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Multiple Regression Analysis of Health Care by Relational Coordination Mediation Model

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Abstract

The overall efficiency or effective performance of a particular work environment is enhanced by proper implementation of Relational Coordination work practices mediation model. The service sectors like health care centers and hospitals are considered for the above said implementation. With that fact in mind several parameters are taken into account for improvising the quality care provided in selected hospitals in and around tamilnadu. Questionnaire which directly or directly relates the quality and efficiency outcome is framed and survey is conducted in different levels in different departments in health care centres. Cronbach alpha validation suggests that the consistency level of such parameters is in excellent level. Multiple Regression Analysis helps to find how the RC variables are maintaining interdependence with each other within the organization. By this we can able to find how systematically quality improvisation can be achieved within the departments.

Keywords: Quality Outcome, Efficiency outcome, Cronbach alpha, Multiple Regression Analysis.

I. INTRODUCTION

Coordination in Health Care

The equality in sharing of Information, Knowledge, Skills and Resources for reaching a specified target within a cluster of people is called coordination. For achieving the stipulated level of performance outcomes in working environment the mutual respect and knowledge sharing is very important. The chance of attaining a better outcome in terms of quality and efficiency is high when level of coordination between the individuals is high. This above said fact have been attained by following objectives,

- Respecting others ideas and works
- Creating a zone of comfort for mutual knowledge sharing
- A perfect platform to communicate effectively in an organized manner which should be time based, accuracy based and helps to solve the problems.

Relational Coordination impact in the work environment

Relational Coordination is a method of collaborating all the variables in the work environment which helps to coordinate the functions of the work environment.

It always carries two primary functions. One being proper sharing of information through communication channels which is a two-way process and other being mutual understanding of the individuals who are taking part in the study.

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There are various phases of Relational Coordination and is shown the figure. Several methods have been incorporated for measuring those phases. All the phases have to be taken into account for attaining the required quality outcome.

II. STRUCTURE OF WORK PRACTICES MODEL

The Work practices mediation model is subdivided into 4 categories as shown in the figure. They are

- High performance work Parameters
- Relational and Communication Dimension
- Quality Outcome
- Performance outcome

By keeping the above-mentioned parameters in mind 2 sets of questionnaires are being framed. The first set consist of various elements which reflects High performance work parameters and RC dimensions. The second set reflects the quality and efficiency outcome.

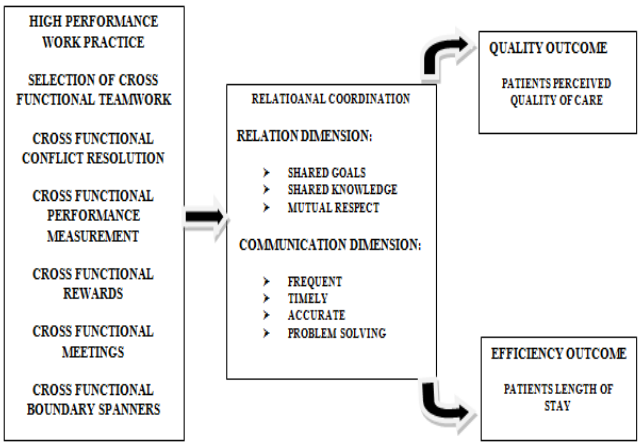

Fig.2 Structure of Work Practices model

III. LITERATURE ANALYSIS

TABLE.1 Literature Summary

AUTHOR	COORDINATION PROBLEM	COORDINATION MECHANISM	PERFORMANCE MEASURED
Chantal Sylvain. Et al(2012)	Difficulties in integration service	Integrate professional services	Analysis of Dynamic work practices in work environment

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Jody Hoffer Gittell(2011)	Low performance	Relational coordination	Investigated performance effects of relational coordination
Donna S. Havens et al (2010))	Difficult in relationship, and customer satisfaction	Doctor-patient relationship, Customer satisfaction	Efficiency of quality of care
Rob Seidner et al (2010)	Organizational problems	Communication and integration	Improvising the Collaboratory approach to develop cross functional team work
Abraham carameli ,Jody Hoffer Gittel (2008)	Way of communication and knowledge sharing	Collaborative communications, Knowledge transfer	Competencies within different types of healthcare organizations
Jody Hoffer Gittell et al (2008)	Difficult to knowledge sharing	Knowledge sharing	Effective knowledge sharing networks in professional complex systems
Zhen Xiong Chen et al (2008)	Reduced the customer relationship	Mutual sharing of information between care givers to the care receivers	Quality and Efficiency outcome as a result of the mutual relationship
Jody Hoffer Gittell (2008)	During the quality Maintenance hospitals feels difficult in cost reduction	Relational coordination in high module	Relational work system performance

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Jody Hoffer Gittell, Dana Beth Weinberg, Cori Kautz (2007)	Coordination in complex work	Knowledge transfer	Effective knowledge transfer
Jody Hoffer Gittell (2002)	Low communication between primary physicians	Coordination and communication	Good communication and information transfer
Jody Hoffer Gittell, Kathleen M Fairfield et al (2000)	Patients duration of stay in health care center	Mutual respect	Understanding and equality for other care providers

IV. RC IMPLEMENTATION METHODOLOGY

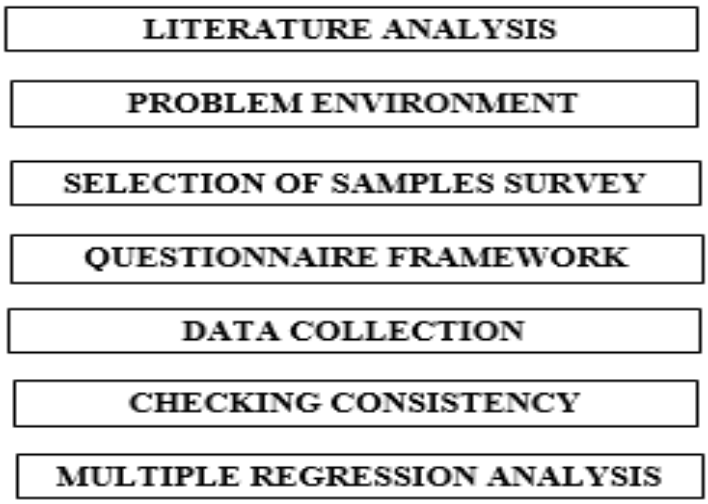

Fig.3 Methodology for RC implementation

V. PROBLEM IDENTIFICATION

The Health care centers are one the areas which depend more on quality of service provided to the patients. To achieve this the inter department relationship should be maintained fruitfully. By selecting various respondents in different departments, the quality of care perceived to the patients and their regular work practices have been noted.

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The Respondents taken for the study are listed in the figure and their relationship flow will be in the prescribed manner.

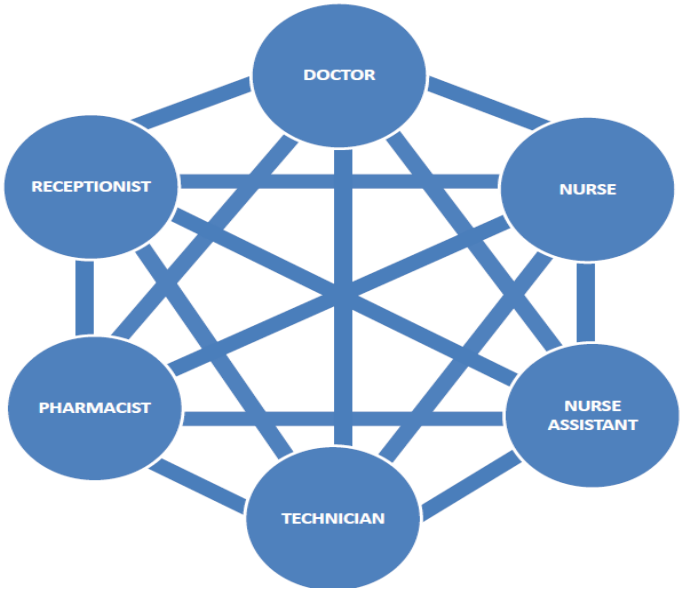

Fig.4 RC Model in Indian Hospital

VI. OBJECTIVES

The main objective of the work is to,

- Validate the consistence of Relational Coordination dimensions by Cronbach alpha.
- Find reasons for communication gap between the care providers.
- Establish the relationship between dependent and in dependent variables by multiple regression analysis.

VII. QUESTIONNAIRE FRAME WORK

Questionnaire 1

CROSS FUNCTIONAL TEAM WORK:

1.Do you believe working in team formation improves quality of care?
2.Is the previous health records of an individual very important for giving best treatment?
3.Is it fair to say lack of experience in team does not help to solve complicated problems?
4. Do you think working in a cross functional team improves outcomes in terms of quality?
5. Equality in work load allocation helps to share the load of individual worker

CROSS FUNCTIONAL TEAM REWARDS:

6. Do you have the practice of getting appreciated for your good work?
7. Will your team gives you a better space to get reward for your work?
8. Do you think the appreciation you received your work matches the effort of your work?
9. Do you think you are in a wrong team which affects your performance?
10. Is there a scope for creativity and innovation in your team?

CROSS FUNCTIONAL TEAM MEETINGS:

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11. Effective participation in team meetings helps to resolve problems?
12. Do you think all the problems you are facing are addressed in team meetings?
13. Are you getting proper invitation for attending meetings in different departments?
14. Do you think commencing and completing of meeting are planned perfectly?
15. Does the multi-disciplinary team meetings helps you to rectify your flaws?

CROSS FUNCTIONAL CONFLICT RESOLUTION PROCESS:

16. When a problem arises do you have a common strategy to address the problem?
17. Do you get frequent support from your colleague for facing a difficulty in work?
18. Do you face any mis understandings with your co-worker during work?
19. Do you think the reason for Conflict of interest between the workers is due to improper information sharing from hierarchy of control?
20. The conflicts within the organization always creates a negative impact in the care given to the patients?

CROSS FUNCTIONAL PERFORMANCE MEASUREMENT:

21. Do you think the cross functional treatment expands the patient's retention in the hospital?
22. Immediate response to the problem always give a positive feedback in patients duration of stay?
23. Do multi-disciplinary team meetings helps to sort out the problems of patients in several aspects?
24. Cross functional appreciation to the workers increases their morality to work?
25. The length of stay of a particular individual can be enhanced by properly resolving the conflict of interest?
26. Most of the patients are looking for health care providers who have multi-disciplinary skills?
27. The method of linkage between Cross functional approach and service quality is?
28. Steps taken for solving the patient's problem will have direct relation with the quality of service given to them?
29. Multi-disciplinary team meetings helps to improve the quality of care given to the patient?
30. Appreciating the workers in multi departmental level helps to improve the level of care given?
31. Resolving the conflict of interest between the workers results in better quality outcome?
32. Does the impact of cross functional team work made impact in service quality.

RELATIONAL COORDINATION:

33. Do you discuss the details of the patient with your colleague frequently?
34. Will you have the habit of sharing the case history of the patients to other people?
35. Do you communicate the criticality of the patients in a measured quantum of time?
36. Will you maintain timely cross functional approach to discuss about the patient?
37. Does the interrogation you are having about the patient is exactly matches the actual problem?
38. Does accurate communication is carried out with other department people about the patients?
39. Can you get help from your co-workers during critical situations of your patient?
40. Can you get help from the workers of other units during critical situations of your patient?
41. Does all the workers maintain mutual respect towards each other?
42. Do you get recognition for your effort outside your department?

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43. Do you share the objective of your work to others in the department?
44. Will the persons outside your department understand your idea in patients care easily?
45. Does all the members in your department knows others roles in quality care?
46. Does the vision of your department is open to others for better understanding?

Questionnaire 2

PATIENT PERCEIVED QUALITY OF CARE (QUALITY OUTCOMES)

1. To what extent care providers (i.e. Doctor) communicate well with the medical instructions clearly?

2. How carefully do these care provider answers to your queries?

3. How far you are satisfied with the duration spent by the care provider?

4. To what extent the care providers pay attention to collect and analyze important patient medical history in detail?

5. To what extent you are pleased with care providers courtesy and respect during treatment?

PATIENT LENGTH OF STAY (EFFICIENCY OUTCOMES)

6. To what extent you believe the worthiness of treatment with respect to payment?

7. To what extent you believe the worthiness of treatment with respect to facilities?

8. How far you are satisfied with respect to your length of stay in Hospital and recovery?

9. To what extent you think the latest hospital experience is efficient when you compare the service you received in other hospitals

10. To what extent the length of stay to you is important when selecting the hospital for treatment.

VIII. VALIDATING A QUESTIONNAIRE

The above given questionnaires have been shared to 500 number of participants and their response have been recorded. The response haven been measured in 7-point likert scale. The internal reliability of the questionnaires has been checked and is found to be in optimum range. The figure 6 shows the optimum acceptable range of Cronbach alpha.

$$\alpha = \frac{K}{K-1}\left(1 - \frac{\sum_{i=1}^{K} \sigma_{Y_i}^2}{\sigma_X^2}\right)$$

Fig.5 Chronbach Alpha formula

K - Total questions in terms of number
σ^2 X -Variance of number of variables
$\sigma^2 Y_i$ - Variance of samples.

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ALPHA VALUE	INTERNAL CONSISTENCY
$\alpha \geq 0.9$	EXCELLENT
$0.7 \leq \alpha < 0.9$	GOOD
$0.6 \leq \alpha < 0.7$	ACCEPTABLE
$0.5 < \alpha < 0.6$	POOR

Fig.6 Acceptable alpha values for checking internal consistency

The formula to calculate the internal consistency is given in fig 5. The detailed calculation of this will be found from SPSS software. Based on the response of the respondents in the 7-point scale the value is tabulated. The variance is calculated for both the variable and samples. The result suggest that the reliability of the above questionnaire is in excellent (0.925225036) and good(0.8995) condition which also ensures the feasibility of the study.

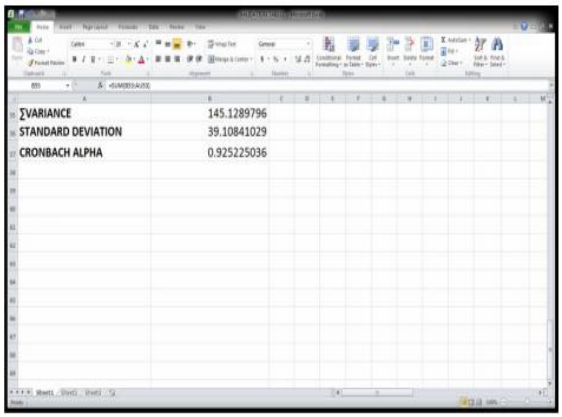

Fig.7 Questionnaire 1 internal consistency

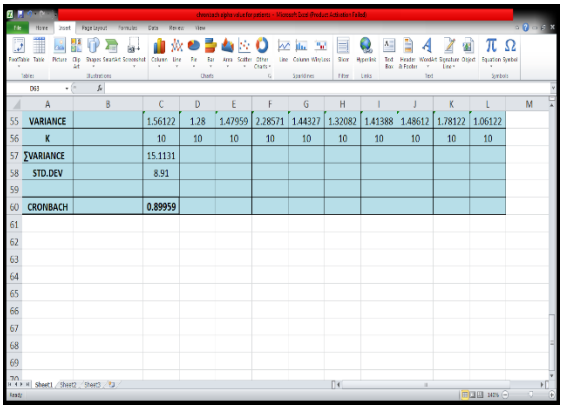

Fig.8 Questionnaire 2 internal consistency

IX. MULTIPLE REGRESSION

The purpose of multiple regressions is to predict a single variable from one or more independent variables. Multiple regressions with many predictor variables are an extension of linear regression with two predictor variables. In SPSS multiple regressions is done with one dependent variable and two or more independent variables. Of the 5 dependent variables i.e., the 5 work practices chosen, each practices are individually analyzed in SPSS to check for their dependency. The work practices are the dependent variables and the RC dimensions

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accounts for independent variables. For each practices regression analysis is run on SPPS and each of its output are individually analyzed to find out the RC dimension which has more impact on the corresponding work practices. The following are the results thus obtained from SPSS.

TABLE.2 Cross Functional Team Work Variables Entered/Removed

Model	**Variables Entered**	**Variables Removed**	**Method**
1	SK, FC, AC, PSC, MR,TC, SG[b]	**.**	Enter

a. Dependent Variable: CFTW
b. All requested variables entered.

Model - SPSS allows to specify multiple models in a single regression command. This tells the number of the model being reported.
Variables Entered - SPSS allows entering variables into a regression in blocks. Hence it is necessary to know which variables were entered into the current regression. This column lists all of the independent variables that are specified.
Variables Removed - This column listed the variables that were removed from the current regression. Usually, this column will be empty unless we do a stepwise regression.
Method - This column tells the method that SPSS used to run the regression. "Enter" means that each independent variable was entered in usual fashion.
Model Summary

TABLE.3 Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.451[a]	.204	.120	.76722

a. Predictors: (Constant), SK, FC, AC, PSC, MR, TC, SG

Model - SPSS allows specifying multiple models in a single regression command. This tells the number of the model being reported.

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R - R is the square root of R-Squared and is the correlation between the observed and predicted values of dependent variable.

R-Square - This is the proportion of variance in the dependent variable which can be explained by the independent variables. This is an overall measure of the strength of association and does not reflect the extent to which any particular independent variable is associated with the dependent variable.

Adjusted R-square - This is an adjustment of the R-squared that penalizes the addition of extraneous predictors to the model.

Std. Error of the Estimate - This is also referred to as the root mean squared error. It is the standard deviation of the error term and the square root of the Mean Square for the Residuals in the ANOVA table

TABLE.2 Anova[a] Table

Model		**Sum of Square**	**Df**	**Mean Square**	**F**	**Sig.**
1	**Regression**	10.082	7	1.440	2.45	.027[b]
	Residual	39.438	67	.589		
	Total	49.520	74			

a. Dependent Variable: CFTW

b. Predictors: (Constant), SK, FC, AC, PSC, MR, TC, SG

TABLE.5 Cross Functional Team Work (CFTW) Coefficients

Model		**Unstandardized**		**Standardized**	**T**	**Sig.**
		B	**Std.**	**Beta**		
1	(Const	3.1	1.345		2.3	.022
	FC	.17	.116	.188	1.5	.136
	TC	.01	.094	.018	.14	.882
	AC	.10	.109	.130	.98	.330
	PSC	.09	.081	.133	1.1	.243
	MR	-	.128	- 189	-	.100
	SG	**.18**	.107	.218	1.7	.093
	SK	.05	.088	.063	.56	.571

a. Dependent Variable: CFTW

B - These are the values for the regression equation for predicting the dependent variable from the independent variable. Higher the B value, higher is its impact on the dependent variable
In this case, Shared Goals (SG) has the higher B value which indicates that the for an increase in SG there exists an increase of 0.183 in CFTW which is 18.3% increase in the work practice chosen.
TABLE.6 Cross Functional Team Reward (CFTR) Coefficient

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a. Dependent Variable: CFTR

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. E	Beta		
1	(Consta	4.570	1.42		3.19	.00
	FC	-.023	.123	-.025	-	.85
	TC	.092	.099	.121	.927	.35
	AC	- 147	.116	- 177	-	.21
	PSC	.105	.086	.146	1.22	.22
	MR	- 258	.136	- 228	-	.06
	SG	.008	.114	.009	.067	.94
	SK	-.091	.093	-.114	-	.33

TABLE.7 Cross Functional Team Meetings (CFTM) Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.797	1.151		3.298	.002
	FC	.190	.099	.245	1.908	.061
	TC	-.011	.080	-.018	-.138	.891
	AC	.062	.093	.091	.668	.506
	PSC	-.052	.069	-.088	-.753	.454
	MR	-.111	.109	-.119	-1.019	.312
	SG	-.002	.092	-.003	-.024	.981

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	SK	.140	.075	.214	1.860	.067

a. Dependent Variable: CFTM

TABLE.8 Cross Functional Conflict Resolution Process (CFCRP)

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	3.933	1.175		3.347	.001
	FC	-.071	.094	-.095	-.759	.451
	TC	.035	.089	.049	.387	.700
	PSC	.030	.110	.039	.274	.785
	MR	**.129**	.128	.121	1.002	.320
	SG	.050	.110	.064	.457	.649
	SK	.088	.089	.118	.983	.329

a. Dependent Variable: CFCRP

TABLE.9 Cross Functional Performance Measurement (CFPM) Coefficients

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	3.763	1.335		2.818	.006
	FC	.131	.115	.144	1.141	.258
	TC	.016	.093	.021	.171	.865

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	AC	-.026	.108	-.032	-.242	.809
	PSC	**.198**	.080	.282	2.467	.016
	MR	-.227	.127	-.206	-1.794	.077
	SG	.049	.106	.059	.457	.649
	SK	.079	.087	.103	.912	.365

a. Dependent Variable: CFPM

x. CONCLUSION

Cronbach Alpha

The (Cronbach alpha) value of questionnaire collected from the Staffs is 0.925.This shows that the internal consistency is in excellent level.

Similarly the (Cronbach alpha) value of questionnaire 2 collected from the patients is 0.89.This shows that the internal consistency is in Good level.

Multiple Regression Analysis:

i. When cross functional team work is chosen as dependent variable the factor of impact is Shared goals. In this case, Shared Goals (SG) has the higher B value which indicates that the for an increase in SG there exists an increase of 0.183 in CFTW which is 18.3% increase in the work practice chosen.

ii. When Cross functional team Reward is chosen as dependent variable the impact factor is problem solving communication. In this case, Problem Solving Communication(PSC) has the higher B value which indicates that the for an increase in PSC there exists an increase of 0.105 in CFTR which is 10.5% increase in the work practice chosen

iii. When Cross Functional Team Meeting is chosen as dependent variable the impact factor is frequent communication. In this case, Frequent Communication (FC) has the higher B value which indicates that the for an increase in FC there exists an increase of 0.190 in CFTM which is 19% increase in the work practice chosen

iv. When Cross Functional Conflict Resolution Process is chosen as dependent variable the impact factor is Mutual Respect. In this case, Mutual Respect(MR) has the higher B value which indicates that the for an increase in MR there exists an increase of 0.129 in CFCRP which is 12.9% increase in the work practice chosen

v. When Cross Functional Performance Measurement is chosen as dependent variable the impact factor is Problem Solving Communication. In this case, Problem Solving Communication (PSC) has the higher B value which indicates that the for an increase in PSC there exists an increase of 0.198 in CFPM which is 19.8% increase in the work practice chosen.

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