Attrition of Knowledge Workforce in Healthcare in Northern parts of India – Health Information Technology as a Plausible Retention Strategy

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ABSTRACT

Faced with a global shortage of skilled health workers due to attrition, countries are struggling to build and maintain optimum knowledge workforce in healthcare for delivering quality healthcare services. Forces that affect healthcare professionals' turnover needs to be addressed before a competent uniformly adoptable strategy could be proposed for mitigating the problem. In this study we investigate the effects of the socio–demographic characteristics on attrition of healthcare knowledge workforce in northern parts of India that have a wide gradient of rural and urban belt, taking into account both public and private healthcare organizations.

For this purpose healthcare professional attrition tracking survey (HATS) was designed. The data has been collected from a random sample of 807 respondents consisting of doctors, nurses, paramedics and administrators to explore the relationships between various factors acting as antecedents in affecting the job satisfaction, commitment and intention of a healthcare professional to stay in the job. Structured questionnaires were utilized as the data collection tools.

Descriptive statistics, factor analysis and path analysis were carried out using multiple regression and correlation to propose a model that best explains the theoretical assumption of factors leading to attrition. Six factors of attrition namely compensation and perks, work life balance, sense of accomplishment, work load, need for automation and technology improvement, substandard nature of work have been identified as the main factors with a data reliability of 0.809%. It has also been identified that the intention to shift is a major decision maker that affects attrition and in turn affected by job satisfaction dimensions. Based on the survey response and analysis, a highly possible strategy of utilizing information technology implementation for increasing worker motivation, job satisfaction and commitment to reduce attrition has been proposed.

Keywords

Healthcare professional, healthcare information technology, attrition, job satisfaction, work-life balance.

1. INTRODUCTION

Health care industry relies a lot on advanced medical technology, but it is also a labor-intensive industry. In recent times there has been a steep rise in healthcare costs and healthcare staff shortages leading to healthcare organizations undergoing changes [1, 2]. Some of these changes have lead to increased performance expectations and efficiency further leading to stress, decrease in staff morale; amongst other reasons, resulting in increased attrition[3-5]. In this study, the terms "health care professionals" and "human resources for health" are used interchangeably, comprising of doctors, nurses, paramedics and hospital administrators. Researchers have identified the effect of shortage of skilled workers in hospitals that have led to high patient mortality, job dissatisfaction and burnout [6, 7]. The migration of health professionals has been debated to be one of the main reasons of attrition and has been the main focus of such studies [8,9]. It has been argued that opportunities for professional training, higher salaries and perks and better living conditions act as "pull" factors whereas surplus production of health personnel, resultant unemployment, less attractive salary, stagnation or underemployment coupled with lack of infrastructure act as "push" factors for the youth to migrate. A number of strategies have been discussed to counteract migration [8-11]. Human resources management plays a significant role in retaining health care workers [12].

As the Indian healthcare industry experiences phenomenal growth, hospitals are moving forward towards excellence rather than survival and gearing up to fulfil the gaps in three key areas of people, process and technology. India is

the one of the most populous country with larger population in rural areas[13] with an estimated 27.5% of Indians still living below the poverty line who cannot afford the healthcare services offered by private organizations due to cost and accessibility issues. Most of them utilize the public healthcare services provided by the government organizations. In a recent survey of dichotomy existing in the utilization of private and public health services in India, it emerged that a bias towards the use of private health services exists in spite of the earlier mentioned problems, may be due to the opinion that public healthcare services are not of good quality[14].

Even with greater number of health care professionals viz, doctors, nurses, pharmacists, paramedics getting trained ,the Indian healthcare sector is suffering from acute shortage of healthcare professionals and facilities delivering quality healthcare services to the citizens[15]. According to survey carried out in 2008-09, India has only around 85,000 doctors practicing modern medicine and 1.5 million nurses to serve its more than one billion population. It has 0.8 beds/ 1000 population, and 0.7 doctors / 1000 population (lowest in the world). This transforms to 7 doctors per 10,000 patients with a doctor/ nurse ratio of 0.83 compared to China having 20. This large disparity indicates a high attrition of knowledge workers in healthcare.

Implementation and utilization of information technology in healthcare (commonly identified as Health Information Technology or HIT) has proven to be of immense benefit like, improved patient care, reduced waste and inefficiency in services, reduction in adverse drug effects and medical errors etc [16-18]. Since healthcare professionals job satisfaction also has important implications for quality healthcare delivery, the relationship between the use of HIT and physician career satisfaction needs to be probed. In an earlier small scaled study [19] it was determined that using more information technology was the strongest positive determinant of physicians' being very satisfied with their careers.

India has joined the bandwagon of information technology adaptors and is one of the main global forerunners in this area[20,21]. A number of government policies and programs have been developed pertaining to use of healthcare information technology (HIT) to improve the quality of healthcare delivery [22,23]. Major private hospitals (corporate) and public hospitals at state level have implemented hospital information systems for patient management, employee management, inventory, pharmacy, laboratory etc, [24,25]. While there are articles that indicate there is greater danger of brain drain in the area of healthcare in India, there are no detailed studies that offer effective retention strategies for reducing the attrition in Indian scenario.

The aim of this study was to envisage implementation of information technology as a probable strategy to reduce attrition. More specifically, the purposes of the study were (a)to identify those aspects of the healthcare professionals job satisfaction that contributed to attrition among them, (b) to determine if the lack of information technology (IT) adoption in their work was one such factor and (c) more importantly can use of HIT be perceived as a probable retention strategy for reducing attrition.

The study was intended to advance our understanding of turnover among healthcare staff in several important ways. First, by focusing on healthcare personnel working in different settings: rural and urban, private and public. This approach was designed to avoid inappropriately generalizing findings from studies conducted exclusively either in private or public and urban or rural environments. This approach not only allows one to understand these environments exclusively, it also enables to ascertain those factors common to all. Second, our sample of personnel is considerably larger and more diverse than those employed in previous studies, which strengthens both the internal and external validity of the findings. Finally, we developed and tested a theoretical model that incorporates elements of both needs-satisfaction and work associated determinants of job satisfaction among healthcare personnel and their subsequent effects on intent to leave and turnover. This model represents an advancement over previous research , wherein it specifies the common processes by which turnover occurred among different types of healthcare staff in various work setting. Such an approach provides a stronger basis for designing a generalized scalable targeted intervention to increase job satisfaction and reduce turnover among healthcare personnel.

We adopted the multistage attitudinal, decisional, and behavioral process [26] for our theoretical model of turnover **(Fig. 1).** The behavioral component of the model is the act of separation from job which indicates attrition. This behavior is directly affected by the intent to shift from the current job (decisional component) which further represents the intervening variable between turnover and other antecedents of turnover [27, 28]. Although our proposed model conforms generally to this established approach, it places particular emphasis on the relative importance of specific dimensions of job satisfaction that influence intention to quit and on the personal attributes of healthcare personnel that may shape such attitudes towards their job. Attitudes toward the job are not exogenous nor are they universal to all healthcare personnel. They are, rather, an interactive product of what the professionals bring to the work situation and the work situation itself. Cotton and Tuttle [29] for example, found that correlates of turnover varied with the employee group under study.

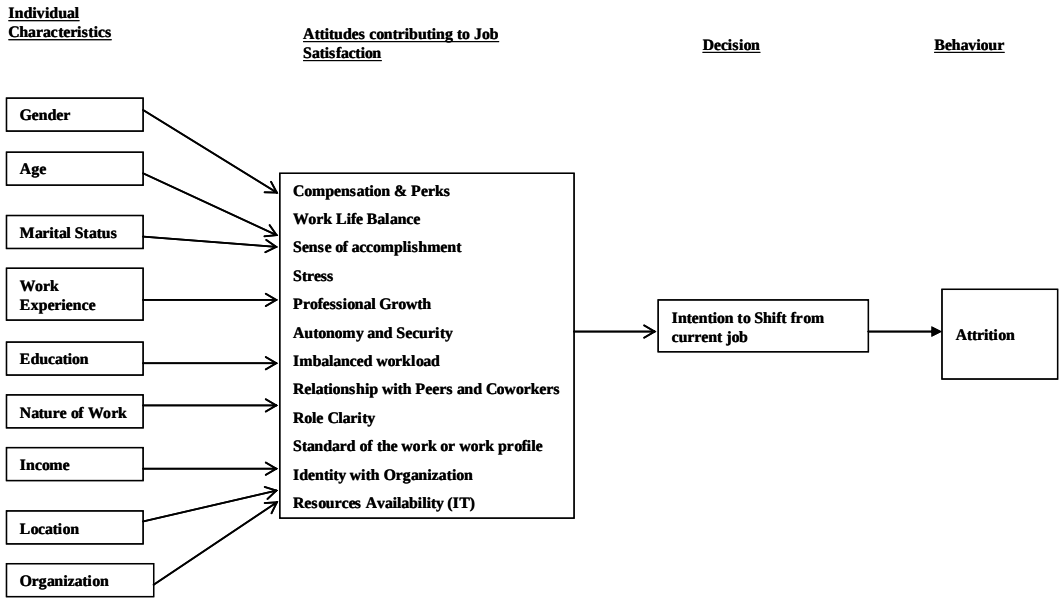


Fig. 1. Theoretical model assumed for intention to shift and attrition

As reflected in **Fig. 1**, our model incorporates causal linkages between key individual attributes (e.g., age and occupation) and attitudes toward the workplace that potentially influence turnover (e.g., satisfaction with workload, pay, and rewards). We examined attributes that reflect their social orientation and are assumed to differentially affect job satisfaction: age, gender, work experience, marital status, level of education, and type of work group. Previous investigators have linked age and duration in current organization (tenure) to both job satisfaction and turnover, with older workers and those with longer experience in the current organization are more likely to be satisfied and less likely to leave their jobs [30,31]. In addition, investigators have shown women and married workers have higher levels of job satisfaction than their male and unmarried counterparts [31, 32]. Finally, level of education has been positively related to job satisfaction [32, 33]. We also examined eleven dimensions of job satisfaction that may affect healthcare personnel's intention to leave and turnover. These were identified based on earlier such research studies. These include satisfaction with: (a) compensation and perks—the degree to which monetary and nonmonetary compensation is consistent with responsibility, ability, and workload; (b) work-life balance support – the degree to which the organization supports in maintaining a balance between the work and personal life; (c) Sense of accomplishment- the degree to which the professional feels accomplished or successful in his/her job; (d) imbalance workload— the degree to which the amount of work required interferes with the ability to meet patient needs and deliver high quality care; (e) standard of the work or work profile – the degree to which it provides a learning and motivating experience; (f) autonomy and security—the degree of discretion an individual is able to exercise in the performance of her job; (g) relationships with coworkers & peers -the degree to which a member and his/her fellow workers share trust and confidence in one another; (h) role clarity—the degree to which information about the tasks and responsibilities associated with the job is conveyed by the organization to its members; (i) identity with organization - the degree to which the professional feels oneness with the organization (j) professional growth opportunities— the degree of potential upward occupational mobility in the organization and (k) work stress. Based on the ubiquitous prevalence of technology in almost all areas of healthcare delivery and management [17-20], we have included a new dimension, availability of IT technology resources as one more aspect to job satisfaction. The strength of these relationships is assumed to vary as a function of their importance to particular categories of healthcare personnel.

2. MATERIALS AND METHODS

Data for this study came from the second round of the Healthcare Attrition Tracking Survey (HATS). HATS is a part of the multi-level study of the ongoing doctoral research program conducted to address these issues regarding attrition among healthcare professionals and to determine if implementation of Health Information Technology in hospitals and healthcare centres can work as an effective retention strategy in India. HATS was conducted among a non homogeneous group of skilled healthcare professionals such as doctors, paramedics, administrative and managerial staff in public as well as private hospitals covering rural and urban regions of Northern India. The survey was designed based on a non-formal discussion with nearly 40 healthcare professionals

from different parts of the country in management role. This was done to get a perspective of the employee turnover among healthcare professionals.

In the first round pre-test studies were conducted in five hospitals (minimum 100 bedded) one each from the five states of Delhi, Haryana, Uttar Pradesh, Madhya Pradesh and Jammu and Kashmir. This was followed by focus group discussions (FGDs) conducted one each in private urban hospital and another in a rural government hospital. Each lasted for one hour with 15 professionals participating from private hospital and 9 from public hospital. Based on the results obtained from these an elaborate cross sectional survey was conducted to yield a non-biased representative sample of healthcare workforce both in rural and urban areas for the study. Out of the 2000 respondents in 40 hospitals (20 public and 16 private from 20 urban and 20 rural hospitals) approached for the survey, final data was obtained from 807 respondents using the questionnaire tool developed by the authors and reviewed by the experts in the field. The nine steps indicated by Churchill et al [34] were followed for developing the questionnaire. Intention to quit and the dimensions of job satisfaction were measured, via a survey of staff satisfaction, as mean scores on multi-item indices. The items were patterned after instruments used in earlier job-satisfaction research in health care settings available in literature, but modified based on the pre-test survey and FGDs. Each dimension with the number of items contained in each dimension, along with a sample item are shown in **Table I**.

Table I Job Satisfaction Scale Items

Dimensions of Job Satisfaction	No of Items	Sample Item
Compensation and Perks	2	I am rewarded fairly with respect to industry standard
Work Life Balance	3	I have flexible schedule of work
Sense of Accomplishment	3	My job increases my self esteem
Imbalance Work Load	3	I feel exhausted from my work
Substandard Nature of Work	3	My job is very exciting
Autonomy and Security	3	This job denies me the opportunity to use my personal judgement in my work
Relationship with Peers	4	I have sympathetic and considerate seniors
Work Self satisfaction	4	I have clear objectives regarding my work
Organization Effect	4	I feel proud to tell others that I work for this organization
Professional Growth	4	I have a good chance for promotion as my organization recognizes my abilities for the same
Work Stress	3	I feel like burnout from my work
Need For Technology Implementation	3	The organization has equipped itself with latest technologies that ease my work

Each job-satisfaction item was scaled on a 5- point agree-disagree continuum. All negatively worded items were reverse coded so that a higher mean score on an index always reflected a higher level of satisfaction on that dimension. Major challenges faced were in obtaining the permission from the HR authorities to conduct the survey due to issues of transparency of the system and HR policies.

Doctors, paramedics, administrative and managerial staff were interviewed. Due to the sampling technique adopted, respondents diverged from every age group, gender, education, marital status etc. but were restricted only to low and middle level employees, where the attrition is highest. The respondents were screened to determine survey eligibility based on three criteria namely : a) should be a Permanent resident of India, b) have a License to Practice modern medicine and c) capable of expressing their current job satisfaction. Participants who responded "don't know" or "refuse to answer" to the job satisfaction criteria were excluded from the survey. This allowed examination of potential differences in the attitudes of the respondents towards identifying reasons for attrition. Descriptive data on the personal characteristics of the sample members are prescribed in **Table II**.

Statistical Analysis: A random 5% sample of responses were checked for coding errors. Wherever the data was left uncompleted and unclear the respondents were approached individually to recollect the data. The data analyses were undertaken in three stages. First, data robustness was established with confirmatory factor analyses and reliability measures. The reliability tests on data yielded a value of 0.809%. Factor Analysis on Rotated Factor Matrix using Principal Components Analysis (PCA) in SPSS 16.0 package was performed to determine the relationships between factors influencing attrition. Descriptive statistics included percentage rates for categorical variables, means and standard deviations. The categorical variables considered were gender, marital status, age, education, work nature, location, organization type, work experience and income. Second, chi-square tests to find the associations between the reasons indicated for leaving a job and t-tests to compare the contribution of each categorical variable on the forces of attrition were performed. Last, path analysis was conducted to access the relative strengths of the associations between the dependant and independent variables [35]. For this multiple regression analysis and the correlations obtained from factor analysis were utilized. Two layers of multiple regressions were utilized: first, with job satisfaction as the criterion and those dimensions identified using factor analysis as the predictors; second, with intention to shift as the criterion and demographic variables and job satisfaction as the predictors. The path coefficients were given by β values and correlations. The error values were calculated as $e^2 = (1-R^2)$.

Further in accordance with the main objective of the work to explore the possibility of utilizing HIT as a plausible retention strategy, descriptive statistics were utilized to

analyze the knowledge, usage and the type of HIT used by the respondents.

TABLE II Demographic details of the respondents

		N=807	
1	Gender		
	Male	57.6%	(461)
	Female	43.2%	(346)
2	Age		
	17-25	18.7%	(150)
	26-35	52.1%	(417)
	36+	30%	(240)
3	Marital Status		
	Married	62.4%	(499)
	Unmarried	38.4%	(307)
4	Work Experience		
	< 5 years	76.1%	(609)
	> 5 years	24.7%	(198)
5	Education		
	undergraduate	11.6%	(93)
	graduate	54.7%	(438)
	postgraduate	34.5%	(276)
6	Nature of Work		
	Doctors	38.9%	(312)
	Nurses & paramedics	37.1%	(297)
	Administrators	24.7%	(198)
7	Income (Rs)		
	upto 10,000	20.5%	(164)
	10,000-20,000	18.9%	(151)
	20,000-30,000	26.6%	(213)
	30,000-40,000	16.6%	(133)
	>40,000	17.9%	(143)
8	Type of Hospital		
	Public	39.2%	(316)
	Private	60.8%	(491)
9	Location of Hospital		
	Urban	72.6%	(586)
	Rural	27.4%	(221)

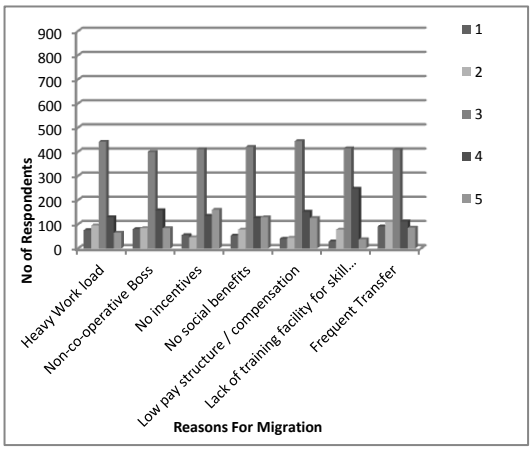
3. RESULTS

The sample was predominantly male and the proportion ranged 57.6 ± 0.5%. The respondents were mostly middle-aged (52.1%) in the range 26 to 35 years and mostly married (62.4%) living with family. Nearly 20% of the married respondents especially male were living alone with their family in their respective home towns. Almost two-thirds of the participants were doctors, paramedics, nurses, administrators who had less than a year of practice in the current organization and also middle-aged. 54.7% of the participants were graduates while the postgraduates were 34.5%. Undergraduates were few (11.6%). Approximately nearly equal number of doctors and nurses, paramedics participated while the administrators were less. There was not much difference in the number of participants based on their income.

The factor analysis on Rotated Factor Matrix has led to 6 factors of attrition as: ***Factor 1:*** Compensation and Perks ; ***Factor 2 :*** Work Life Balance ; ***Factor 3 :*** Sense of Accomplishment ; ***Factor 4 :*** Work load leading to Exhaustion ; ***Factor 5:*** Need for Automation and Technology Improvement and ***Factor 6 :*** Substandard Nature of Work.

These factors were identified based on their factor loadings greater than 0.7. All the above six factors were compared with the 9 descriptive parameters indicated in **Table II**. Only those that had a significance effect on the forces of attrition are described in detail in this study. Gender, marital status, age and education did not contribute much. Time spent by a healthcare professional at an organization does contribute to the attrition. Two factors namely how the organization contributes to the work – personal life and extent of the work load seem to be the major contributors.

During the survey it was identified that many respondents had shifted job within a year and some have decided to do so within short period of time. Through open ended questions the reasons for shifting and their future plan to shift were ascertained **(Fig. 2).** The effect of socio-demographic details on the responses were calculated and plotted in graphs. Chi-test was performed to ascertain the significance of these on migration.



1. Strongly disagree 2. Disagree 3, Neutral 4. Agree 5. Strongly Agree

Fig.2. Reasons provided for shifting jobs within last 1 year

Stress due to over workload was the main contributor when type of the healthcare organizations ie., private versus public was considered. Nature of the work of the respondents considered seems to throw significant contributions to attrition. Nearly 4 out of the 6 factors were affected. All the four factors namely, Compensation and Perks, Work -Life balance, Sense of accomplishment and Need for Automation and Technology all were significant at 0.01 level (**Table III**). Irrespective of the salary package five out of the six factors of attrition identified were significantly found to contribute to attrition **(Table IV).** It was observed that gender, age, marital status, nature of the

work profile, work experience and wage had significance with respect to the reasons for shifting job. The three main reasons identified were heavy work load, no social benefits and low pay structure. The distribution of the salary drawn by the respondents had greater significance with the reasons identified than other variables. Non- cooperative boss and frequent transfers were also identified.

TABLE III Comparison of factors of attrition with nature of work group
W1 – Medical Professionals W2- Nurses and Paramedics W3 – Administrators = DUNCAN'S MEAN TEST

Factors of Attrition	W1		W2		W3		W1 V/s W2	W1 V/s W3	W2 V/s W3	F- Value
	Mean	SD	Mean	SD	Mean	SD				
Compensation and Perks	2.88	.84	3.03	.71	2.53	.80	-	*	*	11.52**
Work life balance	2.65	.78	2.80	.55	2.44	.70	-	*	*	7.77**
Sense of accomplishment	2.67	.49	2.77	.49	2.6	.55	-	-	*	3.39**
Work load	2.88	.81	2.94	.74	2.9	.84	-	-	-	.24
Need for Automation and technology improvement	2.17	.73	2.40	.72	2.17	.69	*	-	*	4.24**
Monotony of Work	2.94	.83	2.92	.51	2.92	.62	-	-	-	.03

NS : Not Significant * Significant at 0.05 level ** Significant at 0.01 level

TABLE IV Comparison of factors of attrition with Income group
I I1 = UPTO RS.10,000/- , I2 = RS.11 – 20,000/- , I 3 = RS21 – 30,000/-, I 4 = RS.31 – 40,000/-, I 5 = MORE THAN RS.40,000/-) - DUNCAN'S MEAN TEST

Factors of Attrition	I1		I2		I3		I4		I5		compare	F - Value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Compensation and Perks	3.00	.69	2.87	.88	2.61	.85	2.99	.77	2.9	.73	I2 Vs I3 I3Vs I5 I3 Vs I4 I1 Vs I3	3.45**
Work life balance	2.73	.47	2.66	.68	2.57	.80	2.79	.75	2.57	.67	-	1.49
Sense of accomplishment	2.81	.51	2.68	.50	2.65	.56	2.83	.49	2.50	.38	I1 Vs I5 I3 Vs I4	4.93**
Work load	3.01	.69	2.95	.77	2.74	.72	2.95	.82	2.95	.97	I1 Vs I3	1.57**
Need for Automation and technology improvement	2.47	.78	2.39	.63	2.18	.75	2.24	.69	1.98	.65	I4 Vs I5 I2 Vs I5 I1 Vs I5 I1 Vs I3	5.29**
Monotony of Work	3.02	.43	3.02	.63	2.97	.75	2.73	.73	2.85	.76	I3 Vs I4 I2 Vs I4 I1 Vs I4	2.33**

NS : Not Significant * Significant at 0.05 level ** Significant at 0.01 level

The proportion of respondents proposing to shift the existing job within next few years was further investigated. The doctors were more prone to shift jobs compared to others (**Fig.3**). It was determined the proportion of those who did not plan to change jobs in near future were more than those who had planned to shift within near future. The male health professionals especially those who were married and health professionals with low income packages were very much keen to change jobs. Also middle aged professionals were keener to shift with job satisfaction and salary being indicated as the prime reasons.

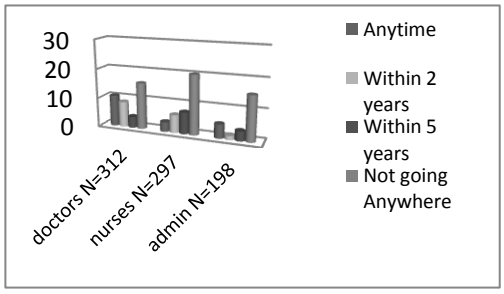


Fig 3 Proportion of respondents planning to shift jobs

Zero order correlations among the various variables were determined. The configuration of the model generally fits the overall theoretical prediction assumed initially. The intention to shift is affected by the specific dimensions of job satisfaction. Additionally certain background characteristics (dependant variables) age, gender, nature of work group also affected the intention to shift jobs. The path coefficients and error variances are shown in **Fig.4.** From the error variances in job satisfaction and intention to shift, it is clear that there are still unpredicted variables that contribute to the variance and need to be further looked upon. Although the final structural model revealed some exceptions to the theoretical model proposed, in general it was consistent with our theoretical framework.

All dimensions of satisfaction identified through factor analysis, affected attrition through their effects on intention to shift. Specifically, work load imbalance and the substandard nature of work were significant predictors of intention to shift. While the other 4 also contributed to intention to shift, the strength of contribution was not significant enough to act as independent predictors. Instead we found that the overall job satisfaction score contributed significantly to the intention to shift, which in turn was predicted by the dimensions of job satisfaction. The higher the satisfaction level on these dimensions, the less likely is the intent or plan to shift. Several background and

demographic attributes affected intention to shift directly other than indirectly operating through job satisfaction. Gender, for example, affected attrition through intention to shift. Female personnel were less likely to intend to quit than their male counterparts. The type of the organization, whether it is a private or public contributed for the intention to shift. We found that middle aged professionals with higher education qualification were more likely to shift jobs.

The respondents were also tracked regarding their usage of HIT in order to determine their awareness and willingness to adopt HIT to increase the job efficiency **(Fig 5).** It was also observed that health professionals within minimum postgraduate education and those who were middle aged had greater computer awareness.

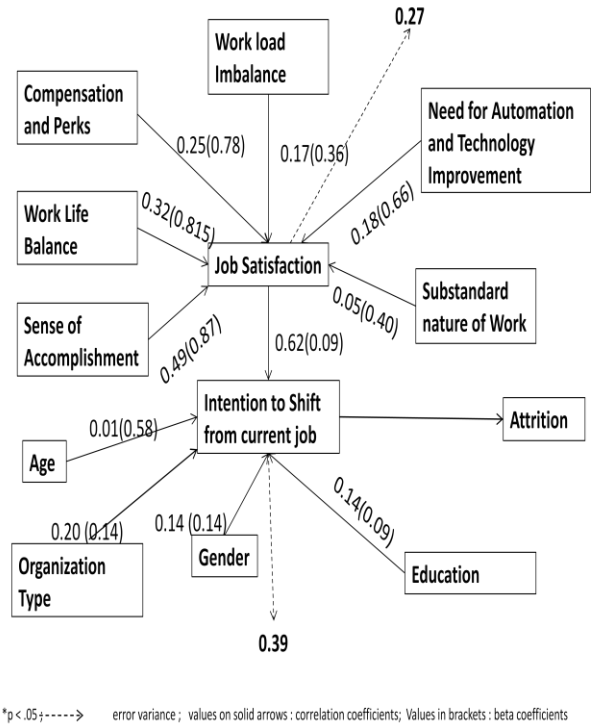


Fig 4 : Path coefficients and error variances

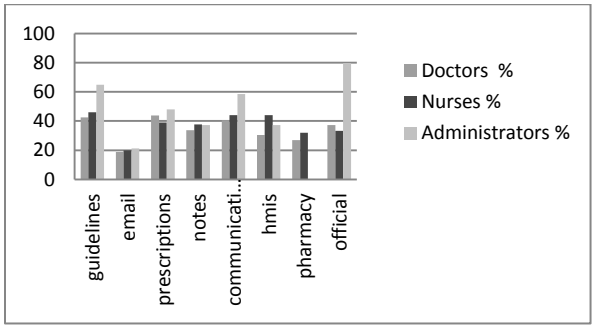


FIG 5 Proportions of Respondents using IT

The respondents were further questioned to ascertain the need of HIT in their work and their willingness to undergo further IT training. The respondents were further questioned to ascertain the need of HIT in their work and their willingness to undergo further IT training. 80% of the respondents felt the need of implementing HIT to simplify their work and almost all of them were ready to undergo training with overall percentage of 60% respondents being favourable.

4. DISCUSSIONS, RESULTS AND CONCLUSION

Results show a significant difference in attitudes towards factors of attrition. The results provide evidence to demonstrate that economic motivation as a factor for changing jobs is not an independent, stand-alone factor in itself, but rather a component of broader factors that takes into consideration the yearning to improvise both developments in both professional and personal front. This finding is a departure from the previous studies that indicate the intentions of healthcare professionals to frequently change jobs and migration to foreign countries are mainly dependent on remuneration [36, 37].

Based on a broader framework of understanding derived from the results of this study, a number of inferences can be drawn relating to strategies to encourage retention. Based on path analysis, it can be inferred that intention to shift from the current job is the main decision based predictor that affects attrition. It can be presumed that before leaving the job the health care professional makes a definite decision to leave the job. Though the survey did not consider the difference between voluntary decision to quit and induced decision (sudden decision due to circumstances), the fact that few independent characteristics of the like age, gender, education predicted the intention to shift indicate that it cannot be ruled out. The current findings also lend insight into the underlying factors that affect attrition through intention to shift. For example, job satisfaction is an integral role in our model, representing a key component that eventually affects turnover directly and indirectly through the intention to quit. Six dimensions of job-satisfaction, which represent distinct features of the jobs of health care personnel, were significant predictors. Compensation and perks that refers to providing incentives and extra income in terms of benefits need to be structured through contested policies of public and health sector reforms that would induce the health care workers to continue in the existing organization [11].

Work life balance depends on the nature of the work, type of the workplace and issues in the workplace. Introducing strategies like flexible work options, specialized leave policies, paid maternal leave, paternal leave, etc. can increase the satisfaction level of the healthcare professionals. Doctors and administrators who spend greater times of the day in the hospital are affected by work life balance issues. Sense of accomplishment is about job satisfaction felt by the healthcare workers. This does not depend upon the monetary issues and it deals with the sense of achievement and fulfilment felt by the employees. A key to build such a culture is by involving the medical staff members to make collaborative decisions in clinical and operational issues [38]. Satisfaction with professional growth is very important for every health care professional. They are clearly more prone to intend to quit or shift jobs if they feel frustrated with the lack of advancement and growth opportunities available to them. It was also identified that the substandard nature of the work affects the job satisfaction felt by the professionals. Similar such observation was made in a recent study conducted in two states of India, that have a major rural population [39].Though this has not been echoed equally by all the respondents interviewed in the current study, it can be presumed that healthcare professionals need a quality in their day to day responsibilities. For few this can involve job rotation or enrichment while for others it can be through skills improvement through the implementation of HIT. This factor needs to be further researched as this will vary depending upon the nature of the work group and work environment.

Based on our results it can be inferred that imbalanced workload may affect intention to quit and turnover resulting in attrition through its relationship with job satisfaction. Higher workload may promote greater job hazards, either through increased physical demands that accompany more work or because insufficient staffing does not permit proper work – personal life balance. While this was not much of the problem in urban hospitals interviewed, it was more prominent in the rural areas. This is due to higher workloads, coverage of large geographic areas, lower access to specialists, and to a broad array of patients. This specifies the need to improve working conditions and the professional interface with other health professionals and society in the rural areas. Planned interventions could employ non-financial incentives such as recognition by management, performance review and improving inter-professional working relationships, to uphold and strengthen the professional ethos of health professionals [40]. Need for Automation and Technology Improvement implies the requirement of HIT implementation in the health care industry. The supply of good support, education and training is a key approach to attracting and retaining allied health practitioners, especially in rural locations [12, 41]. HIT enables health care professionals to confidently access, interpret, and apply organisational knowledge, patient care procedures, professional workforce competencies, best practice knowledge and other skills information in a manner that improves patient satisfaction, achieves positive clinical outcomes, and maximises cost savings for the organisation [18, 19]. In this present study irrespective of gender, age & education, location the importance of implementing HIT was stressed by almost all respondents. The nature of work done by respondents seems to play a significant role in assigning the need for automation and technology as a major factor of attrition. The doctors seemed to be the preferred users of computers, than the healthcare administrators and the nurses and paramedics. Also it was identified that the HIT usage was more prevalent in urban hospitals than in rural hospitals. Moreover, the difference in the salary does not seem to detract the fact that implementation of HIT was seen as a basic requirement of healthcare professionals.

Based on the discussions with the respondents it was understood that the healthcare professionals leave their jobs due to the greater job opportunities and higher pay packages abroad. Attrition of post graduate doctors is seen to be in lure of attractive salary packages, better technologically equipped healthcare facilities besides higher studies. Medical professionals working in rural private health set ups found reasons for leaving their job in search of opportunities that not only provides good financial benefits but also better professional development through adoption of newer technologies. Given the industry standard salary, they still were ready to shift jobs to organizations that were endowed with advanced technologies of healthcare delivery. Unlike the other background characteristics, age exhibited a single, direct path to intention to shift. The effect of age may simply reflect the general pattern of greater stability among older members of the workforce. As workers age, they may be less attractive to new employers and have greater human capital investment in their current place of employment. The opposite is true for younger workers, making them more mobile and, thus, more likely to leave. Our finding on the role of gender in the process of turnover is consistent with previous findings in the literature. It is seen that women tend to have higher levels of organizational commitment then men. Thus, it is not surprising in our study to find that men were more likely to express a greater intent to leave the job than women. So is the case with marital status where married professionals are less likely to do quick shifting due to want of stability.

Based on the observation the following it can be inferred that for any hospital and health care system the planning of manpower (human resources) is very vital [42]. Detailed planning of human resources and a plan of action for their selection, training and deployment are very important factors to be considered right from the project planning to implementation and should be undertaken at the inception of the project.

Other than better salary packages and financial benefits, better work environment etc implementing HIT to reduce work load stress, enrich knowledge and core specialization, improve quality in service can work as an ideal strategy to increase job satisfaction of healthcare professionals thereby reducing attrition. This also reduces medical errors and increases quality in healthcare delivery [18, 43]. Healthcare is rapidly becoming an interconnected ecosystem, with IT as its circulatory system. While the above strategies can be uniformly followed among all healthcare professionals irrespective of their nature of work and location the following guidelines may be followed especially in India. Since all the processes of recruitment and selection are critical and attrition rate of knowledge workers in Healthcare is significant, the healthcare industry should focus on employing right talent and develop the talent to increase retention in the organization for a longer period of time.

A potential solution to bridge acute shortage of healthcare workers and reduce attrition rate is through providing accessibility to online healthcare, which has emerged as very important tool for offering healthcare services that can be accessed by patients across boundaries. Online healthcare connects patients and doctors via internet services [44]. Online health portals can reduce workload and streamline processes for consultations, booking appointments, maintaining patient health records, getting second opinions, among various other services offered. Healthcare professionals needs to be provided financial support and resources to further their knowledge in the realm of HIT, mandatory practical exposure to using computer and internet etc. Incentivization mechanisms need to be adopted to encourage them to use the technologies implemented. Awareness of the benefits needs to be propagated through continuous training that would increase by adopting IT for reduction in work load, increase quality of service etc. Training also needs to be induced at various levels for apprising technological developments to learn about guidelines, surf medical and health databases to retrieve vital information, to retrieve information from journals, e-books, and to stay updated with professional groups etc.[45]. Continuous training needs to be inculcated in work culture to reduce the fear of increase in work complexity through the use of technology. At the same time the technology implemented should be simple like work list management to reduce workload instead of being a documentation burden.

This study has several limitations. We used self reported data so that the times reported may not reflect actual use. Also, the study was conducted in a multi-type sample both in rural and urban settings using convenience sampling having spread in northern parts of India. The modern medicine practitioners have only been considered in this study only. Although the general strategies mentioned here can be adopted in common they may not be generalizable to other countries, especially to rural settings where there is a diverse in technology adoption. Also depending upon whether the strategies are proposed for private or public, rural or urban they need to be customized taking into consideration the type of the respondents considered. Also the current study does not include voluntary organizations, NGO's and small private clinics.

It can be concluded than implementation and adoption of technology and best practices would result in simplifying healthcare delivery processes. These can be in terms of Unique Health Identification Number (UHID) for each patients, Electronic Medical Record (EMR), Telemedicine, reduction in physician errors, time savings in processes such as information retrieval, adoption of international standards and best practices, instant availability of administrative data, increased financial savings and clinical trials & research, simplification of work load and reducing stress. This in turn would bring in transparency in the system and healthier working conditions. Improved efficiency and profitability would lead to better employee compensation and working condition

thereby leading to retention of knowledge workers in healthcare.

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