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VALIDATING A WORK ATTRIBUTE QUESTIONNAIRE FOR PHARMACEUTICAL SALES REPRESENTATIVES AMIDST COVID-19 IN NIGERIA: A STUDY USING CONFIRMATORY FACTOR ANALYSIS

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The COVID-19 pandemic has had significant adverse effects on the work-life characteristics of sales professionals in the pharmaceutical industry. Work attributes are crucial factors that can determine a person's effectiveness in a particular job role. Therefore, this study aimed to validate a 13-item questionnaire on the work attributes of pharmaceutical sales executives involved in pharmaceutical marketing in Nigeria during the COVID-19 lockdown period. A confirmatory factor analysis (CFA) was used to develop a structural model from the initial 13-item factor structure obtained from a previous exploratory factor analysis (EFA) study. The results show that community education was the most important work attribute, while limited access to customers was the least important. The CFA confirmed the structural model produced by the EFA study. Additionally, it confirmed the model's validity and its construct reliability, although divergent validity can be improved with more constructs. The study's findings are crucial for the pharmaceutical industry to understand the work attributes required during a pandemic and adapt their roles and work structures accordingly.
Keywords: COVID-19, pharmaceutical sales, work attributes, confirmatory factor analysis, Nigeria.

INTRODUCTION

The COVID-19 pandemic has had an unprecedented impact on individuals, communities, and nations worldwide. The pandemic's effects have been particularly significant on the work-life characteristics of sales professionals in the pharmaceutical industry, requiring significant adaptations in work attributes and occupational structures [Elbeddini & Yeats, 2020; Bashir et al., 2021; Oamen, 2021a; Oamen, 2021b]. Work attributes refer to an individual's unique traits that can determine their effectiveness in a particular job role. In previous research, the work attributes of pharmaceutical sales executives in Nigeria were investigated using an exploratory factor analysis (EFA) [Oamen, 2021c]. The EFA study produced a 13-item questionnaire and an underlying theoretical structure consisting of three factors or latent variables, including sales-related, communication/access-related, and COVID-related activities. However, to confirm the validity of the structural model, a confirmatory factor analysis (CFA) is required [Cheung, 2009; Fan et al., 2016]. Therefore, the purpose of this study was to validate the 13-item questionnaire on the work attributes of pharmaceutical sales executives involved in pharmaceutical marketing in Nigeria during the COVID-19 lockdown period using CFA.

METHODOLOGY

The sample size used for the initial published study was 170 while this study used a larger population of 226 respondents. The target sample was obtained using a random sampling method. The questionnaire items were rated on a Likert scale of 1 to 5, where 1

is the least relevant and 5 is the most relevant work attribute during the COVID-19 lockdown period in Nigeria. The study used CFA as a tool to develop a structural model from the initial 13-item factor structure obtained from the previously done EFA [Goretzko et al., 2019]. The maximum likelihood method option was selected to compute CFA. The preferred method of factor extraction for EFA was principal axis factoring with the promax rotation method—a type of oblique extraction technique [Matsunaga, 2010; Henson & Roberts, 2006]. This analytical approach was based on the assumption that the items or indicators are related, compared to using typical orthogonal-rotation methods like principal component analysis with the varimax rotation method [Matsunaga, 2020]. The resultant factor structure obtained was examined using eyeballing techniques to identify items with factor loadings less than 0.45 or cross-loadings of more than 0.2 difference in absolute value [Henson & Roberts, 2006; Thompson, 2004]. However, two items: 'improved access to customers' and 'made fresh business contacts/opportunities' have factor loadings below the threshold of 0.45 and were removed from the analysis, and the process was re-run to achieve a final pattern matrix structure consisting of three factors or latent variables (F1, F2, and F3) with 4, 3, and 2 items/indicators respectively. Appropriate measurement options were configured in the output/plugin platforms in SPSS AMOS to generate model fit indices, model validity indices, and standardized regression estimates of variables required for inferential analysis.

RESULTS AND DISCUSSION

The impact of the COVID-19 on operations and work attributes has been significant. Hence, the focus of this study was to confirm using CFA the previously proposed model of work attributes as reported in a published EFA study [Oamen, 2021a]. The objective of the study was to perform a CFA of work attributes of pharmaceuticals sales executives in order to provide possible validation of a previous EFA study.

Table 1: Pattern Matrix Structure from Initial Exploratory Factor Analysis

Item Code	Work Attributes	Factor (F)		
		1	2	3
WL	Increased workload	0.822		
RR	Recognition/commendation for sales efforts during the pandemic	0.784		
1P	Drug information provider	0.624		
SP	Increased sales of your products	0.554		
HCP	Limited access to doctors, nurses, and pharmacists		0.874	
CS	Limited access to your customers		0.621	
OC	Observed compliance by people during the lockdown period		0.501	
VC	Virtual consultation with clients/customers		0.480	
CSA	Involved in COVID-19 screening activities			0.754
CE	Involved in community education			0.712

Table 1 shows the pattern matrix composed of 10 (ten) work attributes were obtained with factor loadings of more than 0.45. The minimum cutoff was 0.45 for inclusion into the pattern matrix. Three key factors were obtained namely: Factor 1 with WL, RR, IP, and SP; Factor 2 with HCP, OC, OC, and VC; and Factor 3 with CSA and CE. Factor 1 represented workrelated constructs, Factor 2 represented access/communication-related constructs, and Factor 3 represented COVID-19 related constructs.

Table 2: Model Fit Measures from Confirmatory Factor Analysis

Measures	Threshold values	Results	Inference
Model chi-square (X^2)	p-value<0.05 (sensitive to sample>200)	0.01	supported
Tucker Lewis Index (TLI) Normed-Fit Index	TLI>0.90, NFI>0.90	TLI=0.905, NFI=0.917	supported
Comparative Fit Index (CFI)	CFI>0.90	CFI=0.950	supported
Root-mean-square-error-ofapproximation (RMSEA)	RMSEA<0.08	0.064	supported
CMIN/DF (=2.297)	Less than 5	X2=55.118, df=24	supported

In Table 2, the output of CFA was obtained from the pattern matrix by using the AMOS packager. The model fit measures were compared against threshold values for determining model fit [Kline, 2005]. All key parameters were found to be within the acceptable range for a good measurement model. This invariably affirms the theoretical model presented by the EFA study [Oamen, 2021a] and thus validates the outcomes.

Table 3: Measures of Reliability (Cronbach Alpha Test) Attributes	Factor (F)	No. of items	Threshold values	Results	Conclusions
WL, RR, IP, SP	F 1	4	≥0.6–0.7	0.795	supported
HCP, CS, OC, VC	F 2	4	≥0.6–0.7	0.748	supported
CSA, CE	F 3	2	≥0.6–0.7	0.633	supported
All attributes	Overall	10	≥0.6–0.7	0.842	supported

Table 3 shows the Cronbach alpha test estimates of the 3 latent factors as explained by their respective items (attributes). Factors 1 and 2 have greater than 0.7 internal reliability score while Factor 3 has a score of 0.633 which is considered acceptable. Overall reliability of study attributes was excellent with a score of 0.842. Hence, the internal reliability of various items in each latent variable was ascertained to be reliable.

Table 4: Relative Importance of Work Attributes Based on CFA Output Item Work Attributes Factor Regression Ranking

Code		loadings	coefficients	
WL	Increased workload	0.822	0.664	7
RR	Recognition/commendation for sales efforts	0.784	0.774	3
1P	Drug Information Provider	0.624	0.730	5
SP	Increased sales of your products	0.554	0.693	6
HCP	Limited access to doctors, nurses and pharmacists	0.874	0.640	8
CS	Limited access to your customers	0.621	0.446	10
LC	Observed compliance by people during lockdown period	0.501	0.734	4

VC	Virtual consultation with clients/customers	0.480
CSA	Involved in COVID-19 screening activities	0.754
CE	Involved in community education	0.712

Note: Benchmark was set at factor loadings ≥0.45

Table 5 shows the standardized regression coefficients for each of the attribute items in the CFA output. The coefficients revealed the relative importance of each attribute to the study population. The most important item was CE with the highest weight of 0.892 while the least important was CS with a coefficient of 0.446. The high relevance placed on community education as an extended role of the pharmaceutical sales executive is reflective of the demands caused by the COVID-19 pandemic. Consequently, roles and work structures must be readapted to accommodate this reality in the pharmaceutical sales and marketing industry [Bashir et al., 2021].

Table 5: Test of Construct Validity of Model

Factors	Name	CR	AVE	Factor 1	Factor 2	Factor 3
Factor 1	Sales-related	0.807	0.512	**0.715**		
Factor 2	Access-related	0.766	0.525	0.739*	**0.725**	
Factor 3	COVID-19 related	0.689	0.540	0.624*	0.694*	**0.735**

Note: *p<0.001, CR=composite reliability, AVE=average variance explained

The validity of the structural model was further investigated to determine convergent and divergent validity. Model reliability as measured by CR was supported with values above 0.7 for Factors 1 and 2 as shown in Table 5. However, Factor 3 had an approximate or borderline value of 0.69 and could not be improved on because the latent nature of Factor 3 cannot be improved on by the removal of any item in the structural equation model [Figure 1]. In other words, it would lose its latent nature if only one (1) item is remaining. Convergent validity was measured by having AVE values greater than 0.5, which in this study shows that all factors (latent variables) had AVE values above 0.5. Also, divergent validity was evaluated based on the square root of AVE greater than the intercorrelations of factors along the diagonal [Gaskin & Lim, 2016; Hu & Bentler, 1999]. The study showed that divergent validity was confirmed for Factors 2 and 3; however, Factor 2 had concerns as the square root of AVE (0.739) was less than the inter-factor correlation (0.725) along the diagonal [Henseler et al., 2015].

Limitations of the Study

There are several limitations to the study. Firstly, there is a need to include more items in the study frame in order to improve the extrapolation of the findings. Secondly, there is a need to improve divergent validity concerns by removing items with the lowest loading items (such as 'CS-limited access to customers' in this particular study).

CONCLUSION

The confirmatory study confirmed the underlying theoretical structure produced by the published exploratory study of work attributes of pharmaceutical executives. The study showed that the most dominant attribute was involvement in community education programs and the least was limited access to customers. Model validity measures were acceptable although divergent validity can be improved with more constructs. The study confirmed the validity of the EFA obtained from the previous research work.

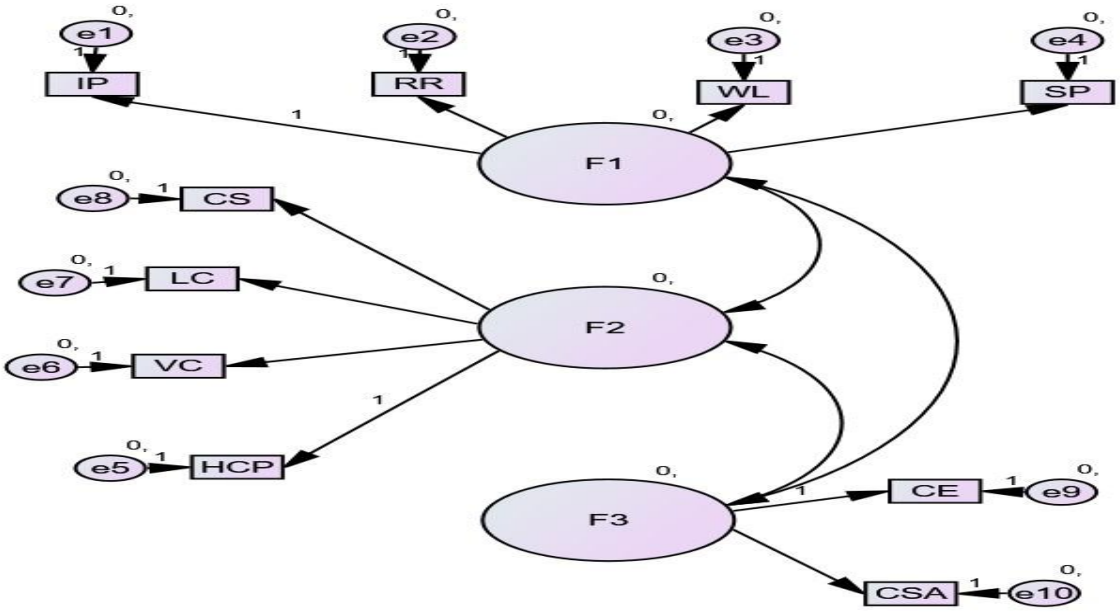

Figure 1: Measurement Model Showing 3 Distinct Factors with a Total of 10 Items

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