

An insight among students of health sciences towards HIV/AIDS: A cross sectional study in coastal Karnataka

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Short running title: Perceptions of medical students on HIV

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Abstract: The objective of this paper is to assess the level of knowledge about HIV/AIDS among Interns of a Dental and Medical College. The data is collected through structured questionnaire by cross sectional study method with the sample size of 246. The model is tested on a context of Interns of dental and medical students for the first time. The present study has used a reflective measurement model. Due to the model complexity, the use of Partial Least Square-Structural Equation Modelling approach is found to be appropriate for the purpose of analysis of constructs and their corresponding data. The structural model has proved that the path coefficient value and empirical t values of exogenous latent variables on endogenous latent variable are above that threshold value in relationship between knowledge and trust as well as perception and trust except attitude and trust. The testing of hypothesis confirms the strong relationship between knowledge and trust as well as perception and trust. Based on the results of Importance Performance Matrix Analysis results corporate need focus on changing the perception of interns primarily. Hence,

medical college must aim at increasing the performance of the target construct trust so their first priority should be to improve the performance aspects captured by the construct perception performance by improving its total effects as this construct has high chance to improve its total effect which in turn improves its performance.

Keywords: Knowledge, Perception, Attitude, Trust, HIV, AIDS

1. INTRODUCTION

HIV infection is transmitted via the body fluids of an infected person. It is transmitted from human to human due to unsafe sexual practices, for instance, Vaginal, Oral and Anal Sex. HIV infection is also transmitted through use of IV needles previously used by an infected person, blood transfusion, through childbirth or breastfeeding. . HIV infection, a foremost worldwide source of illness, is a devastating public health issue with high morbidity and mortality rates ^[1]. As per World Health Organization, 36.7 million people are infected with HIV at the end of 2016. Out of this, 3.5 million belonged to South East Asia ^[2]. In 2014, the estimated number of PLWH in India was 2,088,638 with an adult HIV prevalence rate of 0.27% ^[3].

HIV infection imposes devastating health burden on women's reproductive organs as women are prone to untreated infections. Also, lack of awareness, social factors, fear, stigmatization, and hesitation to resist makes women more prone to HIV Infections. In rural areas, HIV infection is more prevalent due lack of information, lack of access to sex education , lack of appropriate information due to less access to education and lower social status which leads to compromise of the reproductive health of women, making women ache from more contrary concerns from HIV infection than males ^[1].

According to the studies conducted in the past years, it is evident that there is lack of knowledge, perception, negative attitude and unwillingness on behalf of most of the healthcare professionals towards handling patients with HIV infection. Majority of respondents has ample knowledge about approaches for reducing HIV/AIDS related dishonor; but a negative prejudiced approach towards PLWHA ^[4]. Survey also showed that there is lack of knowledge among healthcare professionals with respect to HIV infection ^[5]. Evidences are drawn from the research reports that there is unwillingness on part of some nursing students in some specific provinces of the world to provide care for people with HIV/AIDS ^[6]. It has been observed that most of the defendants had sound information about mode of transmission of HIV but lacked knowledge and availability of materials required for universal precautions and exhibited discriminatory attitude towards PLWHAs ^[7]. As health is a state subject in India research also showed even a positive attitude and willingness of staff and students to treat a patient suffering from HIV/AIDS ^[8].

Dental and Medical students represent a potent and highly educated group in the society. Mixture of blood-borne pathogens as well as microorganisms cause HIV infection. Dental and Medical practice usually catch blood and saliva which may contain such pathogens and microorganisms, leading to transmission of HIV infection when proper care and appropriate treatment is not provided during dental and/or medical procedures ^[2]. Oral manifestations of HIV can be devitalizing and may deteriorate the caliber of life of the patients. To provide an improved patient's quality of life, early detection and management of the oral manifestations are necessary. Stigmatization and discrimination towards such diseases contribute to hindering the healthcare efforts to curb the disease and prevent its transmission. Ethical codes and conducts in medicine and dentistry comprise of principles which strengthens the professional practice in providing treatment. Therefore, it's the ethical responsibility to provide appropriate treatment and care for people suffering from HIV infection ^[2].

Hence, it is important for Dental and Medical healthcare professionals to understand the significance of HIV infection in order to provide effective clinical management to these patients. For this, adequate knowledge of the disease process, oral manifestations, and mode of transmission is necessary^[1].

Unacceptable behaviour and discrimination by healthcare professionals against patients with HIV infection have been observed. This, in turn, tends to have a detrimental effect on the patient's health status physically as well as psychologically. With increasing numbers of HIV infected patients, it is important for Doctors, Dentists, Nurses and Allied Health Science Professionals are expertise about disease, its form of transmission, management and their attitude and behavior should be positive while treating such patients ^[1,2,9]. Hence, present research endeavor is intended to survey the awareness and perception of dental and medical students towards HIV infection so as to prevent reluctance of the Doctors towards treating patients with HIV infection and to increase awareness and knowledge about the disease and its mode of transmission, as Dental and Medical students are the future healthcare providers.

2. METHODS

The foremost objective of study is to assess the level of knowledge about HIV/AIDS among Interns of a Dental and Medical College. A cross sectional study is organized among the first year Undergraduates and Interns of Manipal College of Dental Science, Mangalore and Kasturba Medical College, Mangalore. All male and female students equal and above 18 years of age studying in the colleges mentioned above who has provided written informed consent for this study. Total of 246 students are randomly selected for the study who have registered for the course of medicine and dentistry in the above mentioned Colleges. Data is collected by using pre-decided semi-structured questionnaire. Details regarding knowledge, perception and attitude of the First years and Interns of Dental and Medical College towards treating patients with HIV infection is enquired in the survey. Non-probability random sampling method is adopted as the sampling procedure. Statistical analysis is done by using Smart PLS 3 software which is a second generation software through which PLS-SEM model (Partial least square- structural equation model) has been developed. Data was collected using web-based questionnaires through google forms. The study is commenced only after obtaining clearance/approval from the Institutional Ethics Committee. This study may better help us in identifying the barriers in the willingness of Dental and Medical Students towards the treatment of HIV infection and thereby improving upon it resulting in a better response of Dental and Medical Students towards treating patients with HIV infection for the benefit of those in need of treatment for the same.

3. RESULTS

Measurement model

PLS-SEM approach recommends the measurement of reliability by using the measure of composite reliability as it measures internal consistency reliability far better than Cronbach's Alpha. In this regard, composite reliability has two distinct advantages over Cronbach's Alpha. First, the measure of composite reliability does not consider all indicators to be the equal contributors to the construct as does the measure of Cronbach's Alpha. Second, composite reliability does not underestimate the internal consistency reliability by not demonstrating the tendency to increase the value of internal consistency reliability even as the number of items in the scale increases, a tendency that we find in the measure of Cronbach's Alpha. There are varying rules of thumb that explain whether R^2 values are high

or not ^[10]. Prior research states that the cut-off values of 0.25, 0.50 and 0.75 for endogenous constructs are treated to be weak, moderate and high respectively in other studies ^[10].

Figure 1: Measurement Model

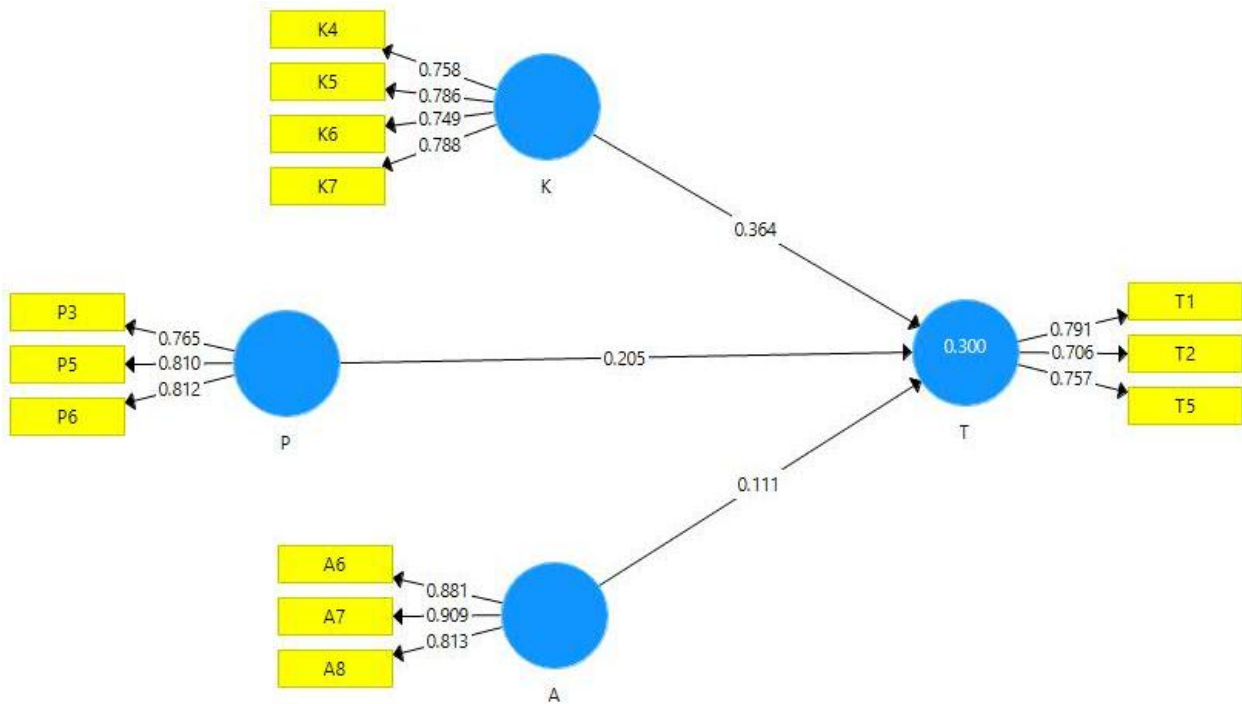


Table 1 : Measurement model assessment

Latent Variable	Elements that the indicator capture	Outer Loadings	Indicator Reliability	Composite Reliability	AVE
A	A6	0.881	0.776	0.902	0.754
	A7	0.909	0.826		
	A8	0.813	0.660		
K	K4	0.758	0.574	0.854	0.594
	K5	0.786	0.617		
	K6	0.749	0.561		
	K7	0.788	0.620		
P	P3	0.765	0.585	0.839	0.634

	P5	0.810	0.656		
	P6	0.812	0.659		
T	T1	0.791	0.625	0.796	0.566
	T2	0.706	0.502		
	T3	0.757	0.573		

Measurement model assessment: Outer loading

Outer loadings of indicators, in reflective measurement models, indicate the absolute contributions of indicators to their respective constructs. PLS-SEM approach calculates outer loadings of indicators by running simple regression models in which a latent construct is the independent variable and a given indicator is its dependent variable. Therefore while outer loadings of indicators signify the absolute contributions of indicators, indicator reliability signifies the communality of every indicator. For a reflective model the threshold value of path loadings should be above .70^[11]. The threshold value of outer loadings of all indicators are above 0.7 (Table 1.1). This indicates that the indicators of all constructs have acceptable levels of outer loading. It may be noted that the survey instruments, adopted for this study, eliminated those indicators which had weak outer loadings and indicator reliability. Further, some items including a few constructs had to be eliminated either because of it has weak outer loading or due to their distorting effect on the average variance extracted.

Measurement model assessment: Indicator reliability

Indicator reliability is a communality of an item. We find this out by squaring the outer loadings of indicators. There should be a threshold value of 0.5 to obtain acceptable values of indicator reliability. Indicator reliability may be understood as the square of the outer loading. Indicator reliability value is 0.5^[10]. This indicates that a given construct provides at least 50% explanation for the variance of its items. This means that a given indicators adequately represent the theoretical meaning embedded in a construct. The indicator I would not give a disgusted look when I see patients with HIV infection has value of 0.776, the indicator I would be compassionate enough with patients suffering from HIV infection and give him/her hope that he/she can recover from illness has value of 0.826 and indicator I would prefer treating HIV infected patients without any discriminatory attitude has value of 0.660 respectively indicates that the items of construct attitude has established indicator reliability. The knowledge constructs has item I am well acquainted with the procedure in case of needle sick injury with value of 0.574, standard protective equipment's like gloves and mask should be used by the healthcare professionals to provide sufficient safety against infection has value of 0.617, Medical/dental students having HIV infection should cease their occupation so as to prevent transmission of the infection to the patients has value of 0.561 and patients who are seropositive for HIV cannot donate blood with value of 0.620 indicates that items of knowledge has established indicator reliability. Similarly, items of construct perception HIV infection can be transmitted through infected shaving blade, coughing/Sneezing and by touching the blood of an infected person has values like 0.585, 0.656 and 0.659 respectively which is above the threshold value. Finally indicator trust has items like HIV infected patients should be treated unbiased, HIV infection can be transmitted through needle stick injury, so HIV infected patients should not be treated in the clinic and HIV infection can be

transmitted through needle stick injury, so medical/dental students should practice infection control and treat patients with 0.625, 0.502 and 0.573 respectively establishes indicator reliability. Thus, all items has have demonstrated indicators reliability values that are above 0.5 (Table 1.1).

Measurement model assessment: Composite/Internal consistency reliability

Composite reliability also known as internal consistency reliability is considered to be more adequate than Cronbach alpha has the measure of composite reliability doesn't have the tendency to increase the value of reliability along with addition of every new item. For confirmatory research the threshold value of internal consistency reliability should be equal to or greater than .70^[11]. The exogenous latent variables of the measurement models, in the present study, demonstrate high levels of internal consistency reliability. This is illustrated with exogenous latent variables constructs namely, Attitude, knowledge, perception and trust with the values of 0.902, 0.854, 0.839, and 0.796 respectively which is above the threshold value of 0.7 (Table 1.1).

Measurement model assessment: Convergent validity

Average variance extracted (AVE) a strongly recommended test to measure convergent validity.^[12] Convergent validity is measured with AVE threshold value should be more than 0.50^[13]. The extent of correlation that a particular measure of reflective construct exhibits in relation with rest of other construct is what convergent validity indicates. AVE is the measure through which we evaluate convergent validity. AVE is also the communality of a given construct. It is measured by finding out the average of the squared outer loadings of all construct related outer loadings. In an acceptable model, threshold value of AVE should be greater than .5^[12, 20]. The latent variables constructs namely, Attitude, knowledge, perception and trust has values like 0.754, 0.594, 0.634 and 0.566 respectively indicates convergent validity. AVE values of all exogenous and endogenous latent variables constructs are above the threshold value of 0.50 (Table 1.1). Therefore, there exists convergent validity in all exogenous and endogenous latent variables constructs of all measurement models.

Measurement model assessment: Discriminant validity through Fornell-Larcker criterion

PLS is a better way to assure the degree to which a given construct of the model is distinct from other constructs for measuring the discriminant validity^[13]. To assess the discriminant validity the square of the correlations among the variables has been contrast with the AVE^[15]. Before assessing the structural model, calculating the measurement models is essential. Discriminant validity can be assessed using^[14] criterion which is a comparison between square root of AVE and other latent variables. Therefore, discriminant validity is a measure of uniqueness of a given construct. The table 1.1 demonstrates how the square root of AVE of every latent variable exceeds its correlation with other latent variables.

Table 2: Discriminant validity by Fornell-Larcker criterion

	A	K	P	T
A	0.869			
K	0.484	0.770		
P	0.395	0.378	0.796	
T	0.368	0.495	0.386	0.752

Figure 2: Boot strapping

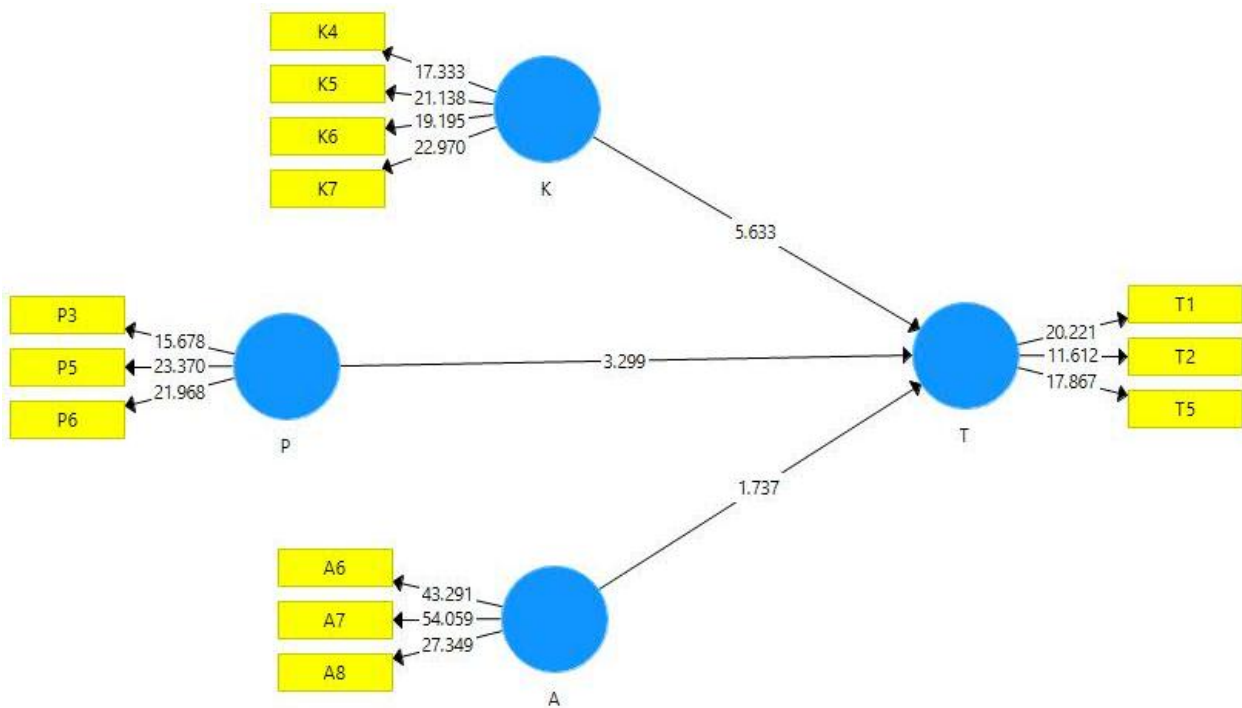
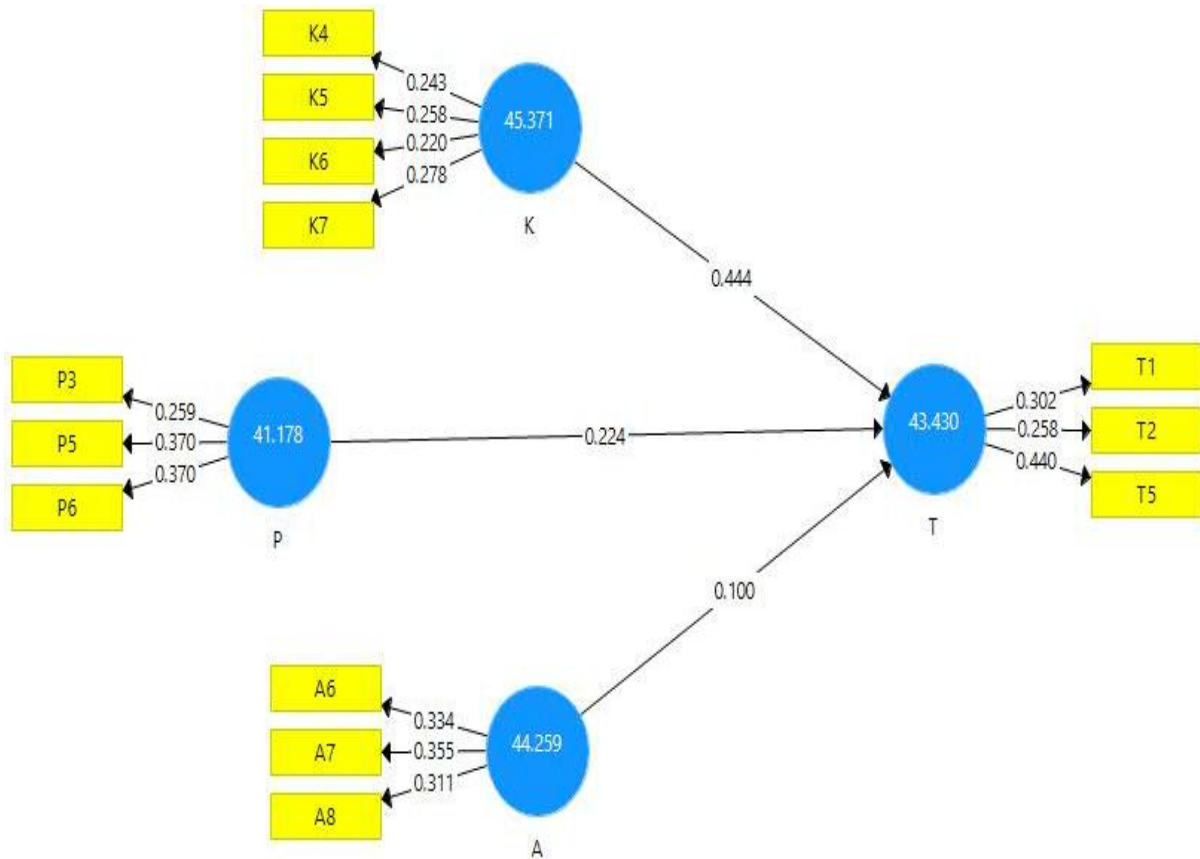


Table 3: Hypothesis testing

Relation	Path coefficient	p-value	t – value	Bias corrected 95% confidence interval
A -> T	0.111	0.082	1.737	(0.013, 0.236)
K -> T	0.364	0.000	5.633	(0.225, 0.475)
P -> T	0.205	0.001	3.299	(0.074, 0.318)



The values shown, in the table 2, reveal that there exists discriminant validity among all constructs of the measurement model as the square root of all latent constructs is higher than their correlation with all the other latent constructs. The above criterion, in accordance with the Fornell-Lecker criterion, is considered by researchers to be conservative in assessing discriminant validity [10]. The amount to which a given construct of the model is distinct from other constructs [15, 10, 23]. The exogenous latent variable attitude has value 0.869 which is higher when compared with other constructs. Similarly the value of construct knowledge is 0.770 which is higher when compared with other constructs horizontally and vertically. The value of construct perception with value 0.769 is higher in comparison with other constructs. Finally, the endogenous latent variable trust with value of 0.752 is higher in comparison with rest of the constructs. The diagonal values shown in the (Table 1.2) is nothing but the square root value of AVE of the construct, which is higher when compared horizontally and vertically with other constructs values.

Note: It may be noted that this study chose the algorithm settings of 246 cases, 5000 samples, and the option of 'no sign changes' in order to check the path coefficients' significance (Hair et al., 2014). The p-value is found out by invoking the bootstrapping procedure with 246 cases and 5000 samples. Double bootstrap routine has been used to arrive at the bias corrected 5% (two-tailed) confidence interval (Chin, 1992^[15]).

The direct effect of construct attitude on trust was investigated. 0.111 was the path coefficient above the threshold value of 0.20 (Table 1.3). Below the threshold value of 1.96; the empirical t value of 1.737 exists. Thus, these values validate the hypothesis 1 ; there is no affirmative straight effect of attitude on trust. The direct effect of construct knowledge on

trust was measured the path coefficient of 0.364. The empirical t value is 5.633 is above the threshold value of 1.96. Accordingly, there is significance in the relationship between knowledge and trust at 5% level of significance. Thus, these values substantiate the hypotheses 2 that states the positive direct effect of knowledge on trust. The direct effect of perception on trust was investigated. The path coefficient and the empirical t value are 0.205 and 3.299 respectively which is above the threshold values. Accordingly, there is significance relationship between perceptions on trust at 5% level of significance. Thus, it reveals that perception exercises direct effect on trust. Thus, these values authenticate the hypotheses 3 that states the optimistic direct effect of perception on trust.

Importance- Performance matrix analysis

The IPMA analysis gives us an idea regarding the relative importance and performance of exogenous constructs in their relationship with endogenous construct. Total effects of exogenous constructs represent their importance, while their index values represent their performance. Importance reveals the complete overall effect on the final endogenous variable in the path diagram. Performance reveals the capacity of latent variable scores. More precisely, the IPMA contrasts the total effects, representing the predecessor constructs' importance in shaping a certain target construct, with their average latent variable scores indicating their performance [14, 16, 17].

Importance- Performance matrix analysis for trust (Constructs wise)

see figure 3

On the X axis, "Importance" is measured which reveals total effect. If the total effect of any construct is higher than other construct then that construct is more significant. On the Y axis, "Performance" is measured and if a construct has higher mean value then that construct has higher performance which reflects solid measurement paths [10, 19, 20, 21, 22].

The IPMA of the exogenous constructs of this study is given in Figure 4.

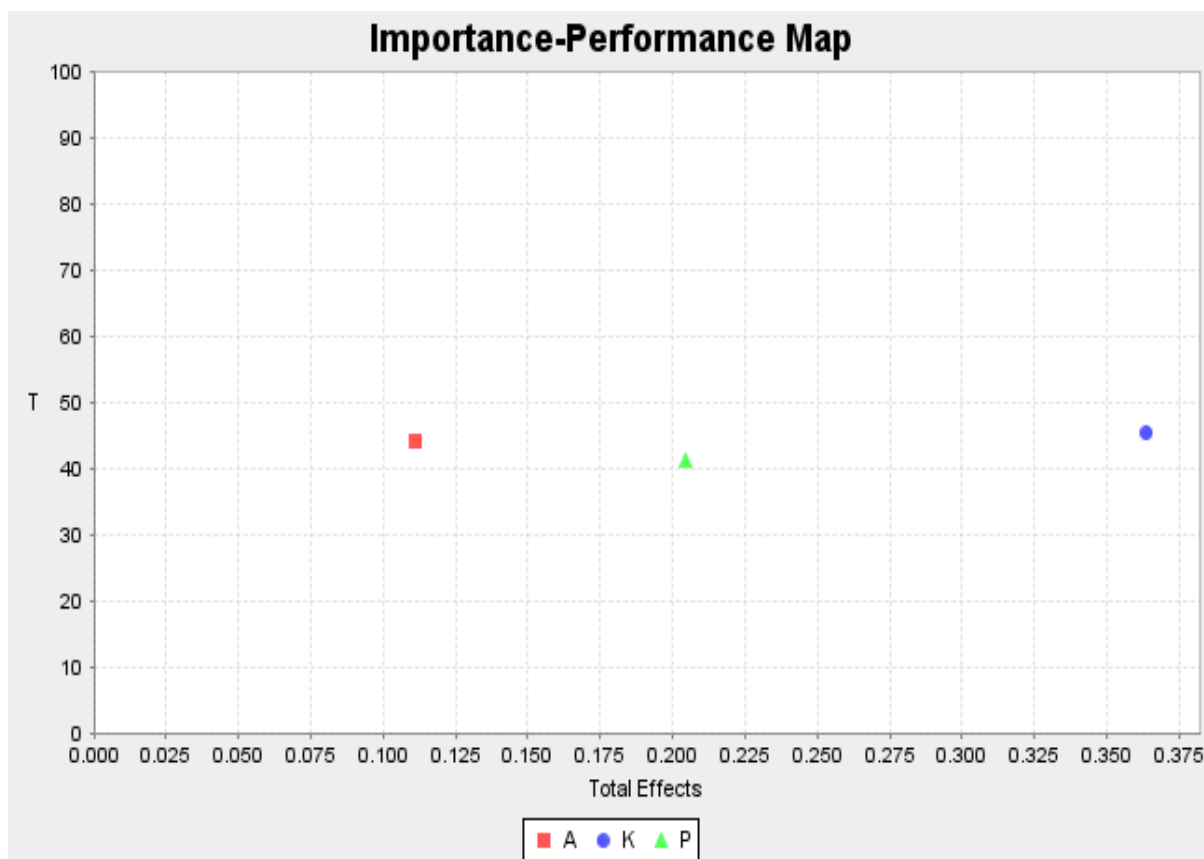


Table 4

Latent constructs	Importance (Total effects)	Performance (Index values)
A	0.111	44.259
K	0.364	45.371
P	0.205	41.178

IPMA analysis (Table 4) shows that construct knowledge has a high performance of 45.371 in comparison with the other exogenous latent variables. On the other hand, with a total effect of 0.5364 of construct knowledge importance is particularly high. Therefore, a one-unit increase in knowledge performance from 45.371 to 46.371 would increase the performance of trust by 0.364 points from 43.430 to 43.794. The construct attitude has a performance of 44.259 and total effect of 0.111. Therefore, a one-unit increase in construct attitude performance from 44.259 to 45.259 would increase the performance of trust by 0.111 points from 43.430 to 43.541. The construct perception has a performance of 41.178 and total effect of 0.205. Hence, a one-unit increase in construct perception presentation from 41.178 to 42.178 would upsurge the act of trust by 0.205 points from 43.430 to 43.635.

4. DISCUSSION

This research endeavor has empirically shown the vital role played by the exogenous latent variables on endogenous latent variable through importance performance matrix analysis. Hence, medical college must goal at augmenting the performance of the target construct trust so their importance should be to progress the performance aspects taken by the construct perception performance by improving its total effects as this construct has high chance to

improve its total effect which in turn improves its performance. It is necessary to change the perception of doctors towards HIV patients because many of them are apprehensive, the moment they get the information that patient is positive with this sexually transmitted disease. So changing perception of the doctors by creating awareness programme about HIV is essential. HIV awareness programmes as well as professional counselling from the psychiatry department is essential for the medical students so that in the near future they will treat HIV patients normally without any discrimination. So hospital need to concentrate on conducting effective awareness programmes on HIV for doctors which will change their mind set up towards STD.

5. CONCLUSIONS

The research study is confined to only to students of a Medical College attached to tertiary care center at Mangalore; of Karnataka state in India. The choice of the college and students for the purpose of the study was based on the relevant sampling method. Generalizing the findings to the Indian context may not be appropriate as the state of Karnataka is one of the relatively developed states in India, and there could be regional disparities. So One needs to concentrate on different well known medical colleges in India. Thus, generalizing the result of the study to India cannot be made on the basis of the findings. Structural model of the future research can take up global items and develop hierarchy model of PLS-SEM^[18]. It may be noted that the repeated indicators approach^[10], which is used for building the hierarchical component model in the future research endeavor, must warrants the inclusion of same number of items in every lower order construct.

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Conflict Of Interest: Nil

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