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Factors Influencing Integration of Social Determinants of Health into Clinical Practice in Hospitals in Uganda

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Abstract

The overall objective of this study was to assess the factors influencing the extent of integration of social determinants of health (SDH) into clinical practice in hospitals in Uganda. This was cross-sectional. Data was collected from 1042 health workers using a self-administered questionnaire. The factors influencing integration were elucidated using multiple regression modeling. The final model of the influencing factors contained the factor domains health worker confidence, hospital environment, health worker attitude, adoption level for strategies of integration, disease characteristics, and accreditation to the Nurses and Midwives Council. The study successfully elucidated the model for factors influencing the integration of social determinants into clinical practice. The findings have educational, practice, administrative, and policy implications. The multi-method approach was used to limit social desirability bias among health workers; however, the study did not adjust for carry-over effects arising from health workers who were also practicing in private clinics and medical centres.

Keywords*: Clinical practice; Factors, Integration; Social determinants.*

Introduction

The role healthcare workers can play in integrating social determinants into the healthcare process has been recognized [1], but the shortage of strategies and interventions to institutionalize the practice poses a great challenge. Social determinants play a key role in shaping health outcomes; hence their integration into the healthcare process has numerous potential benefits to patients, the health system, and to the communities. This is especially important for minimizing disparities in health outcomes and targeting healthcare and clinical resources to derive maximum value. Disparities in mortality and morbidity due to Covid 19 further underscored the importance of addressing social determinants during healthcare provision [2], For low-resource settings the importance of addressing social factors as an integral part of the healthcare process cannot be overemphasized hence underscoring the need to integrate social determinants into clinical practice in these settings. Effective strategies and interventions are, however necessary to do this in a manner that produces maximum benefit. However, developing effective strategies and interventions requires a proper understanding of the factors influencing the integration of social determinants into clinical practice in such settings.

Social determents include a variety of non-medical factors that affect health negatively or positively [3-5], and the World Health Organisation (WHO) defines them as non-medical factors affecting health and hieratically classifies them as the conditions under which people are born, grow, live, work, and age; and the broader socio-economic context that shapes these conditions at local, national, and global levels [1, 6, 7]. Those that lie beyond the individual have been categorized as macrosocial determinants, and they include culture, the economy, and corporate structures [8, 9]. Those that lie at the middle level have been categorized

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as meso-social determinants and include friendships, families, schools, and neighborhoods [8, 9]. Micro-social determinants are those that are specific to individuals and include health literacy, income, home surroundings, and individual dietary practices [9]. Based on their nature, social determinants of health may be physical, social, or economic factors. Physical factors include water quality, air quality, infrastructure and amenities, social security, food security, land, and soil quality. and quality housing, social factors include cultural norms and cultural orientation, ethnicity, gender, social norms, religious inclination, social support, dietary practices, and health literacy. Economic factors include occupation, education, income, national policies, living standards, and employment. Similarly, Healthy People, the US 10-year rolling national effort to improve the health and well-being of US citizens, frames social determinants into five domains: Economic Stability, Education, Health and Health Care, Neighborhood and Built Environment, and the Social and Community Context.

Social risk factors affect morbidity, mortality, and utilization of healthcare services in a variety of ways [3, 10, 11]. At the preclinical level, social determinants influence patients' perception of symptoms, treatment-seeking behavior, and access to healthcare facilities. For instance, lack of reliable transportation has been shown to cause foregone or delayed care in up to 3.6 million people annually and 25% or more of missed clinic appointments [12]. At the clinical level social determinants shape patients' expectations of care and the nature of the interaction between patients and health workers, moderate the nature and extent of engagement between patients and the health system, and they influence patient preferences regarding medical procedures. Social determinants at the post-clinical level affect acceptance and adherence to medical instructions and treatment plans [13]. Integrating social determinants into clinical practice is closely linked to social epidemiology and community health [14]. The difference is that the latter two concepts direct their interventions outside of the health sector, while the integration of social determinants into clinical practice places the burden of responsibility onto the health worker to undertake certain actions during the healthcare delivery process [15].

Practically there are a variety of activities and actions for integrating social determinants into clinical practice, which can be undertaken at patient, departmental or practice, hospital, and community levels [1, 16, 17]. At the patient level, health workers can integrate social determinants into clinical practice by identifying patients faced with social challenges and taking relevant actions [1, 15, 16, 18]. This includes identifying social challenges related to access and retention to health care; the ability to read as well as understand and interpret medical instructions; identifying predisposing and precipitating factors; and detecting exposure to stress-inducing factors [1]. Actions to address social challenges at the patient level include advice and counselling, direct material support, adjustment of treatment plans, referring patients for social services, supporting patient's access to social services [1], and documenting the social challenges in the patient's medical record.

Healthcare departments can develop supportive systems such as regular reminders to health workers, language services for patients, sharing information on patients' social challenges, adjusting clinic hours, organizing patient flow, and evaluation and feedback [1]. Hospitals can establish strategic direction, provide resources for outreaches and talk shows, establish supportive infrastructure, provide patient navigation services, provide patient counselling services, establish referral systems, provide information on available social services, and provide guidelines and procedures to health workers [1] At community level hospitals can develop partnerships with communities and social service agencies, engage in community sensitization and mobilization, engage in

community advocacy, and assess community needs [1].

Integration of social determinants into clinical practice promotes accommodative, focused, person-centred and sensitive care, better patients' ability to cope with or manage their social challenges, better continuity of care, enhanced continuum of care, enhance patience experience, improve treatment outcomes, and ultimately eliminate disparities in health outcomes [8, 16, 17, 19]. It leads to increased community participation in health care, a better understanding of community health needs, better coordination of health services, and organized community advocacy [16, 20]. These improvements will enhance optimal use of scarce resources, greatly improve healthcare quality, clinical outcomes, and population health. The benefits have catalyzed and galvanized the healthcare industry to search for strategies to integrate the social factor perspective into the clinical process [7, 16, 20, 21]. While most of these have been predominantly in the developed countries, the dividends are of greater importance for health systems in the less developed and developing economies typically characterized by adverse chronic budgetary shortages, low budget support for the health sector, constrained human resources for health, and low uptake and utilization of health services.

Inadequate integration of social determinants into clinical practice, therefore, results into an amplified triple jeopardy effect in less developed countries: patients miss out on the associated clinical benefits; healthcare workers miss the opportunity to address upstream social factors; and hospital managers miss the opportunity to align healthcare services to suit the social and cultural characteristics of the catchment population thus underscoring the urgency for effective integration strategies. The search for strategies has, however, been impeded by an inadequate understanding of factors influencing the integration of social determinants into clinical practice [16]. Previous research and scholarly work have been inconclusive and have focused largely on developed countries, mostly the USA and Canada [1, 16], and the findings and experiences from these settings cannot be easily extrapolated or interpolated into systems of less developed countries such as Uganda due to differences in health systems and organisation of community social services. Moreover, Uganda expresses additional challenges resulting from extensive cultural and ethnic diversity and a relatively young health system in addition to the triple burden of disease thus thwarting any hopes to utilize lessons and experiences from the developed countries.

Knowing the influencing factors, healthcare managers, and health practitioners to synthesize policies and integration strategies that resonate with the social cultural context in Uganda thus increasing uptake of services and clinical outcomes. The general objective of this study was to determine the factors influencing integration of social determinants into clinical practice in hospitals in Uganda. This objective was achieved through investigation of the variation of integration with respect to social-demographic, institutional, health worker-related, patient-related, and disease-related factors.

Materials and Methods

Study Setting

The study was conducted in two Regional Referral Hospitals and ten General Hospitals in Uganda. Two hospitals were government, two accredited to the Uganda Protestant Medical Bureau (UPMB), two to the Uganda Catholic Medical Bureau (UCMB), one accredited to the Uganda Orthodox Medical Bureau (UOMB), one accredited to the Uganda Muslim Medical Bureau (UMMB), and two were private. The hospitals were purposively selected to obtain a balanced mix of attributes such as level of care; rural-urban characteristics; health worker payment systems; healthcare financing models; the number of beds, ownership, and cultural attributes of the catchment population. The

participating hospitals provided healthcare to over 11 million people, constituting about 26% of the entire population of Uganda, with over 2,000 hospital beds representing approximately 14% of the total hospital beds in Uganda [22].

Study Design

This was an analytical cross-sectional hospital-based study. The cross-sectional design was selected and adopted for being relatively quick, simple and reputable for determining prevalence. Cohort weaknesses among the health workers were managed using a large sample size. Data on multiple un-manipulated variables were collected. The dependent variable, the extent of integration of social determinants into clinical practice, was measured in the form of frequencies at which health workers undertook certain actions at clinical, departmental, hospital, and community levels. The independent variables were measured in the form of frequencies of the rating at which attributes related to health works, patients, organizational settings, and health systems were reported to influence the extent of integration at the individual health worker level.

Eligibility Criteria

All healthcare workers employed and directly interacting clinically with patients in the selected hospitals were eligible. Health workers satisfying the inclusion criteria but who were on leave during the study period and those who did not consent to the study were excluded.

Sample Size Determination and Sampling Procedure

The sample size n for healthcare workers was be computed from the formula $n=Z^2P(1-P)/d^2$ [23] where n was the sample size, Z =1.96 is the statistic corresponding to level of confidence which is 95%, P was the expected prevalence of screening for social determinants which was 52% as per the Medical Group Management Survey [24], and d was precision which is 0.02. The final sample size adjusted finite population and the proportion of clinical health workers was1169. The sample size for each hospital was computed by proportionating the overall sample size of 1169 across the 12 participating hospitals based on the estimated number of clinical health workers in the hospital. In each hospital, respondents meeting the inclusion and exclusion criteria were selected with support from heads of departments, records personnel, and human resource officers based on availability and willingness to participate.

Data Collection

Data was collected between September and November 2021 using a self-administered questionnaire. The questionnaire, worded in English, included 64 five-point Likert scale items and a few on socio-demographics and professional characteristics of health workers. Eight of the 64 items were used for assessment of the extent of integration from the health worker perspective. Hard copies of the questionnaire were handed over to the health workers after the purpose of the study and the reason for their participation and signing of the consent form. The filled questionnaires were collected and sealed in an envelope awaiting data analysis. The Likert scale was deemed appropriate because the construct under investigation is a social phenomenon. The Likert type of scale has been used to measure attitudes, perceptions, benefits, challenges to practices, and self-perceptions of the level of knowledge and competence [25]. Multiple Likert items were used to measure each of the variables to reduce measurement error; improve validity, accuracy, and reliability; promote the principle of aggregation, and enable more stable and unbiased estimates [25]. This increased the number of possible scores and ensured that random errors of measurement averaged out [26]. The health workers rated their performance against each of the Likert scale items. The Likert scale items in the health worker questionnaire met all four characteristics of a summated rating scale [26]. All items were assumed to possess equal weights in line with the Likert method

which enabled the summation of the responses for each item to create composite scores [26, 27]. The summated rating-scale format was selected because: it produced scales with good psychometric properties hence good reliability and validity [26, 27]; was generally cheap and easy to develop [27]; and had the additional advantage of being quick and easy for respondents to complete [26, 27]. The scales for the dependent variable and predictor variable were developed based on the activities, challenges, barriers, and opportunities related to integrating social determinants of health into clinical practice as outlined in the literature [7, 16]. Therefore, the sieving stage was skipped, and emphasis was placed on reliability analysis which confirmed that the items had high item-to-total correlations and high discrimination.

Data Preparation

Data from the questionnaires and medical review templates were entered into pre-designed plates in SPSS analytical software version 26. The filled questionnaires were reviewed for completeness, inconsistencies, and recording errors. Further checks were conducted on questionnaire data for undetected inconsistencies ad missing or duplicate entries. The data were checked for data entry errors and extremes using frequencies and tabulations. Nominal socio-demographic data, gender, religion, profession, qualification, and professional body, were transformed into dummy variables to make them suitable for linear regression analysis. Numerical socio-demographic data, that is, age and years in active service, were analyzed directly.

Descriptive Analysis

Response rates and sample characteristics were computed in the form of modes, median, means, percentages, and frequency distributions. Frequency distributions were generated for the rating scales of the individual Likert scale items for the predictor variables. Direct and transformed quantitative data were analyzed descriptively to derive proportions, means, scatter plots, and histograms. Histograms and scatter plots of the variables were used to confirm the suitability of multiple regression for model development.

Validity and Reliability Analysis

The validity of the eight Likert scale items for the dependent variable was assessed using Pearson correlation against score totals. All eight items had correlation values higher than the critical value with p value less than 0.001. All eight items had correlation values above the critical value, with p-values less or equal to 0.001 hence confirming their validity for this sort of analysis. The eight Likert scale items for the dependent variable were validated through reliability analysis and summated to produce a numeric scale suitable for linear regression analysis. Reliability analysis for the 8-Likert scale items on the questionnaire yielded Cronbach's alpha of 0.794, considered acceptable, and Cronbach's alpha of 0.795 based on standardized items. The inter-item correlations were between 0.15 and 0.5, which is the statistically acceptable range. The corrected item-total correlations were all within the moderate to strong range (0.333 to 0.576). None of the items exhibited appreciable increases in the Alpha above the summative value when the individual items were excluded (0.759 to 0.794). Hence all the items were relevant to the construct of the extent of integration of social determinants into clinical practice.

Factor Analysis

The predictor variables were assessed for suitability for factor analysis using the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO). The KMO measure was 0.904, the p-value of the Bartlett's Sphericity Test was significant ($p < .001$, Approx. Chi-Square 10655.627, df 1830), and the ant-image matrices were low given that the values in the diagonal of the ant image table raged from 0.706 and 0.952. The data was therefore deemed to meet

Backhaus, Erichson, Plinke, and Weiber criteria for factor analysis. Bartlett's Sphericity test assessed the hypothesis that none of the variables under the test correlated with each other.

Principle Component Analysis

Principle Component Analysis with orthogonal rotation was used to regroup and reduce the number of factors. The eigenvalue or the total of the squared factor loadings across all variables, which is the portion of the total variance of all variables that can be explained through the factors, was used to determine the maximum possible number of factors for regression analysis. The number of relevant factors was determined to be 13 based on the eigenvalues from one and above and illustrated on the screen plot. All factors with a threshold factor loading value of 0.45 (correlation between the variables being tested and the factors) were selected for processing. The factors were then regrouped, and further adjustments were made to remove factors with only one item. This resulted in seven predictor variables in the form of Likert scale items: hospital environment; health worker knowledge about social determinants of health; health worker attitude towards integration; health worker confidence; socio-economic status of patients; disease characteristics; and adoption level of the integration of the social determinants in the hospital. The predictor variables were summated to produce numerical scales suitable for linear regression.

Extent of Integration

The questionnaire Likert scale items were numbered from C1 to C8 based on the order in which they appeared in the questionnaire. The eight items were summated into a single variable that was used to compute the summated scores. The mean-item summated scores for the respondents were converted into a combined composite score for the extent to which health workers integrated social determinants into clinical practice across the 12 hospitals using the frequency distribution of the individuals across the various mean-item summated scores. The combined score was derived by multiplying the summated scores and their corresponding frequencies and then dividing the product by the total possible summated scores for the valid responses and multiplying this by 100.

Bivariate Analysis

As a preliminary step to multiple regression, three types of analyses were conducted: correlation analysis and the associated degree of significance; Chi-square test of independence for categorical variables; and simple linear regression for predictors that had a significant linear relationship (p-value of less than 0.05) to determine the respective beta coefficients, the R-value, the R-Square value, F- value, the residuals, and the p-value. A. The variables regressed onto the outcome variable were hospital climate or environment, health worker confidence, health worker attitude, health worker knowledge, socio-economic status of patients, disease characteristics, the adoption level of the integration, hospital climate with health worker confidence, health worker knowledge with health worker confidence, gender dummy variables, professional body dummy variables, age of the health workers, and years in active service.

Multiple Regression Analysis and Model Construction

The predictor variables were entered into the regression analysis block-wise till all the summated variables, the interaction terms, and the socio-demographic variables had been used to build the full model. The R-squared change was checked after each addition, and when significant, that addition was maintained. The full-model parameters were noted, including coefficients and the corresponding levels of significance for each of the variables or variable combinations with interaction effects, as well as the R, R-Square, and adjusted R-Square. The final model was derived by removing stepwise

variables with high levels of significance in descending order.

Model Validation

The final model was validated using statistical tests for multiple regression. The linearity test was carried out to validate the linear relation between the predictor variables in the final model and the response variable. The normality test was conducted on residuals to establish the normal distribution of the residuals. The homoscedasticity test was carried to determine the variance of errors in the general populations. The multicollinearity test was carried out, using the variance inflation factors, to establish the level of correlation within the predictor variables in the model.

Results

The number of health workers who participated in the study was 1042, representing 90% of the planned sample size. The response rate for the health workers who received questionnaires was 99%. The distribution of the health workers was closely correlated with to the bed capacity of the respective hospitals (r=0.94) and the estimated number of healthcare workers (r=0.99). 67% of the hospitals were Christian-founded, 17% secular, 8% Muslim, and 8% others. The mean age of the health workers was 28.57 years (SD 6.72) with minimum 38 years and maximum 57 years, skewness 1.3 and kurtosis 0.2. The gender distribution of the health workers was Male 40.9% and Female 59.1% (n=1042). The majority of the health workers (88.9%, n=1042) were of the Christian faith, followed by the Muslim faith at 7.6%. The mean period in active service was 5.0 years (SD, 5.9) with minimum of 0.5 years and a maximum at 44 years (skewness 3.66 and kurtosis 16.6). Nursing/Midwifery was the predominant profession at 57.3%, followed by Medicine and Surgery at 11.5%, and Allied Health, Pharmacy, and Clinical Officer. The largest number of the health workers were from Obstetrics/Gynaecology followed by Paediatric. The majority were licensed by the Nurses and Midwives Council, 57.4% (n=1042); The others were licensed by the Medical and Dental Practitioners Council, 10.1%, Pharmaceutical Society of Uganda, 4.1%; Allied Health Professional Council, 16.4%; No licensing body, 12.2%. The majority were certificate holders, 50.2% (n=1042) followed by diploma holders, 28.8%; bachelor's degree holders, 16.2%; master's degree holders, 1.7%; PhD holders, 0.3%; students, 0.3%; and 2.5% did not indicate their qualification. The majority did not have additional responsibility, 72.4% (n=1042).

Extent of Integration

The extent of integration for health workers was 66% mean-item score analysis for the dependent variable a combined composite score of 66%. There was significant variation in integration across hospitals ($p < 0.0001$). Female health workers had relatively higher scores than their male colleagues (modal score 4 vs 3.63), however, the difference was not statistically significant Chi-square=40.402, p=0.991, df=64. Christian health workers had relatively higher scores than the Muslims (modal score 4 vs 3.5), and the difference was statistically significant Chi-square=195.062, p=0.031, df=160.

Effect of Health Worker Competence, Confidence and Attitude on Integration

56.3% of health workers agreed that the preservice training covered topics of cultural competency. The proportion of health workers who reported having a very high to high level of knowledge of what to do for patients identified with social risk factors was 51.3%. For knowledge about non-medical social services available in the community around the hospital, the proportion was 39.8%, an average of 43.5%. For understanding social determinants of health, the proportion was 50.2%. For the level of understanding about methods for screening patients for social risk factors, the proportion was 48.2%. The proportion of health workers who reported the level of confidence in asking

patients about challenges with accessing health care as very high to high was 64.2%. For the level of confidence in asking patients about challenges with health literacy, it was 57.1%. For level of confidence asking patients about challenges with social support, it was 50.3%. For level of confidence asking patients about income it was 40.6%. For the level of confidence asking patients about challenges with personal security it was 42.6%. For level of confidence asking patients about challenges with religion it was 54.2%. For the level of confidence asking patients about challenges with residential stability, it was 45.7%. For level of confidence asking patients about challenges with residential stability it was 45.7%. For level of confidence asking patients about challenges with childhood experiences it was 35.0%. For level of confidence asking patients about challenges with stressful conditions it was 52.8%. For level of confidence in asking patients about challenges with stressful education it was 51.4%. For level of confidence, asking patients about challenges with the marital status was 51.3%. For the level of confidence asking patients about challenges with marital status it was 50.2%. Attitudinal scores were generally low for all aspects related to integrating social determinants into clinical practice, with only 20% being in the high and high bands.

Effect of Patient Characteristics

The proportion of health workers who reported that they get very high to high cooperation from patients when trying to identify and address social risk factors was 47.3%. For the extent to which actions of patients influence the extent to which the integrate social determinants into clinical practice, it was 49.1%. For the extent to which the age of patients influences the extent to which they integrate social determinants into clinical practice, it was 46.6%. For the extent to which the sex of patients influences the extent to which the integrate social determinants into clinical practice, it was 49.1%. For the extent to which the marital status of patients influences integration into the patient care process it was 50.5%. For the extent to which the educational status of patients influences integration into the patient care process, it was 50.6%. extent to which the profession of patients influences integration into the patient care process it was 51.8%.

Correlational Analysis

The results were as follows: Hospital climate 0.607, 0.000; Health worker confidence 0.370, 0.000; Health worker attitude 0.098, 0.014; Health worker knowledge 0.382, 0.000; SES Patients 0.287, 0.000; Disease characteristics 0.185, 0.000; Adoption level 0.181, 0.000; Hospital climate*confidence 0.566, 0.000; Health worker knowledge*confidence 0.410, 0.000; Age of health worker 0.002, 0.970; Years in active service 032, 0.452 for R and significance values respectively. All the summated variables and the interaction terms had statistically significant correlations with the dependent variable, and all correlations were positive except that for attitude. The health workers' years in service and age exhibited negligible correlation with the dependent variable that was not statistically significant.

Chi-square Analysis

Although female health workers had relatively higher scores than their male colleagues (modal score 4 vs 3.63), the difference was not statistically significant Chi-square=40.402, p=0.991, df=64. Religion was significantly associated with the dependent variable (Pearson Chi-square=195.062[a]; p=0.031, df=160) with Christian health workers exhibiting relatively higher scores than the Muslim colleagues (modal score 4 vs 3.5) and the difference was statistically significant Chi-square=195.062, p=0.031, df=160. Age was significantly associated with some aspects of integration but not with the summated dependent variable (picking information from patient's notes, adjusting treatment plans, recording social

information, and frequency of communication of social factors to other health workers (p=0.004, p=0.005, p=0.023, p=0.003 respectively). The profession was significantly associated with the summated dependent variable (p <0.001), with the Pharmacists exhibiting a higher extent of integration followed by social workers, nurses, and midwives. Membership with a professional body was significantly associated with the summated dependent variable with accreditation to the Nurses and Midwives Council exhibiting relatively higher scores (Chi-square=173.017, p=0.05, df=128). Qualification was significantly associated with the summated dependent variable (p=0. 046). The health workers' years in service and age had no significant relationship with the dependent variable (Chi-square =129.027, df=124, p=0,360; Chi-square=77.777, df=93, p=0.872.

Bivariate Regression Analysis

All the summated independent variables and the interaction terms had a significant relationship with the summated dependent variable. The other variables, professional body, gender, years in service, and age of the health workers, exhibited very small R values, almost zero R-Square, and negative adjusted R-square that were not statistically significant.

Multivariate Analysis

The multivariate analysis yielded the full model in which the variables hospital environment, health worker attitude, and disease characteristics had a significant relationship with the summated outcome variable (p= 0.001, 0.002, 0.021 respectively) with negative R values for health worker attitude and disease characteristics. The variables health worker confidence, health worker knowledge, patients' socio-economic status, adoption level of the integration practices, years in service, professional accreditation, and age did not show significant relationship as were the interaction terms health worker knowledge *health worker confidence, and hospital environment *health worker confidence. The multivariate analysis provided the full model, accounting for 43% of the changes in the outcome variable at p<0.001. Table 1 illustrates the full model summary.

Model Selection

The final model was selected by progressively removing the non-significant parameters beginning with the ones with the highest level of significance until all the variables in the model had significant p values. The final model was statistically significant with p value less than 0.001 and 42% of the variability in the data explained by the model statistics with the variables, accreditation to the Nurses and Midwives Council, Health worker attitude, Hospital climate, Disease characteristics, Health worker confidence, Adoption level exhibiting significant relationship with the dependent variable. Table 2 illustrates the final model summary, ANOVA parameters, model coefficients, and residual statistics.

Table 1. Illustrating Full Model Summary

Model Summary[b]									
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Change Statistics**				
					R Square Change	**F Change**	**df1**	**df2**	**Sig. F Change**
1	.656[a]	.430	.391	.57048	.430	11.054	17	249	.000
a. Predictors: (Constant), Active years, Gender=Male, Socioeconomic status of the Patient, Health worker attitude, Professional body=Pharmaceutical Society of Uganda and Pharmacy, Professional body=Allied Health Professionals council, Professional body=, Professional body=Medical and Dental Practitioners council, Health worker confidence, Adoption level, Disease characteristics, Age, Health worker knowledge, Hospital environment, Gender=Female, Hospital climate and Health worker confidence, Health worker knowledge and confidence									
b. Dependent Variable: Extent of SDH Integration Summated									

Table 2. Final Model Summary

Model Summary[b]									
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Change Statistics**				
					R Square Change	**F Change**	**df1**	**df2**	**Sig. F Change**
1	.646[a]	.417	.408	.56256	.417	46.254	6	388	.000
a. Predictors: (Constant), Professional body=Nurses and Midwives Council, Health worker attitude, Hospital climate reworked, Disease characteristics, Health worker confidence, Adoption level									
b. Dependent Variable: Extent of SDH Integration Summated									

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	87.830	6	14.638	46.254	.000[b]
	Residual	122.794	388	.316		
	Total	210.623	394			
a. Dependent Variable: Extent of SDH Integration Summated						
b. Predictors: (Constant), Professional body=Nurses and Midwives Council, Health worker attitude, Hospital climate reworked, Disease characteristics, Health worker confidence, Adoption level						

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.015	.194		10.370	.000		
	Health worker confidence	.108	.046	.111	2.363	.019	.682	1.466
	Hospital environment	.313	.027	.587	11.691	.000	.595	1.680
	Health worker attitude	-.159	.043	-.173	-3.717	.000	.693	1.443
	Adoption level	.141	.050	.132	2.798	.005	.677	1.477
	Disease characteristics	-.108	.039	-.125	-2.741	.006	.728	1.373
	Professionalbody=Nurses and Midwives Council	.105	.058	.071	1.800	.073	.964	1.037
a. Dependent Variable: Extent of SDH Integration Summated								

Residuals Statistics[a]					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.9686	4.4287	3.4269	.48349	362
Residual	-1.97273	1.68415	.06800	.54029	293
Std. Predicted Value	-3.001	2.209	.088	1.024	362
Std. Residual	-3.507	2.994	.121	.960	293
a. Dependent Variable: Extent of SDH Integration Summated					

Model Validation

The normality of residuals was tested and upheld based on the distribution of model statistics for all the predictor variables. None of the predictor-outcome pairs violated the linearity assumption based on the scatter plots, bivariate analysis, and correlation coefficients. The homoscedasticity assumption was satisfied as per the scatter plot standardized and predicted residual. The values for the variance inflation factors (VIF) for each of the predictor variables were below five, implying that multicollinearity did not pause a problem for the regression model. Figure 1 illustrates the P-P plot for the residuals. Table 4 illustrates the correlation coefficients. Figure 2 illustrates the scatter plot for the residuals.

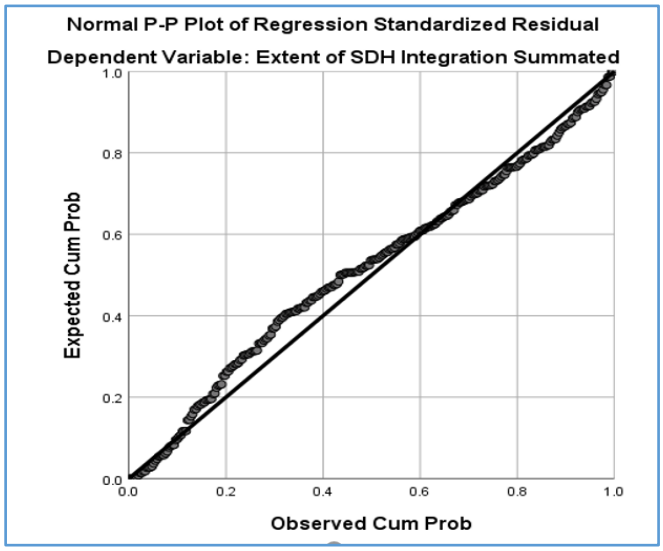

Figure 1. P-P Plot for Residuals

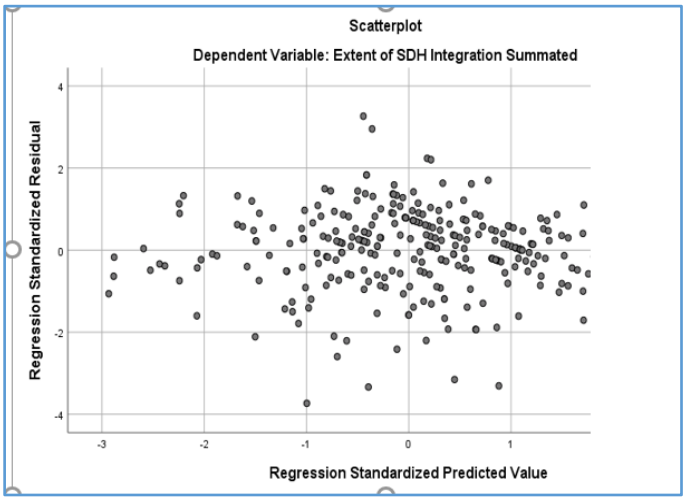

Figure 2. Scatter Plot for Residuals

Discussion

Although the Covid 19 public health protocols in force during data collection altered the duty rosters for health workers and overall utilization of services, the number of health workers, key informants, medical records, and focus groups was large enough for statistical manipulation and analysis.

The mean age of 28.57 for health workers was close to the mean age of 30 years for the working age group reported by the Uganda Bureau of statistics two years ago [28]; the gender proportion of 59.1% was close to the female

proportion of 54% of the health workforce in Uganda [29]. The proportion of 88.9% of the Christian faith was close to the figure of 82% reported in the 2019 Report on International Religious Freedoms in Uganda [30], while 7.6% for Muslims was just half of what was indicated in that report. This finding was expected because of the sample's relatively large number of faith-based hospitals. The mean period in active service of 5.0 years was in tandem with the average length of stay of 10 years [31]. The figure of 57.3% for Nursing/Midwifery is very similar to the 55% observed by MoH Uganda years [31]. Most nurses and midwives work in the obstetrics, gynaecology, and paediatrics departments, thus explaining the apparently larger number of respondents from these departments. This explains the higher proportion of certificate holders given that most of the respondents were nurses and midwives.

The current study provided model highlighting the factors that influence the integration of social determinants into clinical practice. The differences in the extent of integration across hospitals was statistically significant, suggesting that contextual factors influence the extent to which health workers integrated social determinants into clinical practice. Previous studies have highlighted that health workers do not or hesitate to integrate social determinants into clinical practice because of fear of breaching patient confidentiality; inadequate training on social determinants, insufficient knowledge and understanding about social determinants, low confidence in engaging patients on social determinants, negative attitude, heavy workload and time constraints; lack of information about social support services, and perception that this is not the role of health workers [1] [16]. Other factors highlighted in literature were age of the health workers; low receptiveness to the idea; inadequate cooperation from patients; cultural constraints; lack of social support services at the community level, and lack of language services at the institutional level [16].

The study pointed to inadequate training of health workers on social determinants of health, especially in the clinical context, as highlighted by the near-average proportions of health workers who rated their understanding of social determinants and the methods for screening patients for social risk factors as very high to high. This observation is supported by previous findings elsewhere, where the figure was even lower, ranging from 32.7% to 42.8% [32]. There is, therefore, a need to intensify the training of health workers in the various aspects and dimensions of social determinants of health. This is because training health workers to address the social determinants of health in clinical practice serves as a good entry point for promoting integration of social determinants into clinical practice is and promoting equity in health outcomes for patients, families, and communities.

This study showed that cultural competency is not comprehensively covered during pre-service training of health workers in Uganda, although the proportion of health workers who reported receiving pre-service training on cultural competency in this study was higher than the 47.9% observed by other scholars [33]. In-service or post-residency training is expected to bridge this gap however, the same proportion was observed previously thus importance of systematically addressing the issue at curricular and policy level. The level of training in cultural competency observed by Petterson and colleagues was even much lower, at 21% for basic education and 37% for self-directed effort [34]. The proportion of 66.3% observed in literature for those who have received either pre-service or in-service training on cultural competency [33] further underscores the urgency of the issue. This is because cultural competencies for health workers, including skills and knowledge to recognize and value diversity in communities, enable health workers to understand and effectively respond to cultural differences encountered in health service delivery [33, 34]. The low rating for cultural

competency training, which can be attributed to curriculum deficiencies and policy gaps, has implications as it affects important dimensions of care such as patient safety, efficiency, equity, and cost of service delivery.

This study highlighted a shortage of knowledge on how to address social determinants based on the average proportion of health workers who rated themselves as having a very high level of knowledge of what to do for patients identified with social risk factors. This finding was like other observations in the literature [1]. This observation is of prime importance because, without knowledge of addressing social determinants, health workers often feel emasculated when they identify patients with social risk factors. This negatively affects the confidence and attitude of health workers in engaging patients on social issues, which explains the low level of confidence and negative among health workers observed in this study.

Therefore, training in cultural competency should be provided as part of the overall package that includes methods of screening and documentation of social risk factors, and possible interventions for different categories of social risks. This will equip the health workers with sufficient knowledge, skills, and aptitude for integrating social determinants into clinical practice [1]. These observations underscore the need to continually educate health workers on how to identify and address social risk factors, remodel the preservice curriculum, and provide a supportive work and policy environment

Previous studies investigated the relationship between the extent to which health workers integrated social determinants into clinical practice, and the socio-demographic factors of health workers and patients. The health worker socio-demographic factors investigated in this study were age, gender and religion. The patient socio-demographic factors were age and level of education. The study also investigated the following professional factors: years in service, profession, qualification, and professional accreditation. This study showed that the number of years spent in service did not influence the extent to which health workers integrated social determinants into clinical practice. While strange, this is attributed to limited opportunities for training and exposure to practices related to the integration of social determinants into clinical practice. Gender did not exhibit overall influence to the extent of integration although it did for certain aspects. This can be attributed to broad nature of the actions for integration of SDH into clinical practice thus diluting the gender factor and the fact that this is professional issue. The factors religion, profession, qualification that significant relationship with the integration of SDH into clinical practice at bivariate level, lost their status at multivariate level. This observation shows that there are more preponderating factors acting at higher level to influence the integration.

Model Selection

The model was carefully selected following the principles of modelling using linear regression. The model followed the assumptions for normality, linearity, multicollinearity, and homoscedasticity which were demonstrated by the P-P plot, correlation coefficients, variance inflation factor, and scatter plot, respectively. Additionally, the model was constructed complied with the requirement for a minimum of two independent variables which were of the right scale. Only six of the eleven constructs present at the start of the model development made it into the final model. The final model for factors influencing integration of social determinants into clinical practice outlines the importance of hospital environment, health work attitude, health worker confidence, adoption level of the strategies for integration, disease characteristics, and professional accreditation to the nurses and midwives council. Accreditation or registration with the Nurses and Midwives Council was included because it had a high beta coefficient, and its significance was close to

0.05. The factors that were dropped were age, years in service, gender, and knowledge of the health workers, and social, economic status of the patients. Health worker knowledge gained significance as the model development progressed it did not make into the final model. The confidence level did not have synergistic interactions with the hospital environment and health worker knowledge.

Hospital Environment

Hitherto, no previous studies investigated the role the hospital environment is likely to play in driving the integration of social determinants into clinical practice. The findings suggest that the better the enabling environment the greater the integration. This includes aspects such as the strategic direction of the hospital, number of specialties, bed capacity, location of the hospital, hospital ownership, type of services, number of employees, number of clinical staff, health worker payment method, revenue generation, and the relationship between hospital and health workers. Strategic direction influences several actions related to the integration of social determinants into clinical practice: community engagement; partnerships with community social service providers, religious institutions, and charity organizations; type of services, health worker payment method, revenue generation, location of the hospital, and the relationship between the staff and hospital management. These findings underline the importance of taking the hospital environment in designing interventions and strategies to improve the integration of social determinants into the healthcare process.

Health Worker Attitude

Health worker attitude was identified as key factor in integration of social determinants into clinical practice. The results of the study showed that the more favourable the attitude the greater the integration. This finding was corroborated by other scholars regarding attitudes toward patients who smoked tobacco [35-37]. The observation of a negative relationship between health worker attitude and integration of social determinants into clinical practice underlines the importance of engaging, educating and sensitizing health workers regarding the importance of integrating social determinants into the healthcare process. To address attitudinal issues a mix of behavior change approaches and strategies including the ecological model [38] to address attitudinal issues and achieve sustained adoption of practices and actions for integration of social determinants into clinical practice.

Health Worker Confidence

Health worker confidence was identified as a key factor in influencing the integration of social determinants into clinical practice. The findings suggest that the higher the confidence the greater the integration. Similar findings were obtained in a study among nurses [32]. Lack of confidence can affect the ability and willingness of health workers to engage patients on aspects related to social determinants. The findings regarding the effect of confidence underline the importance of confidence-building initiatives.

Level of Adoption of Integration Strategies

This study identified the level of adoption of integration strategies as the key factor for this phenomenon. Hitherto no studies have investigated the effect of the level of adoption of integration practices on the integration of social determinants into clinical practice in Uganda. The study results suggest that the higher the adoption level, the greater the integration. This underscores the importance of institutional frameworks, policy guidelines, and supportive supervision systems. The observations also point to the role of hospital administration in taking deliberate and systematic interventions to promote integration.

Disease Characteristics

The variable disease characteristics was identified as a key factor in influencing the

extent of integration of social determinants into clinical practice. Hitherto no previous studies have investigated the role of disease characteristics in the integration of SDH into clinical practice. The results show that health workers are less likely to integrate social determinants into the care process in cases of severe disease and diseases of an epidemic nature. The connection between disease characteristics and the integration of social determinants into clinical practice can be attributed to the common approach of using stipulated protocols, especially in severe disease and epidemics. This, therefore, calls for a review of these protocols to incorporate social determinant perspectives.

Ethical Considerations

The study was approved by the research and ethics committee of Makerere University School of Health Sciences, the National Council of Science and Technology was duly informed, permission to conduct the study was granted from the respective hospitals, and written informed consent was obtained from the participants. Data was presented anonymously using data masking.

Limitations

The multi-method approach was used to limit social desirability bias among health workers; however, the study did not adjust for effects arising from health workers practicing in private clinics and medical centres.

Conclusion

The factor domains Health worker confidence, Hospital environment, Health worker attitude, Adoption level, Disease characteristics, and accreditation to the Nurses and Midwives Council were identified as key in influencing the integration of social determinants into clinical practice in hospitals in Uganda. The hospital environment had the highest influence. Health worker attitude and disease characteristics exhibited a negative relationship with the outcome variable.

Recommendations

Hospital administration should provide a supportive environment through internal policies and guidelines, community engagement frameworks, civil society engagement platforms, and performance assessment plans that are in line with integration of social determinants into clinical practice. health workers on how to blend the different perspectives on social determinants. The Ministry of Health (MoH) should: develop and disseminate policy and operational guidelines for the integration of social determinants at patient, practice, institutional and community levels. The Ministry of Education and Sports (MoES) should integrate education about SDH into pre-service curricula for health workers. Civil society organisations such as Uganda National Health Consumers Organisation (UNHCO) should engage the relevant ministries and government entities to ensure that the necessary policy guidelines and institutional frameworks are developed and implemented.

Conflict of Interest

The authors have no conflict of interest with respect to this study.

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