 6. Relationship of PHCFAC and STRUFAC.

Development (USAID) etc. The results identified bottlenecks most especially between structural factors affecting budget implementation and the successful delivery of PHC building facilities than all other factors. This implied that a structural factor is the most important factor affecting successful delivery of PHC projects in Northern Nigeria. Moreover, the findings highlighted that direct budget factors, political factors, cultural factors and structural factors had low effects on the successful delivery of PHC building facilities in Northern Nigeria. Similarly, the results indicated no negative relationship between direct budget implementation factors and the successful delivery of PHC facilities in Northern Nigeria. In the same vein, the results indicated that there is no negative relationship between political factors and successful delivery PHC building facilities in Northern Nigeria. The four latent variables revealed a linear relationship with the successful delivery of PHC building facilities. The direct budget implementation factors and political budget implementation factors both had positive relationship with the successful delivery of PHC care building facilities, while the cultural and structural implementation factors had negative relationship with the PHCFAC. However, one of the potential shortcomings of this study is that it focussed completely on budget implementation factors for the successful delivery of the PHC building facilities in Northern Nigeria. One of the limitations of this research is that the model developed establishes the relationship between direct budget factors, political factors, cultural factors and structural factors only. Other factors such as community participation were not included. Also, the study does not focus on other factors like end-user stakeholder management for the successful delivery of primary health care building facilities in Northern Nigeria.

Implication of BUDFAC on PHCFAC

This study considers BUDFAC as one of the latent construct that effect PHCFAC in northern Nigeria. It was discovered that BUDFAC have low effects and positive relationship on PHCFAC in northern Nigeria, the BUDFAC considered for this study are: adequate budget provision, good placed priorities, good coordination/implementation of health care budget, sufficient fund/support from donor groups, and project manager's experience on budget monitoring. This implied that the application of these factors in the implementation of PHC budget for the provision of PHCFAC in not only in northern Nigeria, but in countries having similar health care challenges like Nigeria need to improve upon for it's to have high

effect on PHCFAC that will curtail the high maternal mortality and mobility rates in their countries. . This will facilitates the reduction of the high maternal mortality and mobility rates in developing countries. Thus, there is a need for the governments at all levels: to make adequate budget provision, prioritize their needs accordingly, to engage competent personnel that will appropriately coordinate and implement health care budgets, and to create conducive working environments and requirements that will attract donor groups.

Implication of POLFAC on PHCFAC

POLFAC was also considered as a latent construct that influence Budget implementation for the provision of PHCFAC in northern Nigeria. The POLFAC considered are: good governance, political stability, good policies and adequate government commitment to the provision of facilities, effects of corruption, politicization of health issues, and good constitutional and legal framework on health policies. Their effects and relationship on the implementation of PHC budget for the provision of PHCFAC in northern Nigeria were found to be moderate and positive respectively. This implied that politically the governments in developing countries at all levels have not shown full commitment on their budgets for PHCFAC, despite having the potential of enhancing the provision of PHCFAC. For PHC budget to impact PHCFAC adequately, governments at all levels need to exhibit good governance, ensure political stability, establish good health policies, eschew and curb corruption, stop politicization of health issues, and establish good constitutional and legal framework on health policies.

Implication of CULFAC on PHCFAC

CULFAC were also considered as a latent construct in the implementation of Budget for the provision of PHCFAC in northern Nigeria. Their effects and relationship on the budget for the provision of PHCFAC were discovered to be low and negative respectively. The CULFAC considered are: low level of health care coverage, weak primary health care policies/facilities, poor state of other social facilities (amenities), and lack of involvement of concern communities in the implementation of budget. This implied that a reduction of the effects of CULFAC on the budget provision of PHCFAC in developing countries would enhance the performance of PHCFAC provision and thus curtail the high maternal mortality and mobility rates in developing countries.

Implication of STRUFAC on PHCFAC

The effects of STRUFAC and relationship on the budget for the provision of PHCFAC were discovered to be low and negative respectively. The STRUFAC are: lack of structural alignment among the personnel responsible for budget monitoring, poor structural performance, poor reporting system, shortage of human resources, lack of performance information, lack of proper planning and inadequate timely revision of budgeted proposal. This implied that a reduction of the effects of STRUFAC on the budget provision of PHCFAC in developing countries would enhance the performance of PHCFAC provision and thus curtail the high maternal mortality and mobility rates in developing countries.

Recommendation

The study recommended for the improvement on the budget implementation process of PHC sector through adequate budget and monitoring bases this would mitigate the high effects of maternal mortality and morbidity rates in the rural areas of developing countries through successful delivery of PHC building facilities. So also, the study recommended inclusion of community base health care participation in developing countries as a mediator/mitigates between budget implementation factors and successful delivery of health care facilities in developing countries.

Disclosure statement

No potential conflict of interest was reported by the authors.

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