# Does change in S & T explain dynamics in Human Capital?
## *An enquiry into Emerging Trends in Nursing Labour Market*

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We examine why it is important to consider seemingly autonomous but more embedded socio-political-economic aspects in assessing the impact of changes in Science and Technology (S&T) on human capital. In capturing the linkage between S&T and human capital, as we show, the dynamics in labour market is enmeshed in the complex web of socio-political-economic systems. Perhaps, this mode of reasoning has varying effects depending on the nature of economic activity. While the effect of entanglement of socio-political-economic aspects on S&T-human capital linkage may have less dynamism for primary economic activities, this effect is quite apparent for secondary and tertiary activities, quite reflected in consequences such as migration of labour. Interestingly, we investigate this dynamics taking nursing labour market as a case, viewing its significance in the emerging health care systems. A significant change in S&T of health care is that it has become more diagnostic than heuristic based system, mainly driven by advancements in the bio-medical technology. This change has altered the scope of health care occupations, covering occupations such as physicians, nurses, and para-medical professionals. Of these, nursing as an occupation reports one of the highest rates of women participation. After 2000, the migration of nursing professionals from some of the least developed/developing countries to developed countries has shown a steady increase. This surge in migration may have its roots in changes in S&T of health care systems. However, this link remains incomplete if we exclude a host of factors, primarily state's role in health care, changes in health care education, new institutions in human capital formation, wage dynamics, and an increasingly socially embedded labour market. In this paper, we examine these themes –perspectives and substantive issues- , using the literature and secondary and primary data.

Keywords: *S&T-human capital linkage, Changes in health care system, Nursing labour market*

## 1. Introduction

The fundamental dynamics in a service economy is replete with issues concerned about different units in an economic system such as consumers, firms, labour, capital, and state of art. These units vary in complexity with different centralities in explaining the nature and direction of dynamics. For instance, units which are pivotal in the dynamics of a closed economic system may have less centrality in an open service economy. Supposing a versatile agent, representing the labour, plays a vital role in service production, this unit is a rich source of cues for the dynamics of the system. Following this argument, we may find inter-temporal change in an economy of service is being driven by different units at different times. Given this complexity, it is important to understand linkages between these units in a service economy, in particular evolving systems such as health care. Interestingly, health care as one of the principal activities which contributes to different facets of dynamics such as economic growth, human development, sustainable future and so on, offers great scope for an enquiry into aforesaid linkages in an economic system, more pertinently those linkages of high centrality such as the linkage between state of art, basically represented by science and technology, and labour. Obviously, this mode of reasoning remains naïve unless we chisel out a logical frame. Prior to that, it is important to pinpoint select phenomena in health care economy, primarily to act as a feeder of information for grounding the logical formulation of dynamics in reality. Arguably, the fundamental nature of health care production has been changing, discrete and joint, concomitantly with that globalization. Moreover, this dynamics is reflected in two core variables: science and technology, and basic units in a labour market such as human capital. It is important to note that perspectives on the theme of our investigation can not ignore the basic aspects of society, which are embedded with these units. Obviously, it is more prudent to see human capital formation as a process with high social embedding, viewing the significance of how societies respond to the global labour market.

More succinctly, we lay focus on the nursing labour market, a principal constituent in the health care economy. The case of nursing labour market deserves attention because of two reasons. First, mostly women tend to choose nursing as an occupation; visibly participation of women is relatively higher in the nursing than other health care

related occupations. Second, increasingly nurses from developing countries migrate to developed countries in search of employment. In fact, labour mobility of nurses is not just an outcome of push-pull processes of migration, but social structure, including social networks and institutions, often reinforces person's decision to migrate. Obviously, expectations about substantially higher wage as an outcome of labour mobility motivate prospective labour market entrants to invest on nursing education. On the other hand, in the absence of such expectations, entrants need to be motivated to avail the training. Prior to the large scale labour mobility of nurses as it happens in recent times, human capital formation in nursing served different sets of goals. Often, this phase, characterized by less labour mobility across borders, consists of prospective labour market entrants whose training cost is invested by the state expecting that these nurses will join the public service. However, expansion of health care economy in the next phase altered nurses' expectation about working and living conditions, leading to the exodus of nurses from low wage geography to high wage geography. Although such decisions by nurses may generate best pay-offs within an opportunity set bound by endowment of information, this event raises welfare concerns that are similar to the brain drain, but more importantly its impact on domestic health care systems generates inter generational welfare issues. Supposing nurses migrate from an extremely high infant mortality region to an extremely low infant mortality region, irrespective of their human capital whether funded by the state or self, the labour mobility is likely to generate more constraints in attaining intergenerational well-being. While this labour mobility may bring remittances to the country of origin, leading to more wealth, income and consumption for the present generation, in the absence of initiatives to compensate the vacuum left by these professionals to the system may cause severe human development deficits to the next generation. On the other hand, mobility of nurses between regions with similar human development profile may produce constraints of different nature. Here, a question of significance emerges. What holds key to the mobility of nurses from low human development region to high development region? As expressed previously, push and pull forces in a labour market and structural factors that shape decisions of nurses are surely endogenous variables in the system, but leaving space for a huge proxy for drivers in the global labour market. This proxy may appear as an exogenous variable, but this leaves scope for an argument that these drivers can exist autonomously of

region of origin or endogenous variables internalizing effects of this 'global' aggregate. Supposing the second option prevails, human capital formation acquires basic aspects of foreign trade in manpower; nursing students in the country of origin tend to acquire skills that are essential for being accepted by the destination labour market. Further, where does this 'global' aggregate originate from?

Presumably, visible changes in a political economy may have its roots in technological change that emanates from the science, mainly manifest in creation of knowledge, exchange of it through socialization, and internalization through the culture. More importantly, effects of changes in science and technology tend to be visible in the education system which transforms primary source of labour supply into workforce which caters to demand for labour from an emerging economy, which is based in aforesaid technological change. While surmising this link between science and technology and human capital, we are not committed to a technological determinism of labour market. Rather, we posit a sequence of events saying that there are times when the technological change triggers variation in human capital, causing a chain of future events. Perhaps, this reasoning is a heuristic based on cues which emerge from our judgment about the gravity of explanatory factors in explaining the variation as well as the received views from the literature.

This paper is organized into six sections. Section 2 gives an overview of emerging trends in nursing labour market. Section 3 describes nursing employment in India, using National Sample Survey 61st Round. This section discusses socio-economic and labour market profile of nurses in India. Following this, we explore issues discussed in section 2 in the context of qualitative research based in Kerala, India. This discussion is the content of section 4. Using cues from section 2 & 4, we propose a theory in section 5. The paper ends with a concluding chapter.

## 2. Emerging Trends in Nursing Labour Market

An important trend in international labour market for nurses is increasing labour mobility of nurses from low human development regions to high human development ones. Interestingly, cues from the literature backed by the data point out a clear pattern of labour mobility of nurses from health deficit regions to better off ones.

Pointing the case of United Kingdom (UK), Batata (2005) shows that deficit in supply of nurses in UK during recent years since the late 1990s is being made good by spurt in foreign qualified nurses migrating to UK, mainly from the under developed countries, including regions with high health deficit such as India, Pakistan, Ghana, Kenya and so on. This labour mobility may have generated positive externalities to the country of origin like dissemination of best practices and so on if these migrants return to the country of origin. But, as viewed by Batata, there is little evidence of these spillovers which benefit health system of the country origin, albeit the scope for a cash economy is being generated by remittances from migrants. Batata observes (p. 9) "Of course some migration, particularly temporary, can be beneficial to source countries as their workforce gains additional skills and experience working overseas and, possibly, sends remittance income home, but what little evidence exists seems to suggest only a small proportion of nurses or other skilled migrants return to their home countries." However, institutional structures in developing countries like Philippines see great potential in labour mobility of nurses as a sustained source of remittances, although nursing shortage is an emerging trend there (*ibid*)[1]. Further, the international labour market for nurses is becoming a continuum, more explicit in trends like a region having nursing shortage due to the exodus of nurses to a high wage region is filling the void with migrants from other regions. Interestingly, Batata gives the instance of Jamaica, from where two-thirds of nurse population has emigrated, filling the shortage by nurses from Cuba.

The gravity of the aforesaid imbalance –nurses migrating from health deficit countries to health well-off countries- is quite manifest in basic labour supply indicators such as registered nurses per 100,000 population. As shown in Aiken et al (2004), developed countries report higher ratios while least developed countries report strikingly lowest ratios (Table 1); the highest ratio is twenty fold of the lowest ratio.

[1] Data given in Batata (2005) shows that nurses from Philippines as a proportion of newly registered foreign nurses in UK has increased from 1 % to 41 % during 1998-99 - 2002-03, with an exponential increase from 52 to 5593 nurses.

Table 1
Registered Nurse per 100,000 population among major host and source countries

| Host Country | Registered Nurses Per 100,000 Populations | Source Country | Registered Nurses Per 100,000 Populations |
|---|---|---|---|
| United States | 782 | South Africa | 472 |
| United Kingdom | 847 | Philippines | 418 |
| Ireland | 804 | Zimbabwe | 129 |
| Canada | 741 | Nigeria | 66 |
| Australia | 941 | India | 45 |
| New Zealand | 841 | | |

Note: This data is compiled from different sources by Aiken et al (2004). Sources include scholarly works, Policy documents and government data, comprising of data for different years, ranging from 1992 to 2001.

Source: Aiken et al (2004), p 70

Citing the 2003 World Health Report, Aiken et al (p. 69) notes the gravity of this imbalance: "Botswana's commitment to providing free antiretroviral therapy to all eligible citizens has been undermined not by financing but by the severe shortage of health personnel." In fact, the public health being crippled by inadequate manpower, in particular shortage of nurses may have serious implications for the future generations. It is important to note that for a huge chunk of population in under developed regions, there are hardly any alternatives to the public health care system, mainly due to inadequate coverage of social security and heath insurance. In fact, this issue was noticed by the UK department of health, who created an ethics code prohibiting direct recruitment of nurses from Africa by the NHS. However, these restrictions became porous, leading to African nurses in large number being recruited by the private sector (ibid). In 1998-2002, migration of nurses from select African nations like Zimbabwe, Nigeria, Ghana, Zambia, Kenya, Malawi and Botswana to UK has shown steep increase (Buchan et al, 2003). More importantly, low human development regions like sub-Saharan Africa, with critical shortage of nurses, also report noticeable labour mobility of nurses to developed countries; nurses and midwives trained in sub-Saharan Africa constitute one twentieth of nursing workforce in OECD countries (WHO, 2006).

Moreover, the World Health Report 2006 points out uneven distribution of health workers, including nurses, doctors, and technicians, across the globe. While those

regions with the lowest relative need have highest density of health workers, those with highest need, burdened by diseases, report lowest densities of health workers. WHO (2006, p 8) notes this glaring contrast: "The Region of the Americas, which includes Canada and the United States, contains only 10% of the global burden of disease, yet almost 37% of the world's health workers live in this region and spend more than 50% of the world's financial resources for health. In contrast, the African Region suffers more than 24% of the global burden of disease but has access to only 3% of health workers and less than 1% of the world's financial resources – even with loans and grants from abroad."

In fact, the shortage of health workforce is critical across the globe, varying in magnitude for each region. The region Americas reports the lowest shortage while Africa has the highest (Table 2). This unequivocally points that the health manpower which migrate from high shortage regions to low shortage ones is a matter of concern for both the present and future generations, in particular the population in high shortage regions. It is important to note that the shortage of health workers is more acute in rural areas than in urban areas; the gap exists across regions irrespective of the level of development. While three fifth of nurses, worldwide, work in urban areas the remaining two fifth work in rural areas (WHO, 2010).

Table 2

Estimated critical shortages of doctors, nurses and midwives by WHO regions

| WHO Region | Number of Countries | | In countries with shortages | | |
|---|---|---|---|---|---|
| | Total | With Shortage | Total Stock | Estimated shortage | Percentage Increase required |
| Africa | 46 | 36 | 590198 | 817992 | 139 |
| Americas | 35 | 5 | 93603 | 37886 | 40 |
| South East Asia | 11 | 6 | 2332054 | 1164001 | 50 |
| Europe | 52 | 0 | NA | NA | NA |
| Eastern Mediterranean | 21 | 7 | 312613 | 306031 | 98 |
| Western Pacific | 27 | 3 | 27260 | 32560 | 119 |
| World | 192 | 57 | 3355728 | 2358470 | 70 |

Source: WHO (2006), Table 1.3, p. 13

Given the trend of increasing mobility of nurses from regions with critical health deficit to regions which are well off in health, it is important to look at reasons for this. Cues from the literature and the theory in this paper indicate that the labour mobility has a temporal dimension: (a) push and pull factors (b) structurally embedded factors, manifest in the chain of dependent events.

The first dimension -push and pull- appears to be relatively more substantive, quite visible in the rich literature as principal determinants of labour mobility. Aiken et el (2004), while giving an overview the emerging scenario in nursing labour market, points out push and pull factors which motivate nurses to migrate from health deficit to well off country –almost identical with the situation of labour movement from poor to rich country-. Further, they pinpoint ineffective health governance in deficit countries, especially systems' failure to create good job design and work, as a pivotal issue pushing the works force from the country of origin. Moreover, poorly designed jobs tend to coexist with lower wages –one good example is compensation to nurses-, poor working and living conditions. On the other hand, wages, working and living condition, and career and learning opportunities in developed countries pull these nurses to these regions[2]. WHO (2006), taking health worker as a unit of analysis, gives an inventory of reasons for migration of nurses from African countries –Cameroon, South Africa, Uganda and Zimbabwe-to developed countries; the inventory includes search for better remuneration, safer environment, living conditions, lack of facilities, lack of promotion, no future, heavy workload, to save money, work tempo, declining health service, economic decline, poor management and upgrading qualifications.

The second dimension is structural in nature, embedded in change in health care production, more importantly technology, and institutional structure. In fact, just having cues about push-pull behavior alone may not unravel the dynamics behind the labour mobility. It is important to understand fundamental forces which shape the nursing profession in the host region. One core issue in host countries, especially in developed countries like UK and USA, is that nursing as an occupation is facing degradation while the sector in which this occupation exists –health care sector- is expanding. A host of factors contribute to the degradation of nursing as an

[2] Buchan et al. (2003) has identified more or less same list of push and pull factors.

occupation, as given in the literature. We find argument by Valerie and Nelson (2009), pinpointing the invisibility of care component in nursing and how the systems failed to reward these invisible competencies, brings out structural forces which shape the aforesaid dynamics. Interestingly, they view that work design in health care has imprints of body-mind separation, resembling the philosophy propounded by Descartes. Further, the work varies between two extremes i.e. knowledge and virtue. These two dualities form a space of work design (Table 3). The combination 'knowledge-mind' refers to the nursing work dependent on codified knowledge, embedded in artifacts, and contained in repositories like texts and journals. Perhaps, this combination suffices organizational objective functions of earning return on investment in specific assets which emanate from change in S&T. As argued by them, this component is likely to be rewarded most by organizations. On the other hand, nursing with a missionary zeal, as given in virtue-body combination, for example assisting vulnerable patients with bodily processes is likely to be weighed low. Similar monetary valuations tend to exist for remaining combinations – knowledge-body and virtue-mind, albeit varying in recognition.

It is important to note that the care based services such as health care entail relatively more holistic processes and work designs, with an appropriate mix of aforesaid combinations. However, as argued by Valerie and Nelson, other than knowledge-mind combination of nursing, other components of work tend to remain less visible; the combination 'body-knowledge' is likely to be the most invisible. The visibility-invisibility dualism may have its roots in gender based social division of labour, often generating gender stereo types such as house wife, maid, nursing being feminine, soldier being masculine and so on. Quite obviously, among health care occupation, nursing appears to be most feminine. Perhaps, institutional structure, which reinforces division of labour, has its justification in enforcing the social division of work, snowballing to a received view forming the base for the rationality later. Coming to the nursing, this occupation is incomplete without any of four while organizations tend to value more visible ones like knowledge-mind, leaving other three without deserving valuation; this leads to undervaluation of the nursing occupation. The invisibility in nursing, and resultant undervaluation of it, has complex outcomes, causing students to value courses which help them to get occupation with higher valuations for knowledge-mind combination. Moreover, these valuations create

imbalances within the occupation. Citing the literature, Valerie and Nelson (2009, p 19) notes "Aged care nursing is accorded less status than other more highly technical forms of nursing.... Nurses working in aged care are aware of "the negative image of working in aged care held by other nurses" who see aged care as 'end of the road' nursing". While ageing ought to be given higher weight considering its social return, technical form of nursing is accorded higher weights by the organizations and institutional structures, almost like the situation of prisoners dilemma. Even in developed countries, the issue of poor work design for nurses pay way for nurses spending an excessive time on non nursing tasks, often resulting in less job satisfaction and turnover finally (Aiken et al, 2004[3]).

Table 3
Identifying some aspects of nursing care & Reward

| | Mind | Body |
|---|---|---|
| Knowledge | Nurses use medical, scientific and technical knowledge acquired through specialized education in diagnosing, treating and educating patients.<br>[Recognition: Mixed];<br>[Reward: Yes] | Through direct, repeated and often tactile interactions with patients nurses gain important "local" and individualized knowledge about their patients' physical, mental and emotional state.<br>[Recognition: No];<br>[Reward: No] |
| Virtue | Nurses help their patients and their families by providing personalised counseling and encouragement, often demonstrating compassion and providing emotional comfort.<br>[Recognition: Yes]<br>[ Reward: No] | Nurses assist vulnerable patients with bodily processes. Although these activities often expose nurses to risks and bodily stress as well as unpleasant sights, sounds and smells, nurses accomplish them in ways that maintain their patients' dignity.<br>[Recognition: Mixed]<br>[ Reward: Minimal] |

Valerie and Nelson (2009), Table 2 & 3, p 14 & 18

[3] See Dussault et al (2001) for comments on job dissatisfaction among nurses in Canada.

In countries like UK the nursing work force is ageing. Buchan and Ian (2009, p 32) note this trend[4]: "The UK registered nursing population, as with many others in the developed world, is ageing. In 2008 less than one in ten was aged under 30, whilst one in three was aged 50 or older." Combining two trends -the growing job dissatisfaction and ageing- generates cues why institutional structures in developed countries favour labour mobility of nurse from the developing world. Further, this is compounded by tendencies to under invest in nursing, quite apparent in UK, and relatively lower pay to nurses compared to other occupations which need comparable levels of human capital[5]. Interestingly, Baumann et al (2004) sees explicit role of technological change in health care impacting contraction and ageing in nursing workforce. They point out that impact of technological change is of two types: (a) shift from hospital to primary care, (b) change in career choices. First, the shift in health care requires nursing to be more specialized, needing a work force with different skill sets. Principally, this change emanates from changes in demography. In developed country, with extreme low birth rates, population is getting aged with new health care challenges (*ibid*). Second, with better career options, due to technological change, offering better compensation, working and living conditions, nursing is loosing to other career options.

Seeing labor mobility as a structural outcome rather than positing as caused by push-pull variables entails probing into two core constituents of political economy: (a) technological change (b) capitalist organization of work. Valiani gives a political economy back drop of changes in nursing labour market, with an emphasis on United States. Health organizations tend to invest more on technologies, and then internalize these artifacts in health care. It appears that the care component gets replaced by diagnosis, enabled these artifacts. As shown by Valiani (2007), during the period 1975-99, market size for the medical device and diagnostic industry in the US grew exponentially; unequivocally affirming the shift from care to diagnosis. Concomitantly, a physician led demand for health care, cost of diagnosis being factored in bills, has

[4]The issue of ageing of nursing workforce is common in other developed countries; in particular in North America and Europe, which is markedly different from Asia (Baumann et al 2004).

[5] Aiken et al (2004) highlights the issue of under investment.

begun to emerge, with a great support from medical insurance and social security. During this period, in US, increasingly hospitals became corporate based, moving from a non-profit-community organizational base, implying a shift from health care being non-profit activity to profit making one. Further, the job design of nurses changed from primary nursing to team based nursing. While primary nursing puts nurses in a pivotal role in patient care, with decision making capacity, team based nursing was employers' design mainly intending to curtail collective bargain power of nurses. Under the latter system, cost saving was incentivized and relentlessly pursued, leading to deterioration of working and living condition of workers. These dependent events, with explicit and latent sources of power, circulated the notion of flexible labour market with a clear intent on low wage with flexible forms work such as part time work, leading to more foreign recruits joining as part time workers[6]. We assess these issues against the backdrop of field research conducted in Kerala, India.

## 3. Employed Nurses in India: Patterns from National Sample Survey

Before we discuss insights from the filed-work, it is important to outline salient features of employed nurses in India, in particular household, personal and labour market characteristics. There are two principal databases giving the count of nurses. First is the statistics compiled by Nursing Council of India and the second is estimates from unit level data of National Sample Survey (NSS). While the first source gives the stock of nursing manpower, based on their registration in Indian Nursing Council, this database does not provide information on household, personal and labour market characteristics of nurses. In fact, this database is just a directory giving the count of personnel, not decomposing labour market into labour force and not in labour force. On the other hand, the second database is more informative, outlining household, personal and labour market characteristics of nurses. The contrast between these two databases is quite striking. The first database reports that there are one million

[6] The logic of lower wage for nursing is challenged by Nelson & Nancy (2006), asserting the correlation between good pay and quality health care. Interestingly, this was to counter Heyes (2005), who unraveled the rational of low pay to nurses.

registered General Nursing & Midwife (GNM) personnel in India[7], not conveying how many of them are employed currently. But, the second database offers great scope for filtering relevant information for describing the current scenario.

We use NSS 61st Round unit level data, from government of India for 2004-05, for describing socio-economic aspects of employed nurses. We chose 61st round data mainly due to two reasons: first, this is the latest thick sample survey conducted by NSS, although more recent thin sample rounds such as 62nd and 64th are available. Second, this is latest round which provides data on social security. For extracting data from NSS unit records contained in compact disc (CD), we created separate SPSS spreadsheets for three levels –household, personal (mainly demographic and socio-economic), labour market (employment status and social security)-. Further, using identifiers such as First Stage Sampling Unit (FSU) serial number, Hamlet-group / Sub-Block Number, Household Serial Number, level Number and Item/Person Serial Number, we merged level specific spreadsheets, generating a master file.

After generating a multi level spreadsheet containing household, personal and labour market characteristics, we filtered the occupational category 'nurses' using National Classification of Occupation 1968 (NCO 68) code for nursing professionals –code 084-, excluding midwifes, auxiliary nurses and domestic nurses. Since our interest is in nurses who are employable in an international labour market, we further filtered data by choosing nurses who have attained at least three years of diploma after twelve years of schooling, comprising of two categories –diploma holders and university graduates-. Finally, we applied employment status as a filter, the status of being employed as a criterion for selecting nurses for the analysis, thus not considering unemployed and nurses who are not in labour force.

The data is organized into three levels –household, personal and labour market-. Table 1 (Appendix 1) gives five household characteristics of nurses: sector, religion, social category, type of household, and monthly per capita consumption expenditure. Table 2 (Appendix 1) contains five variables which are principal personal characteristics: sex, age, marital status, relation to head of household and educational attainment. Five labour market variables –economic activity, social security, enterprise by form of

[7] Ministry of Health, Government of India (2009), National Health Profile 2009

ownership and employee size, whether employment contract is written or not, and whether nurses get paid leave or not (Table 3, Appendix 1). After applying the aforesaid filtering process, we have estimated that there are 182042 employed nurses who have at least 3 years of diploma after twelve years of schooling. This estimate is based on a sample size of 152, covering all Indian States (Table 4, Appendix 1).

Quite apparently, close to three fourth of nurses are from urban households. While more than 70 percent of nurses are from Hindu households, one fifth is from Christian households. One sixth of them are scheduled caste and scheduled tribe (SC/ST) while close to one third belongs to other backward class. More than four fifth of urban households is engaged in waged work, largely in regular wage/salaried category. All the households, rural or urban, report higher intervals of monthly per capita consumption expenditure, conveying this section of population is above poverty line (Table 1, Appendix). Out of 100 nurses, 97 are women. Two third of nurses are youth, falling in the age group of 17-34. More than half of them are currently married. Two fifth are spouses of heads of the household. Three fourth of nurses are diploma holders while one forth are university graduates (Table 2, Appendix). Close to 90% of them are employed in health and social work sector. More than three fourth of them are eligible at least one form of social security such provident fund, pension, gratuity and maternity benefit, called formal work. Three fifth of them are employed by government, and one sixth are employed by the cooperative sector while rest are employed in ownership forms such as private corporate, partnership and proprietorship. Four fifth of them work in enterprises employing at least ten employees. More than three fourth of them have written job contract while more than four fifth of them are entitled to paid leave (Table 3, Appendix).

It is important to note that university degree in nursing is likely to generate more decent employment with diverse entitlements than diploma does. As shown in table 4 three fourth of graduates are entitled to social security provisions such as pension, gratuity, health care and maternity benefits while a half of diploma holders are entitled to the same (Table 4). Further, one fourth of diploma holders are engaged in informal work without any form of social security while proportion of informal work among graduates is just one tenth.

Table 4
Formal work and Educational Attainment

| | **Educational Attainment** | |
|---|---|---|
| | Diploma | Graduate and Above |
| eligible for only PF/ pension (i.e., GPF, CPF, PPF, pension, etc.) | 11.9% | 5.5% |
| eligible only health care & maternity benefits | 7.3% | |
| eligible only PF/ pension and gratuity | 0.4% | 0.0% |
| eligible only PF/ pension and health care & maternity benefits | 3.6% | |
| eligible only gratuity and health care & maternity benefits | 4.0% | 9.8% |
| **eligible PF/ pension, gratuity, health care & maternity benefits** | **48.3%** | **73.9%** |
| not eligible for any of above social security benefits | 24.5% | 10.7% |
| Total | 100.0% | 100.0% |
| | Diploma | Graduate and Above |
| informal work | 24.5% | 10.7% |
| formal work | 75.5% | 89.3% |
| Total | 100.0% | 100.0% |

Source: Computed from National Sample Survey 61st Round Unit Level Data (2004-05).

## 4. Qualitative Research

Although above description of data provides an overview of salient features of nursing employment in India, we need more insights about research questions we raised in this paper, in particular focal themes such as labour mobility, changes in S & T, and role of state. It is important to point out there are no secondary databases throwing cues about this. In fact, these themes are complex, requiring in-depth data grounded in insights from nurse. Certainly, this need not go along with conventional scientific objectives such as generalization based on a probabilistic sampling frame. On the other hand, we need insights from nurses who provide us rich cues to build perspectives which are grounded in experiences of them.

We conducted a field research on nurses in Kerala[8], India, one important source of migrating nurses. Our sample includes fifteen nurses: two nurses who retired from government service, one nurse who works in middle-east who is on leave from government service, one nurse who has been employed in government service since graduation, one male nurse who is self employed, one nurse who is employed in middle-east, seven nursing students who are doing internship, and three nursing educators. In the sample, there are fourteen female nurses and one male nurse. The age varies from 20 to 70. The sample consists of nurses who graduated in different decades – 1950s, 60s, 70s, 80s, 90s, and 2000s-. The fieldwork happened during May 2010; mainly theme based unstructured in-depth interviews. We set basic contours of enquiry, based on cues from the literature, covering themes such as motivating factors for acquiring human capital, entry to the labour market, working and living condition, internalization of changes in S&T, and labour mobility and state's role. This sample size is not a pre-determined one like probability sampling. We subjected choice of respondents for our interviews to the exploration of insights for building a theory. For us the relevance of sampling unit is sensitive to variety of insights emanating from the interview which is relevant for the theory building. This is quite akin to the theoretical sampling being used in qualitative research tradition such as grounded theory approach[9].

We found varying reasons, going by responses, for acquiring training in nursing. While older nurses pointed the role of influential family well wishers such as father's employer, priests or nuns[10] from the family and so on in influencing them to enroll in nursing school, considering that the training was provided free of cost by government with an assured government job. Interestingly, being students in government nursing schools they were entitled to monthly stipend. However, younger ones were motivated by the growth in job market for the nurses; their family invested on their education.

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[8] For instance, Margret (2010, p 200) comments "Kerala has been seen as one of the most important regions in India for the training of nurses."

[9] See Glaser & Strauss (1968) and Marshall (1996). Marshall (p. 523) says "Theoretical sampling necessitates building interpretative theories from the emerging data and selecting a new sample to examine and elaborate on this theory. It is the principal strategy for the grounded theoretical approach but will be used in some form in most qualitative investigations necessitating interpretation."

[10] It is important to note the Christians constitute a significant chunk of Kerala nurses.

We sensed this change during interviews, training in nursing being a public investment is becoming a private investment; this shift mainly emanates from expectations about migration to developed countries which may fetch better pay offs. Over generations, it appears that motivating factors for human capital acquisition in nursing have changed from family based social network induced to labour market based. Margret (2010), based on cues from the literature, describes change in social perceptions about nursing, from being a low status occupation to better one, during five decades after India's independence.

An important change, as viewed by a respondent who graduated in the 1960s, is that nursing education and work designs in hospital tend to be detached from social requirements. While old training gave tremendous weight on a virtue based approach to the care, emerging learning systems give less weight on this. Further, she said, narrating her experience, old systems were more structured, being coordinated by nurses who were from the Europe, were working with missionary zeal, and giving centrality to the patient care; they maintained professional composure in dealing with physicians, with clarity about the role. However, she found these model roles have not been pursued diligently by succeeding generations who joined government service after their graduation, partly due to less support from institutional structures in safe guarding the role nurse had before from any drastic alteration; rather job design became skewed towards non-nursing tasks, thus accentuating the deterioration of working condition of nurses. She said that collective bargaining processes for nurses were inarticulate in gaining deserving occupational status, ensuring quality working and living condition while unions of other occupations, such as school teachers unions, were relatively more successful in attaining their goals. On asking her view about internalization of S&T in health care, she said as an employer government has to create capacity for disseminating changes in S&T, echoing, perhaps, that government hospitals lag behind private ones in internalizing S&T. Interestingly, she sees a tradeoff between labour mobility of nurses and quality of public health care systems, calling for better living and working conditions in employment. While interviewing nurses who are in same generation, albeit not as expressive as her, shared some these views, in particular seeing the departure of health care from more care based to less care based, giving more weight on diagnosis.

However those nurses graduated in the 1970s and after doubted, in varying degrees, the trade-off between care and diagnosis. Except one, who found virtues really matter who is employed government service, others said change in job design, perhaps, is inevitable. However, they shared that living and working condition in private hospital is pathetic, making nursing an indecent work while government hospitals provide better wage, and living and working conditions. One of them, who graduated in 1970s, working in government service, but spent more than a decade in Middle East, said that working abroad provides tremendous learning to nurses, more importantly in inter personal skills[11]. While narrating her tenure abroad, she said among foreign labour markets Middle East is having least entry barriers. Further, she observed nurses in Philippines enjoy advantages over other owing to their soft-skills and branding. On comparing working and living condition in Middle East and Kerala, she prefers Middle East. We met another nurse who was working in Middle East, but unemployed now. She graduated in the 1990s. She shared more or less same views on working and living condition, human capital acquisition and motivation to choose the career. While the previous nurse who worked in Middle East was entitled to avail leave from the government to go abroad for work, the latter had no such choices, making her fortunes swinging.

Interestingly, nurses who are doing internship emphatically stated that it is inevitable to go abroad, with higher weight on labour mobility to developed countries, for enhancing their career choices, to make their knowledge more contemporary and thus more employable. On the issue of care-diagnosis divide, they viewed that with low nursing density personal care to every patient is taxing. They view that it is more important to internalize changes in S&T than giving undue weight to the care component. These views echo in perspectives shares by nursing educators who are the deans of nursing schools. We visited four nursing schools: one private and three public. While interviewing the dean of private institution, who is one of the top professionals in the field, with long work history in government service, she unequivocally expressed the need for a nursing education and career which is in sync with global labour market. She defended the role shift of nurses, saying that it is aligned with changes in the state art in the health care sector. She pinpointed that

[11] Family's Social network was the prime source of motivation for her to choose this career.

nurses need to be analytical, having strong reasoning skills. Her school gives higher weight to the analytical methods and new technologies in the nursing curriculum. Assessing the history of placement, most of their students tend to enter labour market in developed countries. Among other three educators, two were quite passive, not willing to engage in an informal and rich narration while one among them, educator of eminence, was receptive, willing to share her views. She is cynical of the boom in migration, anguish about its impact on Kerala's health care system. While narrating she said that nurse deserve more decision making capacity and rights, pin pointing that post-graduate or graduate nurses are quite competent in playing pivotal role in public health care systems, in particular in remote rural areas. Interpreting her, we see that it is relevant to argue that public health care systems, which are physician centric, may generate dynamic benefit if nurses are given more entitlements, like more rights and decision making autonomy. In this field research, an interview with a male nurse stands out, in terms of distinct issues. This nurse is a recent graduate in early twenties. He said that most of the hospitals rejected him fearing he would join a trade union. Now, he works with friend, being self employed, running a unit which gives home care to high net worth aged people. Their initiative works this way: The patient who undergoes a major surgery may prefer to stay at home with adequate medical care facilities. This team provides services for enabling medical care at home to above mentioned patient. For this, the team of nurses charges a fee, which cover their reservation price, wage differential and profit.

The content we discussed in this section is quite akin to reporting of what respondents have said. In the next section, we interpret basic themes and issues we found during our field exploration and identified from the literature reviewed in section 2. This process leads to building a theory.

## 5. Unraveling a theory

We present a theory, grounded in insights from the field, to show the linkage between S&T and human capital formation in nursing labour market. The context in this theory has multiple periods. The basic units of analysis in this theory include labour

market in health care, in particular a core occupation like nursing, health care organizations, regions, institutions and technologies.

We exclude nursing graduates or licensed nurses who are not willing to work for a pay, often categorized as not in labour force. Basically, labour market participation is a dichotomous event: either engaged in employment with regular pay and other entitlements or who are unemployed but willing to work. It may be note that what we consider as employment does not include casual paid work without implicit or explicit contractual frame. Moreover, we assume that an agent who is unemployed has to do a threshold level of search to remain in the labour market, implying that an unemployed who is devoid of any search for job belongs to the category of not in labour force. The agent in our theory should have at least threshold level of human capital; this threshold value is a function of institutional decisions. This means that an agent, who is willing to work as a paid nurse but without threshold human capital, is not considered in our analysis.

Two fundamental forces constitute the labour market of nurses: supply and demand. While supply of nurses emanates from training institutions which are complying with norms and rules of regulatory institutions, demand for them, as shown by micro-economic theory, comes from employers in the health care sector –private and government hospitals. These employers –varying in size, small or medium or large- combine resources and inputs for producing the health care. It is to be noted that these organizations can be classified into two: non-profit establishments and profit making ones. We assume that these organizations, albeit varying in profit motive, tend to minimize the cost of production. Interestingly, some of these organizations don two roles: both training provider as well as employer.

It is important to sate that health care production, output being a service, may have a set of processes giving more or less same output, implying high degree of flexibility in substituting resources and inputs. At the same time, same organization may have outputs as outcomes of process with low degree of flexibility, with least substitutability of inputs and resources. So production of health services in a hospital is more diverse than processes being arranged in large manufacturing or financial enterprises, where processes are fairly standardized, often existing as easily replicable routines. Perhaps, this feature of health care technology makes expansion of health care operations by a

hospital more arduous compared to expansion of manufacturing activities by a firm. Another important aspect which distinguishes a hospital from a manufacturing plant is that a large chunk of output directly flows from the source to the customer, forming a simple supply chain of direct paths while a manufacturing supply chain is relatively more complex, causing more lag between production and consumption. It is also important to note that while core processes in a standardized manufacturing are relatively irreversible, health care process can be either irreversible or reversible.

A distinct feature of health care production is that, in transforming resources and inputs to output, judgment has a pivotal role, with varying scope against the background of technological changes. In other words, the health care service is sensitive to each customer, requiring a combination of tacit knowledge of health professionals such as physicians and nurses, and expanding body of codified knowledge. Further, the aforesaid knowledge mix may vary with respect to the nature of health care systems. While there are systems which depend on a fixed stock of codified knowledge and non-socialized idiosyncratic tacit knowledge, the other extreme is represented by constantly expanding codified and tacit knowledge, often aided by innovation and socialization. Further, the change in knowledge mix in a health care organization, mainly emanating from technological change, tends to trigger off new linkages with the labour market, which is mainly manifest in the nature of human capital formation, in particular the magnitude of financing for that. For instance, if the technological change requires a knowledge mix skewed towards codified knowledge, existing in procedures, artifacts like electronic chips, journal articles and so on, then organizations try to augment the base of codified knowledge, which is likely to be a quasi-public good owing to property rights. In other words, change in knowledge mix of this type, mainly due to technological change -example, advancement in bio-medical engineering-, may alter the design of processes in health production, shifting from judgment-based flexible processes to diagnostic-based unique process with less substitutability between inputs and resources. However, this change is not a simplex tie between two events, but may emerge as multiplex path going through dependent events, directed connects carrying multiple forms of contents. More explicitly this means changes arising from new knowledge mix are manifest in its signal to outcomes such as formation of new culture, new institutions in human capital formation, labour

mobility and so on. Basically, this change may have its points of convergence or divergence, as is the case of any typical dynamical process.

The system which we described above acquires more complexity with multiple regions forming the continuum of labour market and health care production systems. It is important to note the edifice of classical trade theory lays tremendous emphasis on imbalances in advantages between regions. As shown by this received view, these imbalances motivate agents in these regions to engage in voluntary exchanges, thus ironing out imbalances, heralding the stability. However this view has mixed evidences, often not unequivocally established as a stylized fact. Interestingly, in the short run we see persistent imbalances like regions with acute shortage of resources supply resources to regions with relative abundance, which is contrary to the scholarly expectations about the convergence. Is this a paradox of mainstream logic or a series of events dependent on the path of dynamism? The first option is inclined to logical veracity while the second conforms to contours we have laid out.

In the aforesaid path of dynamism, human capital formation assumes significant centrality, especially in translating tremors of change in S & T –manifest in knowledge mix- to high magnitude changes in labour market, portraying a scenario of persistent divergences. We may amplify a basic question that if this instability is an outcome of the path of dependent events. A modest answer would be to say that our perspective is consistent with the inter-temporal dependency of events while admitting chances of interdependence of events at select kinks.

Given this, we posit that change in S&T generates a path of outcomes impacting the human capital formation. Contextualizing this argument in the case of nursing, technological change in the healthcare, following the product innovations in bio-medical sciences and engineering, necessitates organization to invest on new artifacts, viewing chances of zero-sum games between close competitors. Obviously, this investment decision tends to fall in the conundrum of saving organization from possible sunk costs on new technologies; specificity of technology may deepen this. Obviously, organizational managements who are conscious of this may try to generate higher returns enough to crowd out the sunk costs. For this they may not be rational enough to choose the unique best point which satisfies constraints, leading to

exploration of the heuristics which gives desirable outcomes by using cues from the available informational pool.

As shown by conventional wisdom, perhaps a prudent response, organizations strive to get higher returns on investment by expanding the output up to a sensible limit. However, in the context of health care, as mentioned previously, expansion may not turn out to be a dominant strategy. Presumably, another alternative is to redesign production processes in such ways that the new artifact is internalized in every bit of health care services. However, this is not a set of random events, rather appears like a series of dependent events. Belying this pattern, some outcomes may appear quite discrete. For example, changes in job designs in health care –for an example a nurse changing from care organizer to a portfolio of care and diagnostics, with more weight on the latter-. However, seemingly discrete outcomes like this are likely to subsume in the aforesaid dynamic system, with an underlying path of dependent events.

In fact, the change in S&T which seeps through product markets and firms' adaptation to that form a critical mass to impact rest of the economic system, not necessarily in a synchronized manner but, more aptly, in a patterned way which need not generate the stability; more importantly, this effect may generate visible forces in the labour markets. This cascading phenomenon is likely to be more explicit in demand for labour which emanates from employers' expectation about attributes of prospective employees that make them employable. Further, these expectations influence labour supply systems, in particular training institutions. Obviously, these changes will be internalized, going through temporal phases, by different constituents of labour supply system, covering the household, educational institutions, the state, regulatory systems, and exchanging labour market information –through channels such as social networks, relevant institutions and so on-, often reflected in human capital formation processes. It is more likely these changes will be explicit in the nature of human capital being formed in a labour supply system, with unequivocal signs conveying if the human capital becomes specific to the organizational needs.

Basically, human capital is of two types: general and specific. While the general human capital caters to multiple needs, specific human capital is useful to specific needs. For instance, a loco pilot who is employed by the railway company which is monopoly in product market and monopsony in labour market receives training in

engine driving, which is specific to the needs of this company, not improving pilots' employability in other sectors. On the other hand, in a sun-rise industry which is relatively competitive with less entry barriers may strategize the human capital mix, by weighing the specific and general human capital. In fact, as business environment becomes competitive, organizations may try to attain high productivity level by hiring multi-skilled and multi-tasking persons, exposing the limitations of a human capital formation which is skewed towards specific skills. However, in stable and less dynamic businesses, organizations are wary of risks in giving higher weight to the general human capital, fearing the turnover of employees due to their better employability. To mitigate such risks, arising out of employability of skills, these organizations may prefer significantly higher weights to specific human capital, with less employability to the workforce.

Decisions on allocating weights to general or specific human capital by persons who enter the labour force tend to be tremendously influenced by demand for labour, principally due to internalization of specific investment by organizations; causing structural changes in the labour supply systems. However, this behavior is seemingly not a plausible one, conforming to the fair choice within an informational frame, considering that specific human capital may constrain person's career choice. More likely, investment on job specific human capital with more emphasis on vocational requirements facilitates chances of getting job while this relationship between human capital and job is sensitive to the nature of commodity and labour markets. Supposing both these markets are competitive and open, with insignificant entry barriers for labour and capital, investing in job specific human capital may generate higher pay-offs since the impact of monopoly-monopsony combination, as in the case of protected railway market with a monopsony, is too insignificant compared to breadth and depth of labour market due to openness and competition in the market.

It is important to state that the openness in labour market, causing the exodus of workforce from one region to another region for more decent work, may have its roots in institutional decisions, rather than driven by the spontaneity of market forces. For example, if the institutions who coordinate health care in a region forecast that there will be shortage of workforce, causing significant human development deficit in future, may induce both the state and private organizations to strengthen its manpower base,

even lobbying for changes in legislation in favour of migrant workforce. In this case, sequel to the move by the institutions, market forces may adapt to this change if investments generate higher internal rates of return from specific assets.

The linkage between S&T and labour market in a closed regional context is likely to be less complex from this being positioned in an open multi regional context with significant degree of labour mobility. An open multi regional labour market acquires more complexity if non-market forces, primarily a set of institutions with a visible power structure –such as autonomous regulatory bodies, government, powerful guilds and so on-, exert permeating impact on the direction of changes in S&T, seeping through the commodity and labour markets. Further, the aforesaid institution-induced move may generate response functions in the market, in particular the labour market. Supposing, these institutions enjoy rights for which there are no feasible alternatives, agents in the market –for example health care organizations, training institutions in nursing, nursing work force, prospective entrants to the nursing labour market- internalize institutional norms and rules in their decision processes, often supported by the heuristics of sustained performance. This is to say in a multi regional model, we endogenise the institutional structure.

It is important to see the nature of labour mobility between two types of regions with their labour markets, unique institutional structures, different rates of S&T internalization, and differences in forms of organizations. On one end, we have regions with demographic-labour market features like ageing population, narrow gap between labour force participation rates of men and women, higher human development index, predominantly formal employment, universal social security, some degree of occupational mobility and so on, which conform to cannons of decent work. These regions are likely to have relatively more evolved institutional structures, perched in democratic set ups, with high degree of autonomy in directing the nature of S&T-labour market linkage, mainly by being pivotal in impacting S&T internalization rates by organizations. These structures cover regulatory bodies, guilds, universities and so on. Moreover, with a clear institutional intent and more adaptive organizational response, primarily due to reasons such as expected pay offs, and chances of being left to margin if no adaption happens, changes in S&T get internalized by health care organizations, with a back ward linkage to the labour market. Messages from the

institutional structures, affirming the necessity of internalizing changes in S&T, manifest in artifacts, tend to direct the linkage between institutional structure and labour market. Interestingly, the other extreme, there are regions with features like population having a significant proportion of youth, glaring gap between labour force participation of men and women, below or close to average human development index, majority of workers in informal sector without any social security, less degree of occupational mobility and so on. More likely, institutional structures in these regions are likely to be less evolved, often lacking adequate intent to come out with own designs and strategies, but look forward to benchmarks for emulation, often turning up as emulators of designs and strategies of institutions in the former set of regions, in particular in internalizing changes in S&T. This tendency of emulation, owing to less evolved institutional structures, pervades through backward linkages later, more amplified in demand for labour, which gets internalized by the labour force and prospective entrants to the labour market. In other words, we conjecture that institutional structures in the former set of regions tend to assume the leadership, not precisely due to strategic response functions in an oligopoly market but, perhaps, due to less evolved institutional structures in the latter set of regions.

The labour mobility between these two sets of regions, as postulated by us, is not neutral of history of ties between regions. These ties can be either exchange-based or structurally embedded relations. While the former is relatively arms-length, grounded in the principle of voluntary exchange, the latter is relatively more complex, with mixed cues like exploitative relationship between regions and formation of power blocks. It is important to note that the nature of ties, in particular its historicity, impacts the labour mobility. For instance, supposing region i was the colony of the region j for a long period, say two centuries, it is quite likely that even after colonial relations seize to exist institutional structures of i may carry imprints of the dominance by institutional structures of j, seeping through generations until the end of the life cycle of these dependent events. Taking cues from health care services in the context of colonial relations, first round of internalization of heath care knowledge of j by i is likely to have happened with initiatives from j, consisting of disseminators with great zeal, basic infrastructure, and dispelling the indigenous knowledge of i as irrelevant. The series of events in this round also includes formation of institutional structures, which are involved in training manpower for disseminating the knowledge

from j to i, for enabling basic regulatory functions, facilitating for internalization of changes in S&T and so on. These structures would generate a workforce who share high regard for systems related to j, covering institutional structures, knowledge dissemination etc. In the second phase, a few job seekers with training, from the region i migrate to j, often overcoming entry barriers in a foreign labour market, but gaining advantages of early migrants. It may happen that these persons, impressed about the agility of institutional structures and quality of working and living conditions, signal other prospective migrants about the pay offs to migrants, eventually evolving to a social network of critical mass with multiplex ties. In the next phase, entry barriers in migration get internalized in the institutional structure of the region of origin, explicit in training and so on. For example, training institutions may provide skills to clear language test and competency test for becoming eligible for entering the labour market in the region of destination. Interestingly, the exodus of skilled people from the region of origin to the destination, while this emerges as an outcome of social networks being internalized in individual decision making, may have implications for the society in the region of origin, in particular if the large proportion of population depends on public health care facilities, leading to serious health deficits in future.

## 6. Concluding Remarks

We assessed how changes in S&T seep through the labour market, generating a path of dependent event, which is embedded institutional structures, more manifest in human capital formation. Quite explicitly, this dynamics has imprints in labour mobility between regions. There are noticeable patterns confirming that health care workers, in particular nurses, migrate from regions with acute health deficit to better off regions, throwing up a set of imbalances. While there are explanations based on visible patterns, primarily push-pull factors such as wage, being assessed to unravel the labour mobility. Quite presumably, there is rich scope for building a structural explanation for this, emanating from S&T, capitalism, health care organizations, institutional structures and socially embedded labour markets. In this paper, viewing this cope, we have articulated a theory, needing more richness in construction. We view our approach as more heterodox, grounded in plural base.

We have explored emerging trends in nursing labour market, with contents and secondary data delineating substantive aspects which we expressed in the theory. Taking cue from scholarly works, and reports, we found relevant substance for argument that nursing migration is not just a push-pull process, rather more complex enmeshed in the political economy. Further, we narrated our filed research, based on in-depth interviews with nurses, who are dong their internship and nursing educators in Kerala, India. Our narration explored their perspectives about substantive issues like living and working condition, work design, and S&T internalization.

This is just a beginning, an attempt to generate a frame for enquiring complex link among S&T, Human Capital and Labour Mobility. In future, we intend to have a more meaningful research, with better made theories grounded in complexity and rich information.

## Appendix 1

### Table 1: Household Characteristics of Employed Nurses in India

| **Sector** | Percent |
|---|---|
| Rural | 27.5 |
| Urban | 72.5 |
| Total | 100.0 |
| **Religion** | Percent |
| Hinduism | 71.5 |
| Islam | 4.2 |
| Christianity | 20.3 |
| Sikhism | 3.9 |
| Buddhism | 0.0 |
| Others | 0.1 |
| Total | 100.0 |
| **Social Category** | Percent |
| Scheduled Tribe | 5.2 |
| Scheduled Caste | 10.3 |
| Other Backward class | 30.7 |
| Others | 53.8 |
| Total | 100.0 |
| **Type of Household (Rural)** | Percent |
| self-employed in non-agriculture | 15.7 |
| agricultural labour | 2.0 |
| other labour | 22.2 |
| self-employed in agriculture | 2.0 |
| Others | 58.1 |
| Total | 100.0 |
| **Type of Household (Urban)** | Percent |
| self-employed | 12.6 |
| regular wage/salary earning | 86.8 |
| Others | 0.6 |
| Total | 100.0 |
| **Monthly Per Capita Consumption Expenditure (MPCE): Rural** | Percent |
| 950 and above | 100.0 |
| **Monthly Per Capita Consumption Expenditure (MPCE): Urban** | Percent |
| 1120-1500 | 5.1 |
| 1500-1925 | 1.2 |
| 1925 and above | 93.8 |
| Total | 100.0 |

Note: Estimated N =182042, Sample N =152. Data presented in this table is computed as a percentage of estimated N.

Source: Computed from National Sample Survey 61st Round Unit Level Data (2004-05).

**Table 2:**

**Personal Characteristics of Employed Nurses in India**

| **Sex** | Percent |
|---|---|
| Male | 2.8 |
| Female | 97.2 |
| Total | 100.0 |
| **Age** | Percent |
| 17-34 | 65.5 |
| 35-59 | 34.5 |
| Total | 100.0 |
| **Marital Status** | Percent |
| never married | 35.3 |
| currently married | 56.3 |
| Widowed | 7.6 |
| divorced/separated | 0.7 |
| Total | 100.0 |
| **Relation to head of household** | Percent |
| Self | 23.3 |
| spouse of head | 41.3 |
| married child | 0.3 |
| spouse of married child | 8.4 |
| unmarried child | 23.8 |
| Others | 3.0 |
| Total | 100.0 |
| **Educational Attainment** | Percent |
| Diploma | 74.2 |
| Graduate and Above | 25.8 |
| Total | 100.0 |

Note: Estimated N =182042, Sample N =152. Data presented in this table is computed as a percentage of estimated N.

Source: Computed from National Sample Survey 61st Round Unit Level Data (2004-05).

## Table 3:

## Labour Market Characteristics of Employed Nurses in India

| **Economic Activity (NIC 98)** | Percent |
|---|---|
| Health and Social Work | 89.1 |
| Other Sector | 10.9 |
| Total | 100.00 |
| **Social Security** | Percent |
| eligible for at least one form of social security | 77.5 |
| not eligible for any of above social security benefits | 22.5 |
| Total | 100.0 |
| **Enterprise: Form of Ownership** | Percent |
| proprietary | 13.7 |
| partnership | 6.9 |
| Government/public sector | 60.2 |
| Public/Private limited company | 3.1 |
| Co-operative societies/trust/other non profit institutions | 16.0 |
| Total | 100.0 |
| **Enterprise: Employee Size** | Percent |
| less than 6 | 13.7 |
| 6 to 9 | 8.7 |
| 10 & above but less than 20 | 9.9 |
| 20 & above | 55.1 |
| not known | 12.7 |
| Total | 100.0 |
| **Written contract** | Percent |
| No written contract | 21.9 |
| Written contract | 78.1 |
| Total | 100.0 |
| **Paid Leave** | Percent |
| Yes | 84.8 |
| No | 15.2 |
| Total | 100.0 |

Note: Estimated N =182042, Sample N =152. Data presented in this table is computed as a percentage of estimated N.

Source: Computed from National Sample Survey 61st Round Unit Level Data (2004-05).

**Table 4:**

**State wise distribution of Employed Nurses in India**

| **State** | Percent |
|---|---|
| Jammu & Kashmir | 0.7 |
| Himachal Pradesh | 0.9 |
| Punjab | 4.9 |
| Uttaranchal | 2.4 |
| Haryana | 0.2 |
| Delhi | 6.2 |
| Rajasthan | 9.9 |
| Uttar Pradesh | 0.3 |
| Bihar | 0.2 |
| Sikkim | 0.1 |
| Nagaland | 0.3 |
| Manipur | 0.3 |
| Mizoram | 0.1 |
| Meghalaya | 1.2 |
| Assam | 0.4 |
| West Bengal | 9.8 |
| Jharkhand | 0.1 |
| Orissa | 0.1 |
| Chattisgarh | 1.4 |
| Madhya Pradesh | 3.1 |
| Gujarat | 2.8 |
| Maharashtra | 19.1 |
| Andhra Pradesh | 9.8 |
| Karanataka | 4.6 |
| Goa | 2.9 |
| Lakshdweep | 0.0 |
| Kerala | 12.7 |
| Tamil Nadu | 5.3 |
| Pondicherry | 0.1 |
| Andeman & Nicobar | 0.1 |
| Total | 100.0 |

Note: Estimated N =182042, Sample N =152. Data presented in this table is computed as a percentage of estimated N.

Source: Computed from National Sample Survey 61st Round Unit Level Data (2004-05).

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